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Key Performance Indicators' Effects on Public Sector Infrastructure Project Efficiency in Grenada

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Abstract

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MBA, Henley University of Readings U.K., 2004

AMABE, Association of Business Executives U.K., 1999

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Grenada is 1 of 15 developing countries in Caribbean Community known as CARICOM. The infrastructure capital projects in these developing countries are plagued with an array of issues: unethical practices, inadequate supervision, lack of transparency and accountability, inadequate monitoring and evaluation, cost overruns, and inefficiencies. In the 1980s and 1990s, the International Monitory Fund and World Bank introduced a balanced scorecard engineered under the structural adjustment program, but it was unable to improve infrastructure project efficiencies. This qualitative case study sought to understand the role of management key performance indicators (KPIs) on public sector infrastructure capital project efficiency on the island of Grenada. An institutional assessment and development framework and a classical management theoretical framework methodology were used to explore the effects of management KPIs on public sector infrastructure capital projects efficiencies in developing countries. The research incorporated a constructivist philosophy that underpins the evaluation and perception of the government, the National Water and Sewerage Authority (NAWASA), project teams, systems, and stakeholders. A purposive sampling strategy with elements of snowballing was used to obtain 12 representative participants for interviews, and a systematic approach of transcribing, coding, and thematic analysis was done. Findings indicate inadequacies in the BSC performance measure system on infrastructure projects, which justifies the use of comprehensive management KPIs. Positive social change implications of this study include recommendations for comprehensive management KPIs and policies to improve public sector infrastructure project efficiency in Grenada.

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Dedication

This study is dedicated to my amazing wife, Orchid George, whose commitment and support was my constant source of encouragement through this daunting process. It is also dedicated to my children, siblings, and my extended family, who facilitated personal visioning and reflection. Finally, to my deceased mother, Joslyn George, who was unable to witness my current success, but established the foundation and nurtured in me the attributes to persevere and achieve academic excellence.

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Chapter 1: Introduction to the Study

Background

The island of Grenada is also known as the *Isle of Spice* and is one of the small islands of the Caribbean community Caricom (Caribbean Community Secretariat, 2010). It is a tri-island state comprised of Grenada, Carriacou, and Petite Martinique, which is the most southern of the Windward Islands and marks the end of the Caribbean Sea and the Atlantic Ocean. The mainland of Grenada is northeast of the mainland of South America, only 100 miles from Venezuela (Steton University, 2010). According to Steton University (2010), Grenada obtained its independence from Great Britain in 1974, and in 1979, its government led by Prime Minister Eric Matthew Gairy was overthrown by the New Jewel Movement, a revolutionary regime led by Maurice Bishop and Bernard Coard. This government subsequently fragmented, resulting in the assassination of Prime Minister Maurice Bishop. This revolt was coordinated by Deputy Prime Minister, Bernard Coard and a radical fragment of the military (Steton University, 2010). As a result, the United States invaded in 1983, which reinstated democracy to the island, reflecting the system of government of the neighboring small developing countries (Steton University, 2010).

Following the invasion, a revised democratic framework was implemented that included government structures (the executive, legislative and judiciary branches), laws, policies, and administrative structures (Steton University, 2010). These were geared to create political and economic stability, infrastructure development, economic viability, and sustainability comparable to its neighboring islands (CARICOM- Caribbean

Community and Common Market, 2010; Quinn, 2015). Despite the introduction and implementation of policies formulated to achieve these economic objectives, when the International Monetary Fund (IMF) and the World Bank conducted evaluations in the 1980s and 1990s, the economy was failing, experiencing an economic recession along with the rest of the region (Elu, 2000; Green, 2009). As a mitigating strategy by the IMF and World Bank, a Structured Adjustment Program (SAP) was introduced in Grenada and throughout the English-speaking Caribbean. According to Green (2009), the fundamental objectives of SAP were to manage the balance of payments, reduce fiscal deficits, increase efficiency, and encourage private sector investment and export-oriented production. These objectives were only achievable with the introduction of the balance scorecard (BSC), which was the first official performance measurement system instituted to public sector institutions in developing English-speaking Caribbean countries (Elu, 2000).

Notwithstanding the BSC introduction, according to Schrouder (2010), several challenges and opportunities were confronting governmental procurement activity in the Caribbean. These challenges included restrictive department growth and development, ethical issues, integrity, fairness, public trust, effectiveness, efficiency issues, problems, and overall political challenges in the public sector. As a result, there were gross inefficiencies and functional difficulties in these small developing economies, creating the need for a more comprehensive formal intervention. One public sector reformation approach that was introduced to mitigate operational shortcomings was the capacity map (CM) by Kaiser and Streatfeild (2016). This approach tracks public funds or dollar flow

from extraction or collection through to disbursement, emphasizing the need to identify the leakages and wastages throughout the entire system from input to outcome. The approach sought to explore the reasons the leakages occur and the potential impact of this strategy and limitations. One of the principal shortcomings highlighted was the lack of management key performance indicators (KPI) to adequately monitor and measure performance to accurately track the collected dollar (Kaiser & Streatfield, 2016).

According to Fourie and Poggenpoel (2017), another recommended strategy to address public sector inefficiency is the root-cause approach, instead of the symptoms approach. This strategy identifies the factors that inhibit successful public sector reform, which is universally present in public sector institutions, resulting in slow to no economic development and capital growth in developing economies (Fourie & Poggenpoel, 2017). This emphasis is similar to placing focus only on the outcome instead of the input, process, and output. At these stages the controls, performance measures, and KPIs are required to mitigate inefficiencies (Fourie & Poggenpoel, 2017). Additionally, Mensah and George (2012) recommended the use of a summative evaluation strategy to explore the nature and effectiveness of performance management in the public sector. This strategy commenced with the usage of the strengths, weaknesses, opportunities and threats (SWOT) analysis of the public sector, which confirmed that the prevalent phenomena of developing economies are scarce resources, inadequate systems of supervision and measurement, and lack of transparency and accountability. Therefore credence is given to the development of appropriate corrective strategies to meet the industry standards and reduce inefficiencies (Mensah & George, 2012).

Armstrong (2012), Boxall and Macky (2009), and Cokins (2009) asserted that performance measurement is used as an evaluative instrument to appraise, budget, control, manage, acquire knowledge, train, inspire, motivate, and improve operating systems. Against this premise, there is the need to develop a system to measure performance adequately and efficiently to appraise every phase or milestone (Armstrong, 2012; Boxall & Macky, 2009; Cokins, 2009). This evaluative instrument must be comprehensive, encompassing the input, process, output, and outcomes and incorporating the established goals, and the needs of the stakeholders. Kang, Zhao, Li, and Horst (2016) contended that within KPIs there is a hierarchy: comprehensive, basic and supportive. This hierarchy serves as the fundamental premise critical for the development and implementation of KPIs systems. The comprehensive KPI structure incorporates the hierarchical structure of the organization including the executive, senior, and junior management and staff to ensure that each level has adequate basic and supportive performance measures and monitors.

Siddiquee (2014) argued that policies are significant for the success of any reformation project, adding that they are the governing factor for its cogent execution. Policy development involves a rigorous and dynamic process that synchronizes data, evidence, values, cost, ethics, and politics required of government agencies, organizations, politicians, policy makers, funding, international agencies, professionals, and citizenry. For example, in Malaysia, the government implemented a government transformation program, under the New Public Management approach. This initiative was titled ‘One Malaysia, People First, Performance Now.’ Under this program, the emphasis

was on the need to implement KPIs in seven priority areas in the institution with the objective to infuse private sector philosophy in the public sector (Hughes, 2012; Savoie, 2008) by measuring and improving government service deliverability. The program's success was the direct product of strong political support, a separate institutional vehicle, successful leadership, public participation, government agency, policies, and campaigning/marketing (Siddique, 2014). According to Andrés, Guasch, and Schwartz (2013), there should be a continuous performance measurement of public sectors after the implementation of a benchmarking initiative to improve efficiencies with limited funding. As a result, thorough benchmarking assessments of performance indicators are needed to achieve the desired objectives: elements output, coverage, labor productivity, inputs, outcome, processes, operating performance, service quality, and prices, with a clear distinction between rural and urban areas (Andrés et al., 2013). This advocates the need for comprehensive reform of the existing performance management system to improve productivity and efficiency.

Gelderman, Semeijn, and Vluggen (2017) advocated that sustainability is critical for effective public sector governance. However, public agencies are facing many challenges, including procedural, legal, and political constraints, which may be the product of conflicting goals between the internal and external stakeholders. Further, transparency through continuous monitoring provides the active connection with internal and external stakeholders to improve processes, ensure co-operation, encourage an extensive vendor base development, and improve efficiencies (Gelderman, Semeijn & Vluggen, 2017). Lawther and Martin (2014) presented an overview of the challenges

encountered in the implementation of a performance management system. One such hurdle is the need for perfect alignment between the KPIs chosen and public-private partnership (PPP) initiative to achieve the community and the project goals (Lawther & Martin, 2014). The goals established should not be easily attained, but challenging to mitigate premature payments for underproduction, instead to optimize performance. This system is accomplished by introducing a comprehensive measurement system, such as the KPIs, to reduce these challenges by fostering the perfect alignment between objectives, performance, and payments (Lawther & Martin, 2014).

Problem Statement

The public sector, which is the principal employer in developing countries such as Grenada is plagued with ethical, integrity, equity or fairness, public trust, effectiveness, and efficiency issues, manifesting in project inefficiencies and cost overruns (Schrouder, 2010). Mensah and George (2015) posited that the prevalent phenomena of developing economies are; scarce resources, inadequate systems of supervision and measurement, and a lack of transparency and accountability. Critical to the inefficiency phenomenon is the lack of established milestones or KPIs for awarding payments in PPPs (Lawther & Martin, 2014). Additionally, these economies lack adequate measures of input, process, output, and outcome resulting in inefficiencies (Kaiser & Streatfeild, 2016).

Although most public sectors in developing economies employ a system of performance measurement, they are all limited, and focus mainly on the outcome (Parmenter, 2017). Therefore, the areas of input, process, and output are not measured adequately, resulting in an undetermined level of inefficiency, cost overruns, and waste

(Kaiser & Streatfeild, 2016). These factors undergirded the development and implementation of a comprehensive KPI system for the public sector (Mensah & George, 2015). To resolve this issue, Parmenter (2017) explicated four measures for government, and non-profit organizations BSCs to monitor performance: performance indicators, result indicators, KPIs, and key result indicators. These KPIs emerge with direct relation to continuous improvement (Kaiser and Streatfeild, 2016), a product of ongoing measurement, monitoring, and control (Kang et al., 2015).

Siddiquee (2014) advocated that KPIs must be appropriately tailored and undergirded by mandate, mission, vision goals, policies, and stakeholder interest. This management strategy makes the BSC systemic and comprehensive (Mensah, & George, 2015). These principles grounded the recommendation of a comprehensive management KPI system (Siddiquee, 2014). Additionally, this aligned internal goals, process, control, and policy to service delivery or stakeholder needs with project needs to obtain public sector sustainability (Gelderman, Semeijn, and Vluggen, 2017).

Purpose

The purpose of this qualitative case study is to understand the role of management KPIs in public sector roads and buildings infrastructure capital projects efficiency on the island of Grenada. Kaiser and Streatfeild (2016) asserted that efforts to improve public sector efficiencies through initiatives such as the capacity map (theory of tracking funds from collection to disbursement) are unsuccessful because they lack adequate performance indicators, which create the research gap. Additionally, Fourie and

Poggenpoel (2017) emphasized the need to focus on the root-cause (input, process, and output) of public sector project inefficiencies symptoms, instead of the outcome.

The proposed qualitative study focuses on the use of management KPIs in public sector infrastructure capital projects perceived as being plagued with inefficiencies (Schrouder, 2010). The existing performance measure BSC employed by the public sector was modified to incorporate best practices of management KPIs from developed and developing countries to develop a protocol, matrix, structure, and policy for public sector infrastructure capital projects.

Significance

Extensive studies conducted on public sector reform and performance measurement revealed several inefficiencies in the public sectors of developing economies (Schrouder, 2010; Parmenter, 2017; Mensah, & George, 2015; Romeo, Liyanage, & Roumboutsos, 2015; Kaiser and Streatfeild, 2016; Shohet & Nobili, 2017). Kaiser and Streatfeild (2016) contended that the philosophy of capacity map theory (tracking funds from collection to disbursement) is relevant to achieve efficiencies, but there is a mandate for comprehensive performance measurement structures, appropriate policies, accountability systems, and ethical standards in public sector capital project processes (Schrouder, 2010; Gelderman, Semeijn and Vluggen, 2017; Romeo et al., 2015). In light of this, the focus must be on the root cause of the inefficiencies associated with the capital project, instead of the symptoms (Poggenpoel & Fourie, 2017).

Since the last global depression in 2008, root-cause analysis has become more prevalent (Chang, Stuckler, Yip and Gunnell, 2013). The depression resulted in economic

stagnation that forced the world to embrace the consequences of limited internal and external funding (Schrouder, 2010), thereby constricting development in developing countries like Grenada. This recession created a daunting challenge because financial scarcity forced these developing countries to become more efficient, competent, cost sensitive, and performance oriented (Fourie, & Poggenpoel, 2017; Mensah & George, 2012).

Mensah and George (2015) contended that the efficiency outcome was dependent on the introduction of a comprehensive performance measurement system that focused on the significant phases of infrastructure capital projects (initiation, planning, designing, construction, and post-construction evaluation). In this case, it was imperative to incorporate four critical steps for the implementation of an effective performance measurement system including input, processes, output, and outcome at each phase of the project to achieve efficiency (Armstrong 2012; Boxall, & Macky 2009; Cokins, 2009). The result of this study can lead to the development of management KPI protocols, policies, and matrixes that developing countries such as Grenada can use throughout infrastructure projects development and implementation. Doing so can transform the execution of roads, bridges, and buildings infrastructure capital projects by replicating and transferring the management KPI policy adopted in Grenada throughout the Caribbean.

Framework

This qualitative research used a case study methodology with Institutional Assessment and Development (IAD) based on the work of Ostrom (2005), and Schlager

and Cox (2017) and a classical management theoretical framework (Taylor, 2005). First, the system of performance measurement and project management monitored and analyzed input, processes, output, and outcome, transactional, supportive and executive level, stakeholder goals, associated policies, and regulations to ascertain the cause of inefficiencies and possible solutions. Second, the IAD methodology emphasized the need for social interaction, collaboration, and coordination to achieve appropriate institutional rules, culture, structure, and practices that improve policy and performance. The data collection methodology incorporated documentation reviews, and interviews via email, phone, WhatsApp, Skype, and face-to-face. Participants included senior and junior public servants, quasi public sector administrators, and key stakeholders on the island. The findings undergirded the development of state protocols, matrixes, policies, and strategies. The findings have potential to positively transform the management of public sector infrastructure capital projects.

Research Question

The following research question for this qualitative single-case study explored the effects of KPIs on public sector roads, utilities, and buildings infrastructure capital project efficiencies on the island of Grenada:

> RQ1: To what degree do management KPIs affect public sector roads, utilities and buildings infrastructure capital project efficiencies on the island of Grenada?

The following two additional sub questions further amplified the central research question:

RQ1a: What experiences determine public servants' and stakeholders' perceptions of existing KPIs and their effect on infrastructure capital project efficiencies in Grenada?

RQ1b: To what degree do public servants and stakeholders perceive public sector infrastructure capital projects as efficient?

Nature of the Study

The nature of this qualitative case study was to explore the experiences and evaluate the effects of a performance measurement system on public sector infrastructure capital projects on the island of Grenada. Schrouder (2010) contended that public sector's existing BSC measurement and monitoring tool was narrowly focused, revealing inefficiencies, lack of ethics and integrity, project delays, cost overruns, poor quality, overstaffing, and diminishing economic growth. The qualitative approach was used in this study to explore the consequences of the existing BSC system, despite its narrowness on financial indicator measures (Armstrong, 2012; Boxall & Macky, 2009; Cokins, 2009). This has resulted in a lack of formative monitoring and assessing of project phases including planning, designing, construction, and post-construction phases (Andrés et al., 2013). Therefore, thorough benchmarking assessments of the following performance indicators were recommended to achieve efficiency (Mensah & George, 2015): input and output elements, processes, labor, finance, productivity, operating performance, service quality, and prices (Armstrong, 2012; Boxall & Macky, 2009; Cokins, 2009). The goal is to re-engineer processes by reforming the existing system to make it comprehensive, productive, and efficient (Kaiser & Streatfeild, 2016).

Patton (1997) contended that the qualitative case study research method is the most effective in exploratory research. Creswell (2015) asserted that qualitative research is suitable when a conceptual framework exists and a theoretical gap creates the need to explore the phenomenon by entities or stakeholders that are structured or explicit. For this qualitative case study methodology, I used IAD, based on the work of Ostrom (2005), and Schlager and Cox (2017) and a classical management theoretical framework (Taylor, 2005). This framework created the exploratory platform to investigate the public sector performance measurement system in Grenada. The Capacity Mapping theory provided the premise for examining the movement of funds from the point of collection through to disbursement for projects. Additionally, the theory focused on monitoring cash flow at every aspect of a project, from design to implementation, to ensure efficiency (Kaiser, & Streatfeild, 2016).

As a result, the IAD methodology which can be a diagnostic instrument (Ostrom, 2005) focused on the roles of policies, ordinances, administrative rules, and interactions between internal and external stakeholders. This tool assessed the input, process, output, and outcome of the primary phases of the capital project necessary to determine possible effects on performance measurement. Taylor's (2005) classical management theory presents a methodology for evaluating contemporary, scientific management approaches in an organization to improve efficiency. The qualitative exploratory case study design was adapted to understand the existing performance system or BSC, and to lend to the creation of the premise to introduce comprehensive management KPIs for capital projects geared to improve efficiencies and cost savings (Mensah and George, 2012).

Data Sources and Types

The following types of data and their sources were used for this study:

- Case study review of the last decade, including reports form finances, infrastructure projects, management, and marketing, prepared by both internal executives and external institutions.
- Interviews with capital project team members from the Ministry of Finance, and Planning and Works Departments.
- Interviews with key stakeholders including senior and junior public servants from the department of communications and works, project engineers, project designers, managers, the general manager at the National Water and Sewerage Authority (NAWASA), hotel owners, hotel managers, and business owners to better understand the execution and impact of projects.

Possible Analytical Strategies

Data collected during this qualitative study was transcribed and thematically organized into categories and themes based on the research question. This process involved the assignment of adequate codes into Microsoft Excel to link columns and rows with a formula to create connectivity across worksheets. The analytical strategy of thematic analysis pinpointed and recorded critical patterns within the data. A visual display facilitated the comprehension of extensive data, and a depiction of abnormalities in findings was used to support and explain the phenomenon (Bazeley, 2007).

Assumptions

Developing countries such as Grenada suffer from project inefficiencies; these inefficiencies are present in developing countries in the form of unethical practices, low integrity, inequity or unfairness, public mistrust, ineffectiveness, and inefficiency, manifesting in project inefficiencies and cost overruns (Schrouder, 2010). Mensah and George (2012) posited that the prevalent phenomena of developing economies are; scarce resources, inadequate systems of supervision and measurement, and a lack of transparency and accountability. Critical to the inefficiency phenomenon is the lack of established milestones or KPIs for awarding payments in PPPs (Lawther & Martin, 2014). Additionally, these economies lack adequate measures of input, process, output, and outcome, resulting in inefficiencies (Kaiser & Streatfeild, 2016).

The BSC performance measure introduced under SAP was a narrowly focused strategy that resulted in inefficiencies (Elu, 2000). To resolve this issue, Parmenter (2017) explicated four measures for government and non-profit organizations' BSCs to monitor performance, performance indicators, result indicators, KPIs, and key result indicators. These measures are comprehensive and incorporate both financial and non-financial measures.

Management KPIs can improve project efficiencies, and Siddiquee (2014) advocated that KPIs must be appropriately tailored and undergirded by mandate, mission, vision goals, policies, and stakeholder interests. This management strategy infuses a private sector philosophy, making the BSC systemic and comprehensive (Mensah & George, 2015). These principles grounded the recommendation of a comprehensive

management KPI system (Siddiquee, 2014). Additionally, this aligned internal goals, processes, control, and policies to service delivery or stakeholder needs with project needs to obtain public sector sustainability (Gelderman et al., 2017). This occurred in Malaysia during the government's transformation program that resulted in the introduction of a reformed public sector strategy that incorporated a comprehensive KPI system.

In Malaysia, the government implemented the government transformation program, under the new public management approach. This initiative was titled "One Malaysia, People First, Performance Now." Under this program, the emphasis was on the need to implement KPIs in seven priority areas within the institution, with the objective of infusing a private sector philosophy in the public sector (Hughes, 2012; Savoie, 2008) by measuring and improving government service deliverability (Siddiquee, 2014).

Scope and Delimitations

In light of numerous efforts by the government to introduce structural adjustment programs to improve transparency and accountability, the government was unable to achieve its desired outcomes (Elu, 2000; Green, 2009). The program introduced the BSC measurement system, which focused on financial outcomes, instead of a comprehensive KPI system of measurement. This study focused on the current execution of public sector capital projects on the island of Grenada exploring the current system and examining the existing methods of measurement, and their impact on public sector capital project efficiencies, relevant policies, and the role played by public administrators, and key

stakeholders in the implementation of projects. Through the use of the IAD framework and classical management theory, the existing system was evaluated throughout the hierarchy including the strategic, supervisory, and transactional levels. Some possible influential tenets not included were the management KPIs adoption approach and limitations arising from using only two data sources: periodicals and interviews. This restricted the diversity and extent of the range of data collected.

Limitations

The limitations associated with the use of a qualitative case study were the narrowness of this research strategy, the dependability on the sensitivity and integrity of the interviewers, the use of qualitative interviews and documentation review as the data collection source, and the snowballing sampling strategy used (Creswell, 2013; Patton, 2015). Because the study only focused on public servants, administrators, and key stakeholders with the intent of exploring the phenomenon, other aspects, like the impact of psychology and sociology, culture, and colonization on the implementation and adherence to strategies, were ignored (Quinn, 2015). The dynamics of public organizations are unique (Andrés et al., 2013), which creates personal influences that can prohibit independence and the need to share the truth impartially both by the interviewer and the interviewee. This can lead to questioning the dependability and integrity of the interviewers, interviewees, and the research findings. The data collection source of documentation review and interviews may be limited, but in the context of Grenada, where there are limited documentation, the objective is transferability of results based on island similarities, not generalizability as prescribed by the criteria of qualitative research

(Creswell, 2013; Patton, 2015). The snowballing strategy of sampling has limitations as well. First, the initial participants were selected based on recommendations from the administrators, which itself can be discriminatory. The initial participants recommended the other interviewees who participated, thereby fostering new biases and limitations.

After several years as a professional in public, private, and quasi public sectors on the island of Grenada, I have experienced and observed several inefficiencies in capital projects. Additionally, I am cognizant of the economic challenges and resource limitations this developing country faces. The research questions led to interview questions that explore the cause of inefficiencies, the nature of the existing performance management system, the reasons for incompetence, the areas of inefficiencies in different phases of capital projects, the different tenets involved in the process (input, process, output and output), and the performance measures hierarchy. Any preconceived research notions relating to the research strategies and anticipated challenges during the research because of the nature and uniqueness of public policy development on the island and the implementation method were noted. This was communicated properly and assessed in light of the literature review, with the intent to obtain triangulation of data. This resulted in an extensive process of validation and verification to ensure that the strategies and approaches employed captured relevant information with integrity and reliability, eliminated bias, and fostered trustworthiness (Creswell, 2013).

Implications for Social Change

This study involves the exploration of the role of management KPIs in public sector infrastructure capital project efficiencies in developing countries such as Grenada,

and assessment of the policies, rules, structure, and procedures designed to support the existing performance measurement systems. This research evaluated the existing performance measurement system use in the island's public sector infrastructure capital projects and focused on the development of a comprehensive management KPI matrix and protocol to enhance project efficiency. Based on the research, all social factors would be affected at different degrees, revolutionizing modern public sector projects in line with generally accepted business policies, and project management. Particular emphasis was placed on assessing current policies, rules, and procedures designed to support the existing BSC measurement system to understand the contextual challenges with it, the supportive policies of system and implementations on developing countries, such as those in the English speaking Caribbean. This was done with the objective of reforming performance measurements and improving efficiency, productivity, accountability, transparency, and cost savings (Schrouder, 2010).

Andrés et al. (2013) contended that the effectiveness of a performance measurement system influences the organization, professional community, society, and individuals. All local environments are affected by the political system, governmental structure and systems, economic development, ethics, culture, caliber of the human capital, accessibility of resources, and the quality of the legal system. Most developing countries possess similar domestic and economic structures to Grenada, and the findings likely can be representative of all developing countries, confirming transferability.

In this study, the organizations were the public sector and the quasi public sector, professionals were the administrators who develop and manage the systems, and the

community and society were the population and stakeholders who benefit from capital project efficiency. The individuals were subordinates in the sector interviewed. These factors influence the social environment, making a change that incorporates fundamental principles of systems thinking, collaboration, coordination, engagement, and advocacy (Bryson, 2016). These factors manifest in the KPI system, the IAD framework, and through continuous improvement. These change factors will transform or reform the performance measurement systems of ongoing capital projects on the island of Grenada. As a result, this will lead to positive change for the organization, the stakeholders, the community, and society, derived from cost savings and ultimately a more efficient public sector.

Chapter Summary

In this chapter, I provided an introduction to the study, which explored the effect of KPIs on public sector infrastructure project efficiencies in Grenada. This study sought to obtain a comprehensive understanding or illumination of the role of management KPIs in infrastructure project efficiencies. To determine these roles I used IAD and the classical management theoretical framework; these were incorporated through the constructivist philosophy that undergirds qualitative case study.

To collect data relevant to the study, I used a purposeful snowballing sampling strategy. Upon selecting individuals, I conducted open-ended interviews with 12 participants either directly or indirectly involved or affected by public sector infrastructure projects. Subsequently, I reviewed relevant periodicals and other public documents containing information on the existing performance measures system and

policies used by the government and the role of this system on the infrastructure projects. Additionally, I integrated scholarly materials obtained in the English speaking Caribbean, and around the world on the role of management KPIs on developing countries infrastructure capital project efficiencies. Although the emphasis was placed on the island of Grenada, limited scholarly documentation exists on the tri-island of Grenada.

I analyzed the rationale that undergirds the inefficiencies in developing countries' public sector infrastructure capital projects with the intent to examine the challenges these countries encounter under their current operations and performance measures. United National international agencies, IMF and World Bank, introduced the structural adjustment program to English-speaking Caribbean countries in the 1980s and 1990s after the global depression (Elu, 2000; Green, 2009). The island of Grenada, like many other countries was unable to achieve the objectives of the structural adjustment program, despite the introduction of a BSC system of performance measurement. Although there are limited scholarly materials on Grenada, I obtained articles from the region and globally that justified the level of inefficiencies that exist in developing countries like those in the English-speaking Caribbean, resulting from inappropriate performance measures (Schrouder, 2010). Scholars, such as Andrés (2013), Kaiser and Streatfeild (2010), Parmenter (2016), and Siddiquee (2014) have recommended the need for comprehensive management KPIs in public sector institutions and the implementation of infrastructure capital projects.

In Chapter 2, I present a comprehensive review of the literature to explore, justify, and rationalize the effects of management KPIs on infrastructure projects in developing

countries such as Grenada. The chapter commences with an introduction, followed by a comprehensive discussion of the theoretical frameworks. After that, I present a thorough literature review providing detailed illumination and understanding of the phenomenon, with mitigating strategies, policies, and possible literature gaps.

Chapter 2: Literature Review

Introduction

The developing countries of the English-speaking Caribbean suffer from inefficiencies that are the product of lack of ethical practices, integrity, fairness, public trust, effectiveness, adequate costs, and management (Schrouder, 2017). McKoy (2017) stated that bribery and public misconduct are prevalent. Menesh and George (2012) posited that developing economies can be characterized as having an inadequate system of supervision, measurement, transparency, and accountability. Fourie and Poggenpoel (2017) argued that the factors that inhibit successful public sector reform, government success, economic development, and efficiency are overemphasized on the symptoms instead of the root cause or outcome, resulting in reduced productivity, efficiency, and ineffectiveness of public sector operations and infrastructure capital projects in developing economies.

One of the theories established to mitigate the inefficiencies in the public sector is capacity mapping (CM) (Kaiser & Streatfeild, 2016). Capacity map theory tracks money from collection to utilization. This process's objective is to reduce leakages and wastages during operation, including during input, process, output, and outcome. However, this theory lacks crucial comprehensive KPIs geared to reduce failure. Fourie and Poggenpoel (2017) supported the need for KPIs at the input, process, output, and outcome to monitor and measure performance adequately. Additionally, Takim and Akintoye (2002) emphasized the need for KPIs in the construction industry because the pace of economic growth is hinged on the development of physical infrastructure (Buildings, Bridges, and

roads). Parmenter (2017) posited the need for result indicators and performance indicators as the prolific system of performance measures in government and non-profit organizations. Performance measures should be coupled with policies, rules, structure, procedures, government vision, stakeholders support, and leadership (Siddiquee, 2014). Pilkaite and Chmieliauskas (2015) contended that stakeholders, the public sector, and public institutions are pressured for exceptional performance, transparency, accountability, and prudent investments that optimize the use of taxpayer funds and service deliverability.

Villalba-Romero, Liyanage, and Roumboutsos (2015) argued that financial constraints had plagued PPP infrastructure projects in the aftermath of the financial crisis of 2008/2009. These constraints forced developed countries such as Spain, Greece, Portugal, and the United Kingdom, to institute an adequate system for road infrastructure project sustainability, thereby establishing protocols that included actors, comprehensive performance indicators, and measures for monitoring performance. This answers the *what* (nature, objective, quality, and purpose), *when* (duration, cost, and timeline), and *where* (location, outcome, benefactors) of the project (Villalba-Romero et al., 2015). These resulted in overall sustainability, which was summarized as the pillars of construction, namely the environment, economy, and society. These pillars were categorized as the *P elements* people, planet, and profit and the *E elements* environment, economics, and equity (Villalba-Romero et al., 2015). According to Atkinson et al. (2009), Du Plessis (2005), and Kiewiet and Vos (2007), project sustainability is only feasible when there is holistic thinking of the complex interrelationship between the pillar Ps and the pillar Es.

The concept of management KPIs in achieving public sector infrastructure capital project efficiency in developing countries such as Grenada was the focus of this literature review. The review incorporated an assessment of management KPIs and provided the premise for active inclusion in the existing BSC systems employed by English-speaking Caribbean countries (Elu, 2000; Green, 2009). This reformation will include the transformation of the performance measures criteria, administrative rules, and public policies, structure, and procedures necessary to develop an effective KPI system (Parmenter, 2016). Eik-Andresen, Johansen, Landmark, and Sørensen (2015) contended that construction project delays and inefficiencies are mainly associated with external factors instead of internal factors. Such factors include construction environment, construction methods, geographical condition, stakeholders, government policy, economic situation, organizational cultures, management style, and resource availability.

Preliminary research revealed that limited review has been conducted on the effectiveness of the BSC adapted by some of the smaller developing states of the English-speaking Caribbean in the 1990s under the structural adjustment program (Elu, 2000; Green, 2009). Because there is limited recent scholarly material from the English-speaking Caribbean, a snowballing approach was used to compare, analyze, and apply the information obtained from scholarly research conducted on developing countries, including Malaysia, Ghana, Tanzania, Uganda, Senegal, Mozambique, Nigeria, Cuba, Indonesia, Taiwan, Zimbabwe, and Cambodia, and developed countries, including Lithuania, Denmark, the United Kingdom, and Saudi Arabia (Anderson & Holcombe, 2006; Andrés, et al., 2017; Buabeng-Andoh, 2015; Cheng, 2014; Durdyev, Maksat,

Ismail & Lim, 2017; Elu, 2000; Kaming , Olomolaiye , Holt & Harris, 2010; Kjæra & Therkildse, 2013; Quinn, 2015), I search the following database to obtain scholarly periodicals for this review: Walden University's library, Academic Search Complete, Google Scholar, ProQuest Central, World Bank, the government of Grenada, and OECS. The search involved specific phrases, and keywords such as *reformation, management key performance indicators (KPIs), performance measurement, developing countries, capital projects, infrastructure capital projects, institutional assessment and development, public sector, balanced scorecard, capital project process, project initiative, project planning, project design, project implementation, project evaluation,* and *public policy*. Thereafter, I developed a database in Excel, using thematic coding to track the materials sourced, the content, and the literature reviewed, to facilitate this structured and organized discussions.

Management Key performance indicators, IAD, and Classical Theory

Management KPIs are primarily referred to as the financial and nonfinancial goals or performance measures use along control points on the critical path of a project. These KPIs are established to monitor performance and determine the achievement of strategic objectives or milestones (Eik-Andresen et al., 2017; Velimirović, Velimirović, & Stanković, (2011); Villalba-Romero et al., 2015). The critical framework relevant for management KPIs to occur involves understanding, defining, standardizing, and organizing an institution's processes and establishing policies for infrastructure capital project implementation (Chan, 2003; Hornstein 2014; Nurcahyo, Wibowo, Putra, 2015; Kuhfahl, Sehlke, Sones, & Howard, 2018; Peters, Raab, Grêaux, Stronks & Harting,

2017; Velimirović, et al., 2011; Villalba-Romero et al., 2015). Over the last decade, there has been a growing trend to adopt a performance measurement system that narrowly focuses on financial and accounting results (Schrouder, 2010). Little or no emphasis has been given to nonfinancial performance measures, like those of the BSC introduced under the structural adjustment program adopted by English-speaking Caribbean countries such as Grenada (Elu, 2000; Green, 2009). In developed countries, such as Greece, Spain, Portugal, and the United Kingdom, infrastructure projects became inefficient and unsustainable in the aftermath of the financial crisis of 2008/2009, forcing these countries to re-engineer processes, procedures, and policies through the establishment of a comprehensive KPI and performance monitoring system (Eik-Andresen et al., 2017; Velimirović, et al., 2011; Villalba-Romero, et al., 2015).

The management KPIs proposed to reform the existing public sector systems include both financial and nonfinancial performance measures, including strategic management principles (Kaplan & Norton, 2001; Kang et al., 2016; Mensah & George 2012; Parmenter, 2017; Villalba-Romero et al., 2015). This management KPI system includes the incorporation of two contemporary approaches: the BSC for strategic management and the quality management system technical standardization (Velimirovic, 2011). Pamenter (2017), and Schrouder (2010) recommended these approaches to achieve transparency, accountability, and efficiency.

According to Elu (2000), and Green (2009), the acceptance of the BSC performance measure was attributed to the anticipated enhancement of public sector performance under the structural adjustment program of the 1990s, and the IAD

philosophy acceptance of the 1980s and 1990s (Ostrom, 2011; Schlager & Cox, 2017). The structure and function of the BSC are differentiated and influenced by countries' laws, rules, and politics. These variations are the product of leadership style, resource availability, knowledge, functionality, supervisor capability, financial benefits, ethical philosophy, economic and social philosophy, politics, and the philosophy and worldviews of administrators (Bryson, 2016; Eik-Andresen et al., 2015). However, the similarities that exist in the BSC are the anticipatory vision of improving efficiencies, and reforming the public sector (Lawther & Martin, 2014; Parmenter, 2017; Schrouder, 2010).

Management KPIs will re-engineer the BSC to ensure comprehensive performance monitoring, which encapsulates performance evaluation, post-construction evaluation, selection review, cost-benefit analysis, design selection, materials planning that embraces quantification and quality, ordering and logistics, and scheduling within government and quasi-governmental organizations (Kaiser & Streatfeild, 2016; Lawther & Martin, 2014; Parmenter, 2017). Eik-Andresen et al. (2014) added that emphasis needs to be placed on the internal environmental factors, namely, organizational culture and structure, management style, government policies, human resource capacities, and resource availability that interface with the external environment to achieve cohesion. Gelderman et al. (2017) advocated the need for transparency through continuous monitoring and reporting to internal and external stakeholders. Further, Andrés et al. (2013), Lawther and Martin (2014), and Parmenter (2017) recommended comprehensive benchmarking of the following tenets: output, coverage, labor productivity, inputs, outcome, processes, operating performance, service quality, and prices. Additionally,

there is the need for perfect alignment between the KPIs chosen and the PPP initiatives to achieve community and project goals. This should ensure that the goals are profoundly challenging to eliminate premature payments (Lawther & Martin, 2014; Villalba-Romero et al., 2015).

Despite the limitations and narrow focus of the BSC, it was incorporated in governments as an instrument that could transform the public sector (Schrouder, 2010). According to (Ostrom (2011), and Schlager and Cox (2017), in the 1990s the IAD framework became increasingly popular. This theoretical framework used seven components: (a) an action situation, (b) actors, (c) current rules, (d) community attributes, (e) physical and material attributes, (f) outcomes, and (g) evaluative criteria. These components were used to assess the roles of policies, ordinances, administrative rules and interaction between internal and external stakeholders, public sector infrastructure capital projects efficiencies to provide insights to improve strategies for public service delivery. There has been increased use of BSC and improvement of public sector performance across developed and developing countries as capital projects are executed (Kang et al., 2015; Mensah & George, 2015). However, identified shortcomings or project failures have resulted from system inadequacies manifested in a lack of ethics, inefficiencies, quality, and cost overruns (Kaiser & Streatfeild, 2016; Schrouder, 2010).

Eik-Andresen et al. (2015) asserted that prevalent in infrastructure projects are underestimation, uncertainty, and planning inaccuracies that create biases toward the project. This formed the undergirding principles for adopting the classical management theoretical framework (Taylor, 2005; Eik-Andresen et al., 2015). These frameworks led

to the development of a comprehensive management KPI system that encompasses both financial and non-financial measures (Schrouder, 2010). The management KPIs were all-encompassing and incorporated throughout the project phases, the public sector hierarchy, and critical success factors. According to Eik-Andresen et al. (2015), this measurement technique addresses resource allocation, stakeholder interest, government policies, management style, procurement, supervision, construction method, and construction environment and geography. Additionally, the anticipated evidential motives supporting the management KPIs are improving accountability, trust, credibility, transparency, cost savings, and efficiency in public sector operations (Eik-Andresen et al., 2015; Kaiser & Streatfeild, 2016; Parmenter, 2017).

Conversely, there are anticipated constraints derived from government and stakeholder interference along political biases or preferences (Gelderman et al., 2017). These were coupled with resource allocation, management style, supervision, construction method, and construction environment and geography (Eik-Andresen et al., 2015; Kaming et al., 2010). Derakhshanalavije and Cardosa (2017) further argued that cost overrun is the product of inaccurate cost estimations, improper planning, frequent design changes, inadequate labor/skill availability, mismanagement, and inflationary cost of machinery, labor, raw material, and transportation. Durdyev et al. (2017) added that project and cost management, project finance, and project risk factors are also critical contributors to project cost overruns. Although quality, cost, and time are the essential components of infrastructure projects, cost overruns are the primary factor of inefficiency (Durdyev et al., 2013; Rahman, Memon & Abd-Karim, 2013). Additional factors that can

cause cost overruns include poor and delayed design, unrealistic contract estimates, understated requirements, inadequate experience, untimely delivery of materials and equipment, and poor relationships and communication between and among management.

According to Kaplan and Norton (2003), the BSC, which is part of the scientific management philosophy, was initially introduced to measure performance. This performance measurement technique was accepted by governments globally, and was incorporated throughout the management hierarchy, creating linkages between the present and future state of the external environment. However, with management KPIs, the public sector was revolutionized, incorporating elements of the BSC with essential nonfinancial measures. This system resulted in the re-engineering of processes, procedures, and policies that created matrixes and protocols to ensure accurate financial and nonfinancial performance measures (Mensa & George, 2015). This created the need for extensive training of public servants and project personnel, establishing a need for a complete understanding of the KPIs, project consultants' responsibilities, stakeholder and project outcomes, and appointment of qualified staff (Eik-Andresen et al., 2015).

This KPI system was incorporated throughout infrastructure capital project phases, forming the basis for department goals, job and position descriptions, and establishing performance measure indicators at every control point of the project (Kang et al., 2016; Siddiquee, 2014; Armstrong, 2012; Boxall & Macky, 2009; Cokins, 2009). For example, decision and quality check, which involve extensive documentation, project risks analysis, and contingency planning, should be completed at the project initiation and planning phases, and at closure (Derakhshanalavijeh & Cardosa, 2017). Andrés et al.

(2013), and Siddiquee (2014) posited that performance measures should be administrated by civil servants who are part of the project team and whose job functions are supported by policies, procedures, administrative rules, ordinances, and structure, with the objective of effective performance and resource utilization.

An unforeseen component of project efficiency is the need to foster effective communication and relationships between the project owner who focuses on project outcome and management that focuses on project objectives. This reduces disparity, project risk, uncertainty, and misinterpretation, creating the premise for the development of mitigating strategies (Eik-Andresen et al., 2015). In keeping with the IAD model and the classical management theory, management KPIs incorporate the structural hierarchy, including the executive or strategic, supervisory or functional, and supportive or operational levels, policies, processes, procedures, and overall systems (Kang et al., 2016). It included scientific management which focused on analyzing workflows (Eik-Andresen et al., 2015; Taylor, 2011). Project evaluation and review technique (Raborn, 1957) and critical path method (DuPont, 1957/59) are well-known instruments for project time planning (Morris 1987). They incorporate the input, process, output, and outcomes of every project phase (Eik-Andresen et al., 2015), creating a comprehensive performance oriented system that is factored into the entire project phase: initiation, planning, design, approval, financing, construction, post-construction, and maintenance. Scientific management should incorporate financial measures, nonfinancial measures, and stakeholders' interest (Eik-Andresen et al., 2015; Taylor, 2011). Sandru, Olaru, Pirnea, and Weber (2014) recommended that the KPI system should include cost

performance indicators, schedule performance indicators, earned value indicators or quality, resources, and financial indicators.

It is prudent for the KPI system to be immune from political interference only achieved when managed by trained professionals who fully understand their fiduciary responsibility, private sector philosophy, and manage KPIs. Since, this system focused on time, quality, and cost performance measures to accomplish transparency, accountability, effectiveness, and efficiency (Eik-Andresen et al., 2015). It is imperative that the KPIs are holistic (Sandru et al., 2014). Identifying and understanding the veracity of uncertainty associated with estimation, resources availability, objectives and requirements, priorities, and fundamental relationship between parties or stakeholders that are necessary for optimum project performance (Eik-Andresen et al., 2015; Sandru et al., 2014). Once the uncertainties or risks are mitigated, and the performance measures established, there are anticipatory benefits that support the interest for management KPIs as a useful instrument to improve infrastructure capital projects. Mensah & George (2015); Parmenter (2017) posited that cost reduction, timely execution, cost and time control, performance measurement and monitoring, effective project delivery, and efficiency are the manifestation of management KPIs. Additionally, management KPIs reduce the uncertainty of outcome experienced with infrastructure projects' ability to achieve project objectives (Eik-Andresen et al., 2015). Further, management KPIs satisfy the needs of the general public and key stakeholders (Parmenter, 2017). Kuhfahl et al. (2018) therefore recommended the classical management theory, as the scientific approach to performance management, since it involves defining measurable objectives

that are holistic, and encompasses the entire hierarchical structure of the institution and the profound management KPIs.

Similarly, the IAD framework provides the platform to explore the way institutional arrangements and policies were utilized to understand a shared phenomenon and its logical design (Hussain et al., 2016; Ostrom, 2005). Ostrom (2005) added that the framework consists of seven conceptual components: an action situation, actors, existing rules, community attributes, physical and material attributes, outcomes criteria and evaluative criteria. Against this platform, the IAD framework was used to assess infrastructure capital projects inefficiencies, its logic, design, and institutional performance. Additionally, the public sector structure, operations, performance measurement system, government policy, administrative rules, capacity, stakeholders' engagement, and interaction, communication, construction methods, cultures, management style operations, and procedures should be analyzed with the intent to identify gaps (Eik-Andresen et al., 2015; Villalba-Romero et al., 2015; Schlager & Cox, 2017). These gaps are bridged by a comprehensive management KPI system geared to improve efficiency. According to Eik-Andresen et al. (2015), and Sandru et al. (2014), the KPIs incorporate critical measures of quality, cost, and time which are embedded in the critical success factors and critical path. This enables development of the cost performance indicators, schedule performance indicators, and value earned performance indicators. Gelderman et al. (2017) argued that these factors are important for the formulation of policies relating to projects KPIs for inclusion at initiation, planning,

design, construction, backfilling, post construction review, and maintenance at the different control points.

Against this, it is imperative that these project professionals coin these KPIs initiatives, and sell them to elected officials for ratification and approval. Thereafter, it should be executed by the public servants based on receipt of expert knowledge on analytics, KPI measures, project execution and evaluation (Villalba-Romero e al., 2015). In light of this, the civil servants will manage and supervise the established KPIs within infrastructure capital projects control points to ensure adequate KPI fit, policies, regulations, rules, supervision, and deliverables (Andrés et al., 2013; Siddiquee, 2014). These KPIs should be incorporated in the rules and regulations of the government and executing department, forming part of the institutional hierarchy and incorporated in the job and position description (Kang et al., 2016).

Further, the KPIs will be the infrastructure capital projects essentials, forming part of the performance measure at every phase of the infrastructure projects (initiation, planning, design, construction, and post-construction evaluation) and throughout the institution hierarchy (Eik-Andresen et al., 2015; Parmenter, 2017). These project phases incorporate cross-sectional elements of input, process, output, and outcome upon which KPIs are established as the instrument to identify and measure performance throughout the project on an iterative basis (Mensah and George, 2015; Simister, 2004). Armstrong (2012), Boxall & Macky (2009), Cokins (2009), and Eik-Andresen et al. (2015) recommended that in order to effectively measure performance there is the need to create open dialog, communication, relationship and monthly reports sharing between the

project engineer, manager, supervisors, key stakeholder, project partners, and government officials.

Infrastructure capital projects KPIs and public sector reform

KPIs are often viewed within the context of private sector organizations and business operations (Lawther & Martin, 2014). Villalba-Romero et al. (2015) argued that within the context of the infrastructure project it is imperative to differentiate between performance measures and performance indicators. Though they are used interchangeably, they are different, and should be applied in their correct frame when designing KPI systems. The performance measures are defined as several measurable values that explain the quantification of indicators such as capacity, process, and outcomes relevant to the assessment of the performance indicators (Villalba-Romero et al., 2015). On the other hand, KPIs refer to performance measures established as flags to alert users, actors, and project management of the project progress to enable opportunities for improvement (Villalba-Romero et al., 2015).

The KPI system implies the institution of performance measures at all critical control points of the infrastructure project as practiced in private sector operations (Armstrong, 2012; Boxall & Macky, 2009; Mensah & George, 2015; & Eik-Andresen et al., 2015). Villalba-Romero et al. (2015) reinforced that the management KPIs must incorporate 35 measures which encompass six critical pillars, namely; the categorized Ps which are people, planet, and profit and the categorized Es referring to environmental, economic, and equity. These KPIs need to be fully integrated and require the institution of policies and administrative rules, plus, protocols for monitoring, measuring,

controlling, and evaluating performance that will reform the public sector infrastructure capital projects processes (Villalba-Romero et al., 2015). Siddiquee (2014) argued that management KPIs system applicability stems from revolutionizing the infrastructure capital project systems for roads and building construction. This philosophy should be enshrined throughout the government department and public sector to reform and reorient performance measure that will enable efficiency improvement.

According to Nurcahyo, Wibowo, and Putra (2015), the philosophy of KPIs gain popularity in management in the 1990s, with the need for organizations to become more efficient and competitive. As a result, organizations expanded the BSC which was financially oriented to an all-compassing approach inclusive of both financial and nonfinancial measures (Kaiser & Streatfeild, 2014). After the financial crisis in 2007/2008, developed countries such as Spain, Portugal, Greece and the United Kingdom were forced to reform their infrastructure capital project process by introducing a comprehensive KPI system that utilized 35 performance measures with three predefined Likert scale (1-5; 2 to +2, and 1-3) (Villalba-Romero et al, 2015).

Within developing countries, the BSC performance measures were officially introduced to the public sector under the structural adjustment program as mandated by the World Bank (Elu, 2000; Green, 2009). This BSC failed because it was limited in construct failing to include all the control points of operations and non-financial factors (Siddiquee, 2014). However, the all-encompassing KPI system recommended incorporates policies, rules, and procedures to support the system and standard compliance (Armstrong 2012; Boxall & Macky, 2009; Cokins, 2009). According to Kang

et al. (2016) these indicators should be established at every control point of the project phases: initiation, planning, designing, construction, demolition, backfilling, and post-construction evaluation. Ensuring that at each phase, there are the input, process, output, and outcome that are hinged to the organization hierarchy of executive, supervisory, and operational. These different strata within the organization play interfacing roles, such as the executive coordinates both internal and external communication. Parmenter (2017) recommended that these must be enshrined within the infrastructure capital projects policies, performance measures, procedures, and administrative rules. Adding that there are three indicators which must be incorporated, result indicators, performance indicators, and KPI. It is therefore imperative that projects incorporate those fundamental frameworks which are part of every contract, whether internally executed or outsourced forming part of the infrastructure protocol and matrix to ensure accountability and transparency (Armstrong, 2012; Boxall & Macky, 2009; Cokins, 2009).

The above core resultants of KPIs philosophy are synonymous with classical scientific management theory, where holistic performance measures are instituted throughout the institution's structure, to capture information for analysis and development of appropriate strategies (Nurcahyo et al., 2015). Therefore, to be effective, the KPIs framework is hinged on the government 'will' political influences, and relevant policies (Nurcahyo et al., 2015). Additionally, any deviation from the prerequisite political will, mission, mandate, and prescribed outcomes as identified by the SWOT analysis, can lead to the development of management KPIs strategies geared towards efficiency improvement. Although KPI strategies are instituted throughout the public

sector for infrastructure capital projects, it must be managed by human, despite the use of software to collect the data. Senior public servants and project managers are required to conduct analysis and interpretation (Villalba-Romero et al., 2015). Therefore, during policy design, KPIs must be the undergirding principle which seeks to transform individuals' behavior, decision making process, bureaucracy, policies, administrative rules, operational procedures, supervision, and appraisal (Villalba-Romero et al., 2015). KPIs should evolve into a cross-sectional approach that includes project expectation and objectives of the major stakeholders, to ensure both objectives are achieved (Eik-Andresen et al., 2015).

Conversely, KPIs may be criticized on the ground that it may add to the bureaucratic that may slow down operational processes and project implementation rate, since there is continuous monitoring and evaluation at every control point, and continuous trade-off between the project management, senior executives, and the stakeholders (Kerzner, 2017). Parmenter (2017) argued the extent of the process control could require additional staffing to ensure adequate monitoring and capturing of performance measurement data. However, the performance management system inclusive of data collection, measuring, monitoring, evaluation and analyzing can be computerized with automated prompts and alerts along the control points (Kerzner, 2017). This computerized system creates an integration platform to enhance the performance measurement and monitoring process required for infrastructure capital projects KPIs, thereby, adequately refuting the need for additional staffing. However, in the absence of software, adequate training and qualified individuals in performance management, KPIs

measures are required to transform the institution's performance (Kang et al., 2016). This system achieves efficiencies once it is incorporated in the policy and structure throughout the institution hierarchical structure, subdivisions, departments, units, individuals' job, and position descriptions (Kuhfahl et al., 2018).

According to Mensah & George (2015) capital projects' key players' interest is synchronized by the KPI philosophy forming positive correlation to revolutionize and transform the process. As a result, establishes clearly defined goals for input, process, output, and outcome that are linked and synthesized at the strategic, tactical, and operational level (Kang et al., 2016). It must be noted, that throughout the initiation, planning, designing, construction, post-construction review, demolition, backfilling phase of the infrastructure capital projects there is an absolute need for symmetries of information between the hierarchy of the organization, and to maintain a similar relationship with the external stakeholders (Eik-Andresen et al., 2015; Villalba-Romero et al., 2015). This flow of information ensures important feedbacks to perform measurement and analysis to improve efficiency (Kerzner, 2007). Unfortunately, there may be evidence of information asymmetries a product of skepticism of the new performance measurement system resulting from supervision bias, unethical practices, abuse of power, and the potential fear derived from lack of knowledge of the system on public service (Kerzner, 2017).

Additionally, there may be discretion abuse and lack of confidence in the indicators. It is therefore imperative to achieve consonance between the interest of the internal and external stakeholders, where these parties are involved in the monitoring of

the project to ensure that their interest is achieved (Eik-Andresen et al., 2015; Villalba-Romero et al., 2015; Kerzner, 2017). Essential to this KPIs process are transparency and effective communication to the various stakeholders during the different phases, by the utility of mediums, such as reporting, meetings, press conference, press reports, and town meeting (Eik-Andresen et al., 2015).

According to Kuhfahl et al. (2018) suitably designed KPIs provide management and project stakeholders with useful feedback that represent the health of the organization or project. Therefore, there should be little autonomy given to the public sector and the critical stakeholders since it can create conflict and prohibit KPIs efficiencies. The SMART criteria these KPIs must undergird represents; S-specific, M-measurable, A-achievable, R-relevant, and T-timeliness. These measures should be coined within the system's policies, rules, structure, and procedures dictating the chain of command, and it administration (Kuhfahl et al., 2018). These KPIs should be enshrined in the statutes and rules that govern the quasi-public organizations, and the department responsible for the infrastructure project within the government (Anderson & Holcombe, 2005; Nurcahyo et al., 2015).

Also, critical for the achievement of KPIs effectiveness in public sector infrastructure capital projects is support from a parliamentary system of government. This system will dictate the appointment of contemporary management systems, the hiring of professional administrators, training of public servants, and even the development of an agency solely responsible for the administration of capital projects (Andrés et al., 2013; Siddiquee, 2017). Additionally, the KPIs should encompass the strategic level or high-

level KPIs, which focus on the overall institution or project performance that align the tactics to strategy which are goal-driven and focused on performance-based data. Similarly, the lower level or tactical and operational KPIs, which focuses on specific areas, such as budget execution, resource alignment, successful employee training, financial systems operations, and stakeholders satisfaction (Kuhfahl et al., 2018).

Eik-Andresen et al. (2015), and Parmenter (2015) argued the appointment of professionals, assignments of internal and external resources, and effective reporting make it easy to sell the ideology, thereby ensuring cultural adaptation and development of a performance-oriented environment. According to Eik-Andresen et al. (2015), the earmarked duties for the public servants to perform are delegated to the responsible governmental department. These duties must be detailed in policies and procedures, and enshrined in the job and positions description for executing officers, including project engineer, project manager, supervisor, and workers. According to Siddiquee (2014), these duties may further involve the enlargement of the jobs, training, the development of capacity, and competencies backed by a level of job enrichment strategies and incentives to motivate the public servants. Siddique, (2014); Villalba-Romero et al. (2015) recommended that the only autonomy given to the project team is making decisions within the context of the scope of the project, but any deviation must be done through consultation with the relevant minister of government or special appointee, and key stakeholders as detailed by policies. However, this autonomy must not be abused but exercised carefully during the execution of these projects to achieve the ultimate objective (Kaming et al., 2010).

Mensah and George (2012) argued that public servants might exploit KPIs because of the asymmetries of communication and the relationship generated from fear, lack of effective communication and knowledge. The entire hierarchy within the public sector must be effectively informed and appropriate information disseminated to the external stakeholders (Kang et al., 2016; Schrouder, 2010). Rahman, Memon and Abd-Karim (2013) posited that a lack of information sharing might result in negative implications such as, cost overrun, time overrun, and poor quality, thereby prohibiting the anticipated efficiencies associated with KPIs. These were manifested when there was a need to make alterations or corrections to the project either at the designing or the construction phases (Durdyev et al., 2017). In this regard, a need for continuous monitoring of performance and communication of outcomes at every stage to the internal and external stakeholders to ensure the achievement of efficiency was present (Azis et al., 2013; Cheng, 2014; Durdyev et al., 2017).

Formation of Management KPIs for infrastructure capital projects

Infrastructure projects comprised of several phases: initiating, planning, financing, designing, approving, implementing or construction, and project closure (Hornstein, 2014; Takim & Akintoye, 2002). Mensah & George (2012) added three other phases, post-construction review, backfilling, and maintenance of projects. These phases incorporate performance indicators at the strategic, tactical, and operational level (Kuhfahl, 2018). Thus forming the generic framework for construction projects success, which are divided into the following orientations; procurement, process, and result (Takim & Akintoye, 2002), whereas, Andrés et al. (2013) described the framework as

input, process, output, and outcome. Sandru et al. (2014), and Villalba-Romero et al. (2015) presented a summary of the five critical indicators for construction projects: cost, time, quality, financial, and resources indicators.

Notwithstanding that construction performance indicators successes are dependent on the managerial, financial, technical, and organizational performance capacities, they are also affected by external factors: political, project risk, business environment, social environment, technology, legal environment and economic stability (Nurcahyo et al., 2015; Takim & Akintoye, 2002). According to Parmenter (2017), the process of performance measurement is holistic including, the measured values of the entire organization performance along the critical path. Performance measurement compares earned value to baseline value or planned value or the Work Breakdown Structure (WBS) of every activity and milestone (Sandru et al., 2014). Therefore, the approach for KPI measurement incorporates the comparison of every sub-activity or WBS achievements with projected or targeted outcome, as demonstrated in this equation (Nurcahyo et al., 2015).

$$CH = \sum_{i=1}^{n} \frac{Achievements\text{-}KPIs}{Targets\text{-}KPIs} * 100$$

$$n$$

According to Todorovic and Vuković (2013), the initial action in KPIs selection is the identification of the general and specific objective of the project and KPI instrument. Nurcahyo et al. (2015) posited that the developments of KPIs are done in three simple stages. First, identification and evaluation of internal and external principal players including, the top, middle, and lower management, project owners, operating staff, and

key external stakeholders. Second, conducting a SWOT and PESTLE analysis to identify gaps, and organizations' or project's alternatives that create the premise for developing mitigating techniques. Third, the formulation of KPIs based on the SWOT and PEST'TE analysis that is governed by policies, human resources improvement, institutional strengthening, capacity building, policy improvement, facility and infrastructure re-engineering, improved corporation, communication, engagement, information systems, and management.

The fundamental principle in designing and developing management KPIs is the SMART criteria (Kuhfahl et al., 2018; Sandru et al., 2014). SMART refers to: Specific - KPIs have a particular purpose for the business; Measurable - KPIs must be measurable; Achievable - KPIs must include achievable objectives; Relevant - KPIs should consist of relevant measures that align with the success of the organization, and Time Phase - KPI objectives must be measured based on predefined, relevant, and specific time periods necessary to meet organizational goals. Hornstein (2014), and Kerzner (2013) identified nine knowledge areas involved in the development of KPIs to achieve efficiency: project integration management; project scope management; project time management; project cost management; project quality management; project human resource management; project communication management, project risk management, and project procurement management.

According to Sandru et al. (2014), performance indicators are quantity indicators, quality indicators, quality of work indicators, temporal indicators (time), input indicators (resources), outcome indicators (outcome and result of processes), and financial

indicators. These indicators are aligned with the critical path methodology (Stratton, 2006). Thus, maintaining synthesis throughout the project between planned and actual outcomes (Olaru, Sandru & Pirnea, 2014). Sandru et al. (2014) further added that SMART criteria for the KPIs effectiveness and efficiency incorporate the stakeholders' and the organization's outcomes, internal processes, input, output, and governance. These criteria assist in the identification of planned and earned values. For example, to calculate the KPI for TIME it is imperative to determine the schedule variance (SV) and determine the critical path. SV=EV-PV; where EV is the earned value and PV is the planned value. With this information, the Schedule Performance Index or Indicator (SPI) can be calculated. Where SPI=EV/PV, where EV is earned value and PV is planned value. In the case where the SV is lower than 0 or the SPI is lower than 1, the significance is that the actual status of schedule is behind.

Where:

- Planned value (PV) = The budgeted amount through the current reporting period
- Actual Cost (AC) = Actual cost to date
- Earned value (EV) = Total project budget multiplied by the % complete of the project

For example:

- Cost Performance Index (CPI) = EV/AC = 90,000/ 100, 000 = 0.90. This means for every $1 spent, the project is producing only 90 cents in work.
- Schedule Performance Index (SPI) = EV/PV= 90,000/135,000 = 0.67

In the case of COST, a similar calculation is carried out to determine the performance indicators (Sandru et al., 2014). The cost analysis focuses on budget analysis creating a direct relationship between cost analysis and budget at completion (BAC). Therefore, the cost variance (CV) is determined, where CV=EV-AC; where EV is earned value and AC is actual cost. With this information the Cost Performance Index or Indicator (CPI) can be calculated, where CPI=EV/AC. To avoid cost overrun the CV should be 0 and greater, and the CPI is greater than or equal to 1. After that, the COST analysis and monitoring to complete the Estimation At Completion (EAC) is equal to EAC= AC+ (BCA-EV)/CPI or EAC=BCA/CPI. This calculation is repeated for all project phase and activities to identify the projects KPIs or indices that are utilized for monitoring and measuring the project performance to improve overall project efficiencies.

Efficacy of KPIs on Public Service Infrastructure Capital projects

KPIs are crucial for public service infrastructure capital projects efficiencies and should be integrated throughout the structure that undergirds every policy created to govern its operation (Lawther & Martin, 2014; Pilkaitė & Chmieliauskas, 2015; Siddiquee 2014). According to Durdyev and Ismail (2015), KPI systems vary based on structure and policies from organization to organization, public sector to public sector and country to country, however, it converges on performance measurement philosophy. This system incorporates the fundamental principle of classical management theory, management modernization, and public sector reform (Villalba-Romero et al., 2015). It will adopt the management KPI system perceived as the most appropriate strategy to

improve the public sector infrastructure capital projects efficiencies (Armstrong (2012); Boxall & Macky, 2009; Cokins, 2009; Fourie & Poggenpoel 2017; Kaiser & Streatfeild, 2016). Therefore, management KPIs were adopted globally infusing the private sector management approach into public sector creating a contemporary system of management (Villalba-Romero et al., 2015; Lawther & Martin, 2014). This approach focuses on efficiency at every phase of the capital project by introducing performance measures that created a decisive method of control, with emphasis on cost, time, safety, sustainability, and quality (Villalba-Romero et al., 2015; Eik-Andresen et al., 2015).

A similar system of measure, the BSC, has been employed across the developing world and in the Caribbean under the Structural Adjustment Program (SAP) mandated by the World Bank (Green, 2009). According to Khan (1991), SAP can be defined as a complex multi-level organizational and inter-organizational interventions characterized by goals or objectives, policies, public and private sector organization reform, and organizational actors. The Structural Adjustment Program was instituted after the 1980s recession when the developing countries of the Caribbean sought loans from the IMF and World Bank through CARICOM (Green, 2009). A critical policy prescribed by the IMF for adoption by the highly indebted countries was the Baker and Bradly (1986) plan for economic reconstruction under SAP which alluded to 'Third world countries debt affects developed countries trades' (Elu, 2000). The objectives of this policy were to: manage the balance of payment, reduce contractionary fiscal deficits, increase efficiency, encourage private sector investment, reduce and remove excise tariff, and encourage export-oriented productions (Green, 2009). Unfortunately, SAP resulted in the

devaluation of the local currency, reduction in public borrowings and government expenditure, tariff reduction, the abolition of price control, privatization, and reduction in public workforce (Green, 2009; Elu, 2000).

To achieve the required efficiency to sustain these developing economies under SAP, it was imperative to introduce the BSC in developing countries during the 1980s and 1990s (Andrés, et al., 2017). According to Elu (2000), and Green (2009), the BSC is a useful management tool geared to improve operations and realize SAP objectives. Although the BSC system positively impacted the public sector, it was too narrow, focusing mainly on financial measures (Parmenter, 2017). Under the SAP, the factor that was critical for the growth process and achievement of the desired objectives was the development of appropriate policies, however inappropriate policies led to economic stagnation (Elu, 2000). Thereby, creating the premise for the new management KPIs system that is comprehensive and including financial and non-financial measures which encompass the strategic, operational, and tactical level of the different infrastructure project phases (Eik-Andresen et al., 2015; Kang et al., 2015; Villalba-Romero et al., 2015). Worldwide, many developed and developing countries have introduced performance measurement systems which have recorded some degree of success, however these nations continue to struggle with cost overrun, quality, and timely deliverability.

According to Azhar, Farooqui, and Ahmed (2008), cost is the most chronic problem with infrastructural projects. Some of these countries include; Indonesia, Malaysia (Azis, Memon, Abdul Rahman & Abd. Karim 2013), Ghana, Lithuania, and

Turkey (Durdyev et al., 2017), Denmark, Cambodia, and Taiwan (Cheng 2014), Nigeria (Okpala & Aniekwu, 1988), Saudi Arabia (Assaf et al., 1995), and Caribbean region (Schrouder, 2010). Unfortunately, within the Caribbean, only BSC system was adopted by the public sector as sanctioned by the IMF and World Bank (Elu, 2000). Little evidence is available on BSC on infrastructure capital projects including Grenada. However, based on the literature on other developing countries globally, and research conducted in the Caribbean on SAP (Elu, 2000), it is safe to snowball the finding to the island of Grenada and assume the ineffectiveness of its BSC (Lawther & Martin, 2014; Mensah & George, 2015; Parmenter, 2017; Schrouder, 2017). As a result, the public sector infrastructure projects are still continuously plagued with inefficiencies resulting from mismanagement, lack of adequate performance measures, narrowly focus action, lack of monitoring and analysis, undefined goals, untrained or incompetent staffing, inadequate supervision, and unethical practices (Eik-Andresen et al., 2015; Schrouder, 2017; Villalba-Romero et al., 2015).

The theoretical and contextual frame of KPIs undergird modern management philosophies, and institution restructuring to create distinctive advantages and optimize resources utilization by the public sector (Mensah & George, 2015). This philosophy has captivated public sectors around the world, not only because it denotes modernization and efficiencies, but because the public sector is under pressure by stakeholders for performance efficiency and transparency. Additionally, the KPIs ensure responsible and prudent investment for taxpayers and improve service delivery effectiveness and efficiency (Pilkaitė & Chmieliauskas, 2015). Pilkaitė and Chmieliauskas (2015) asserted

that the public sector implementation of the KPI philosophy is equivalent to adopting privatization philosophies to reform the public sector.

In some cases, subunits of the public sector incorporate privatization principles under the BSC and become a quasi-public sector (Elu, 2000), such as the water utility company in Grenada which is NAWASA. This philosophy was accepted because it had political attractiveness, academic appeal, and satisfied the mandate by the IMF and World Bank (Elu, 2000; Green, 2009). Additional anticipated benefits included: performance measurement and monitoring, creating a system of accountability and responsibility, motivation, performance based rewards, transparency, good governance, resources optimization, efficient management, effective budget management, and improved service deliverability (Pilkaitė & Chmieliauskas, 2015). Therefore, the politicians, administrators, and stakeholders can hold the project manager responsible for project delay, cost overrun, and project's inability to attain the desired outcome or result (Derakhshanalavijeh & Cardosa, 2014; Eik-Andresen et al., 2015; Pilkaitė & Chmieliauskas, 2015; Azhar et al., 2009; Kaiser & Streatfeild, 2017).

Governments within the English-speaking Caribbean inherited their structures from the Westminster parliamentary model during British colonization (Quinn, 2015). Williams (1955) stated, 'After all, if the British Constitution is good enough for Great Britain, it should be good enough for us.' Therefore, the British system established the fiduciary responsibility of politicians, ministers, and administrators which are governed by legislation, administrative rules, and policies (Quinn, 2015). It is within this system that politician objectives are established, annual budget is constructed, policy objectives

are created, capital projects are identified, output and outcomes are defined, deliverables are identified, and standards are prescribed (Quinn, 2015).

Conversely, Girvan (2011) contended that the Westminster model is undergoing pressure from neo-liberal globalization because of the transnational drug trade, rising crimes levels, increasing debts, economic vulnerability, and environmental vulnerability. With the introduction of the performance measurement system under the SAP, there was reformation that created transparency, accountability, and improved performance by government's officials (Elu, 2000; Green, 2009). With the reintroduction of the comprehensive KPIs system, there will be further reformation of the public sector, re-engineering of infrastructure capital projects processes, policy revision, and capacity development (Eik-Andresen et al., 2015). This modern management philosophy will be cascaded throughout the government and incorporated within the policies and administrative rules of the ministries, agencies, departments, infrastructure capital projects administration, project governance framework, and every government institution (Pilkaitė & Chmieliauskas, 2015; Villalba-Romero et al., 2015). Liyanage & Roumboutsos (2015) posited that the KPIs should be captured by every activity and incorporated throughout these entities, forming the basis of modern management structure. It is this structure that incorporated performance measure as the most appropriate strategy to accomplish accountability, transparency, and performance efficiencies (Eik-Andresen et al., 2015).

Though performance measures were incorporated within the public sector because of the anticipated benefits, the emphasis was mainly placed on the financial indicators,

not the non-financial indicators resulting in inefficiencies (Parmenter, 2017). This was evident in the English Speaking Caribbean, such as Grenada after the introduction of the BSC system under the structural adjustment program. Unfortunately, there were little identifiable benefits either in the form of administrative management, financial and performance outcome as anticipated (Green, 2009). This undesirable outcome created the premise for a comprehensive system including financial and nonfinancial performance measures such as management KPIs (Parmenter, 2017). This new comprehensive system will infiltrate all aspects of public sector infrastructure capital projects from initiation, planning, design, and construction phase, with indicators established at the control points of input, process, output, and outcome (Mensah & George, 2015). Hassanei (2007); Lawther & Martin (2014); Siddiquee, (2014) advocated that although the public sector would have embraced the BSC which governs decision making, it lacked comprehensiveness and analytics which caused inadequacies in decisions and underachievement (Kaiser & Streatfeild, 2016). Unfortunately, there was little empirical evidence to substantiate the outcome of the BSC on the public sector on the island of Grenada and its infrastructure projects. Therefore, it is difficult to conclude that the management strategy of BSC improved the sector operations and project efficiencies (Fourie & Poggenpoel, 2017; Siddiquee, 2014).

However, there is well-documented research on developed and developing countries experience with performance measures such as BSC (Parmenter, 2017). Unfortunately, its narrow focus resulted in inefficiencies and cost overrun putting a strain on these countries funds, thereby, restricting economic growth and inhibiting

infrastructure development on these emerging economies (Fourie & Poggenpoel, 2017; Schrouder, 2010). This created the premise for the comprehensive management KPIs system and policy philosophy. To date, there is little empirical evidence and scholarly studies of the existing system effects on public sector infrastructure projects efficiencies in developing English-speaking Caribbean countries. Further, there was still limited evidence as to whether there is project cost reduction, greater accountability, transparency, improved ethical practices, cost savings, overall efficacy, project quality, and stakeholders' satisfaction (Elu, 2000). In this regards, the study of Schrouder (2010), and other scholars on performance measures of the developing Caribbean countries are worthy of note.

Implementation of comprehensive public sector management KPIs policy

The implementation of the management KPI system in the public sector relies on appropriate policy development and implementation strategy focusing on process reengineering, public or private sector restructuring, and capacity enhancement (Chan, 2000; Kang et al., 2016; Parmenter, 2017). This policy encompasses all aspects of the public sector infrastructure capital projects, including: initiation, planning, design, financing, construction, backfilling, post construction review and maintenance or initiating, planning, financing, designing, approving, implementing, and completing a project (Hornstein 2014; Takim & Akintoye, 2002). Thereby, forming the governing instrument for all public sector capital projects (Siddiquee, 2014). Additionally, the sector hierarchy must incorporate KPIs throughout the structure: strategic, operational, and tactical level. These KPIs were incorporated in policy, administrative rule, regulations,

and ordinances for measuring and monitoring performance (Kuhfahl et al., 2018). This policy placed the KPI instrument within the context of modern management philosophy impacting the information flow, chain of command, job and position descriptions, procedures, appraisal, and recommendations for adjustments (Hornstein 2014).

Kuhfahl et al. (2018), and Takim & Akintoye (2002) identified seven projects KPIs: construction cost, construction time, cost predictability, time predictability, defects, client satisfaction with the product, and client service satisfaction. Additionally, Takim & Akintoye (2002) identified three company's performance indicators; safety, profitability, and productivity. Takim & Akintoye (2002) added that the general framework for a successful construction project performance could be divided into three orientations; procurement, process, and result. According to Nurcahyo et al. (2015), policy implementation is considered an iterative process involving incremental deployments of phases with continuous monitoring, analysis, and alterations. However, to be effective it may take as much as one year for full implementation (Andrés et al., 2013). Therefore, to conclude that policy implementation is a one-off effort is constricting the process, instead, it must be viewed as ongoing through continuous improvement and monitoring (Kang et al., 2015).

It is imperative for policy implementation to incorporate human capital, technology, financial resources, existing culture, stakeholders' interest (client, consultant, contractor, supplier, end-user, and the community), administrator's vision, policy outcome, structure, and mission of the institution (Takim & Akintoye, 2002). Many scholarly research on policy implementation advocate that the process operates standards

or limits that focus on delineating negative influencing factors of the implementation process (Nurcahyo et al., 2015). This standards or limitations restrict the incorporation of critical components that undergird the successful implementation and achievement of the anticipated outcomes of the policy (Chan, 2000; Siddiquee, 2016). Takim & Akintoye (2002) contended that emphasis must be placed on the public sector processes, procedures, policies, system of management, and administration.

Over the last three decades, several theoretical models have been advanced detailing the implementation procedures for public sector policies, inclusive of top-down, bottom-up, cross-functional, and interactive, iterative, and incremental models (Nurcahyo et al., 2015). According to Takim & Akintoye (2002), these researches explored the limitations and benefits of the policy implementation process which is dependent on collaboration and consensus amongst the internal and external stakeholders. Eik-Andresen et al. (2015), and Takim & Akintoye, (2002) explicated that it is challenging to achieve total accuracy in policy implementation since there are indifferent expectations and knowledge of stakeholders, project owners, and end users during the implementation process. Therefore to mitigate these challenges, it is recommended that the policy implementation commences with the establishment of the policy goal or objective (example KPI introduction) (Taylor, 2011). These goals specify the mandates, mission of the policy initiative adapting the established legislation, administrative rules, laws, and regulations which are designed to guide its success (Bryson, 2014; Taylor, 2011). Once completed, the incumbent step is the implementation process, which incorporates the objectives, structure, procedures, culture, and systems infusing the policy objectives into

the job, position descriptions, and operational manual, to achieve the established objective.

In the absence of the desired outcomes, according to Bryson (2014), and Nurcahyo et al. (2015) a SWOT and PESTLE analysis should be conducted. Parmenter (2017), Schoburgh (2009), and Schrouder (2010) asserted that some justifying factors are inadequate implementation associated with unclear procedural manuals, unskilled staffing, inadequate job and position descriptions, unclear processes, politics, and political will, cultural norms, lack of performance measurement, ineffective management, and control. Therefore, to mitigate these challenges and accomplish the desired objectives the following are recommended: capacity enhancement, resource availability, staff competences improvement, adequate performance measure and management, procedural and policy manual, relevant position, and job description (Bryson, 2016; Cooper, 2014; Gelderman et al., 2017; Kerzner, 2017). Further, there is need for effective policy, competent administrative leadership, stakeholders' integration into local policies, structure, procedures, and system that can lead to effective policy implementation (Bryson, 2016; Cooper, 2014; Gelderman et al., 2017; Kerzner, 2017; Peters et al., 2017). Though these factors may vary from policy to policy, institution to institution, and public sector to public sector, they are all important to policy and KPIs policy implementation (Peters et al., 2017; Schrouder, 2010).

Within governments a policy or philosophy success is dependent on, human capital capacity, availability of financial resources, government political and citizenry will, major stakeholders support, effective communication, continuous analysis and

monitoring, evaluation of outcome with strategic objective and plan, and clearly defined goals and structure (Bryson; 2016; Cooper, 2014; Peters et al., 2017; Schrouder, 2010). Policy implementation involves institutional changes, core competencies formation, new skills and procedures introduction, and employment of additional resources (Bryson, 2014; Nurcahyo et al., 2015). These changes within the institutions require cultural, structural, and procedural reformation throughout the institution hierarchy, that incorporates change management process which is described as unfreeze, change, and refreeze (Hussain, lei, Akram, Haider, Hussain & Ali, 2016). Additionally, it involves re-engineering and reestablishing of clearly defined policies and administrative rules (Bryson, 2014; Cooper, 2014; Nurcahyo et al., 2015).

Therefore, it is prudent for employees and stakeholders to become involved in the planning process which leads to ownership of the policy (Bryson, 2016). This takes the form of assistance in the development of policy initiation, goals, job descriptions, and procedural manual (Bryson, 2014; Nurcahyo et al., 2015). A critical factor which can catalyze or restrict the development and implementation of policies is lobbying and negotiation (Godwin, Ainsworth & Godwin, 2013). Godwin et al. (2013) argued that of the tenets required for the effective implementation of a policy or philosophy, the roles of individual executioners and stakeholders are of paramount importance. As a result, an undergirding factor that can lead to the policy success is the acceptance of the policy substance, content, objectives, benefits, and limitations by these players (Godwin et al., 2013).

The protocol that developed around the policy outlines the aims and objectives of the system and the provisional procedures for the implementation (Nurcahyo et al., 2015). Further, the protocol provides an overview of the key players' roles and responsibilities, methodology, resources requirements, and possible contingencies (Godwin et al., 2013). These factors impact the success of the policy through constant interaction of the key players, elements, and subsystems, to form a cohesive interactive system (Bryson, 2014; Nurcahyo et al., 2015). According to Peters et al. (2017), the protocol is holistic and all-encompassing, affecting the internal and external environment which is influenced by every phase of the implementation that are publicly and inter-sectoral interactive. Additionally, a critical component is a useful network structure that undergirds the implementation process which comprises a comprehensive network integration mechanism that involves information flow and effective communication. Peters et al. (2017) posited that policy success is also hinged on institutional environment, processes, political will or support, and structure. These are governed by effective administrative rules, regulations, and legislatures detailing the guiding principles of the policies, including consequences for non-adherence (Ugwoke, 2015). In some instances, there may be diminishing returns created by uncertainty, risk, and questionable value of the policy by stakeholders, which hinders implementations (Peters et al., 2017). This is prevalent in developing countries creating inefficiencies (Elu, 2000; Fourie & Poggenpoel 2017; Green, 2009; Nurcahyo et al., 2015; Parmenter, 2017).

To combat these adversities and mitigate their effects it is imperative to adhere to the following: establish overall policy network and sub-network as per policy phase,

evaluate network performance, established relations between structure network characteristics, and network performance (Peters et al., 2017). In every circumstance, the process encompasses the inclusion of the input, process, output, and outcomes; the strategic, tactical and operational levels, and the initiation, planning, design, approval, financing, construction, post-construction review, backfilling, and maintenance. These are allied with the political will which focuses on the desire and willingness of the government to support the initiative and stakeholders objectives to achieve desired goals (Kang et al., 2016; Mensah & George, 2016; Parmenter, 2017; Siddiquee, 2014).

The determination of success is reliant on attaining the goals at each control point where there are indicators measuring the progress (input, process, output, and outcome), and at the political level which involves the attainment of the political goals including satisfying of the critical stakeholders, adding value to society, and the economy (Nurcahyo et al., 2015; Parmenter, 2017). Some of the challenges that may delay or prohibit the successful implementation of the policy include bureaucratic systems, resources limitations, unclear goals, unclear procedures, and lack of political will (Peters et al., 2017). According to Eik-Andresen et al. (2017), and Gelderman et al. (2017), it is the responsibility of the project managers to establish project goals to exceed the expectations of the stakeholders. As a result, they are sub-divided for every phase of the project such as initiation, planning, designing, financial, approval, construction, post-construction evaluation, backfilling, and maintenance. These goals encompass project duration, project cost, project quality, stakeholders and community expectations, and

economic outcomes such the anticipated rate of return (Derakhshanalavijeh & Cardosa, 2016; Durdyev et al., 2017; Eik-Andresen et al., 2017; Kaming et al., 2010).

Within each of these phases, there are performance indicators which detail the substratum of the objectives (Nurcahyo et al., 2015). These indicators will be used for automatic calculation of variances between the result and expectations with the objective of making amendments to the input, process, output at the initiation, planning, designing, construction, and post-construction evaluation phase of the project (Durdyev et al., 2017; Eik-Andresen et al., 2017; Sandru et al., 2014). To mitigate project failures which are the product of the developing countries' public sector incapability and resource limitations (Durdyev et al., 2017). Further, there is a need to ensure: adequate system development, human resource training, institutional capacity enhancement, design, and continuous performance measure and monitoring, and evaluation or appraisal (Eik-Andresen et al., 2017).

Of critical importance is the need to balance the objectives between the stakeholders and the government (Gelderman et al., 2017). Therefore, the compromise should be to establish a common ground or goal that is incorporated into the project planning, design, and implementation. Also they should be included in the various departments, stakeholders, private-public sectors, and even non-governmental organizations (NGOs) (Villalba-Romero et al., 2015). This will result in the harnessing of multifarious skills, expertise, and talents for the drafting of the most appropriate framework to monitor, evaluate, and manage the system (Eik-Andresen et al., 2017). Additionally, the KPI system is ideal for maintaining the required linkage throughout

every phase of the project from planning to construction (Parmenter, 2017; Villalba-Romero et al., 2015). KPI system measures and compares planned to earned indicators at every milestone, providing variance justifications, identifying the need for relevant training, coaching, and support to improve implementers' performance, management of human resources, and project process efficiencies (Andrés et al., 2017; Kerzner, 2017; Nurcahyo et al., 2015; Villalba-Romero et al., 2015).

Additionally, project implementation demands creativity, learning from officials and administrator. This is relevant to translate KPIs into a meaningful action plan that complies with regulations, administrative rules, and policies (Nurcahyo et al., 2015; Sandru et al., 2014). Further, KPI system ensures a thorough understanding of the project phases, objectives, and performance expectations (Nurcahyo et al., 2015), which are necessary to achieve infrastructure project efficiencies (Eik-Andresen et al., 2017). Eik-Andresen et al., (2017) recommended a holistic approach during the planning of a project that encompasses all the critical stages and tenets such as institution's hierarchy, resources requirements and the major internal and external stakeholders, in order to formulate a shared vision and purpose. According to Nurcahyo et al. (2015), and Sandru et al. (2014) these criteria will be incorporated during the development of the protocol for the implementation of the management KPIs for public sector infrastructure capital projects to transform and reform the public sector of Grenada and achieve overall efficiency.

Developing Country's management KPIs policy

Bryson (2014), and Buabeng-Andoh (2015) explicated that there are differences between developed and developing countries systematic framework for developing policy which serves as inhibitors to policy process success. Many of the developing countries like those of the English -speaking countries are profoundly influenced by government structure and political will (Cooper, 2014; Stanarevic & Gacic, 2017). These governmental structures were originated from colonizers who established a system of administration based on a mixed economy where the government controls most of the nation's planning, dominating policy development, economic performance, and country's administration (Elu, 2009; Green, 2000; Quinn, 2015). This political environment permeates the core of the society creating a Unitarian culture and system of governance throughout the institution (Bryson, 2014). Bryson (2014) indicated that economic development and growth are the products of institutions adding value to product and services through processes implementation and attainment of established goals.

Unfortunately, according to Mensah & George (2017), and Parmenter (2017), the systems for performance monitoring and measuring within developing countries are dysfunctional and result in overall inefficiencies. These measurement structures and policy dysfunctionalities limit these developing countries from implementing processes effectively. As a result, contemporary management principles and practices are required to achieve desired outcomes (Ugwoke, 2015). Consequently, the need arises for a holistic revision, reforming, reengineering, and restructuring of the public sector's policies, capacities, culture, and technology (Eik-Andresen et al., 2017). Fourie & Poggenpoel (2017), Kuhfahl et al. (2013), and Lawther & Martin (2014) recommended the

implementation of a comprehensive management KPI system as a solution to assist in performance measurement and attaining project efficiency.

Conversely, in developed countries, there is the adaption of more contemporary management principles based on the essentials of classical management theory (Chan, 2003; Pilkaitė & Chmieliauskas, 2015). This gave rise to sound performance management principles and efficiency (Eik-Andresen et al., 2017). According to Eik-Andresen et al. (2017), and Villalba-Romero et al. (2015), it is imperative to establish the contrast between the developing and developed countries to create benchmarks and the premise for snowballing and adapting best practices for the developing nations. This will lead to overall performance improvement and efficiency in the implementation of public sector infrastructure capital projects.

Adoptability and institutionalization of developing countries' KPIs policies

There are many techniques utilized by developing countries to transfer or adopt policy throughout its public sector institution. This involves the re-engineering of processes and systems based on established benchmarks and linking actions-situations as demonstrated by the IAD framework (McGinnis, 2011). Ostrom (2005) postulated that action situation linkage refers to the creation of a link between outcomes of one situation directly to one or more components of another action situation. This action-situation framework defines the phases of infrastructure capital projects where every phase is linked to the other and the outcome of one phase directly impact the subsequent phase process and outcome (Initiation, planning, designing, approval, financing, construction, post-construction review, alpha & beta testing, backfilling, and maintenance). According

to Ostrom (2005), action-situation framework involves two or more individual or stakeholders, who encounter a set of potential actions that jointly produce outcomes. Tang (1994) explicated that action-situation framework is characterized by of allocation action situations, collective choice action situations, and monitoring action situations.

These are governed by rules, including: boundary rules assigned to participants, position rules assigned to positions, and choice rules assigned to the action. Similar to the action situation relationship all rules are nested in another set of rules that detail their undergirded principles. Further, these rules are sub-divided into three levels of governance based on the three action levels: operational-level rules, collective choice-level rules, and constitutional choice rules. The operational-level rules guide and constraint day to day activities. Collective choice rules, guide and constrain collective-choice level actions defining operational-level rules formation, adaption, monitoring, and operational actions. Constitutional choice rules, governs and constrain constitutional-level action, defining collective rules formation and adaption, and monitor collective choice activities. These action situations consist of participants or players who act based on information received from the SWOT and PESTLE analysis of the internal and external environmental (Bryson, 2014). The findings are interpreted then converge to create a balance that is aligned to best practices ensuring full adaption and transfer of the policy (Hussain et al., 2016). The adaption process involves accurate implementation of the theoretical and contextual framework of the IAD, which includes establishing appropriate procedures, knowledge, competences, capacity, systems, and policies for the public sector institution, but is not restricted by geography.

In the context of management KPIs, adopting a reflective approach based on private sector operation and establishing a system of performance management that infuse private sector philosophy into the public sector is ideal (Villalba-Romero et al., 2015). This process may include a holistic or partial approach where all aspects or part of the private sector operational structure is reflected (Villalba-Romero et al., 2015). Elu (2000), and Green (2009) argued that in the 1990s the BSC performance measurement system was the fundamental instrument made by the IMF and World Bank under the Structural Adjustment Program on English-speaking Caribbean countries, such as Grenada. During the policy adaption process, the knowledge was herald by adapting Lewin's Change Model of unfreezing, movement/change, and refreeze (Hussain et al., 2016; Lewin et al., 2015). This process involved continuous training, communication, process modification, and continuous improvement (Gelderman et al., 2017; Kerzner, 2013). The direct changeover or parallel run can be adapted to soothe the transition and mitigate errors, by incorporating several incremental changes, technology, and environmental factors (PESTLE) (Hussainet et al., 2016). Although critical to policy success, they are all dependent on the urgency of the policy and whether the mandate was externally or internally initiated (Elu, 2000). For the internally motivated or initiated project, the implementation methodology focuses on the parallel run system and the sharing of information and knowledge. However, for the externally motivated project, a direct transfer may be adapted based on the established implementation timeline (Green, 2009). Under either of the circumstances, leadership knowledge and creation of a

learning environment are critical for the policy implementation process (Hussain et al., 2016).

Another phenomenal approach of the adaption process is the institution of public sector experience and comfort with the IAD methodology. Once the institution has undertaken either of the methodologies; direct or parallel run on operational level action situation, collective level action situation, and constitution level action situation. There is a need to apply the same method of transfer for the management KPIs, reducing the learning curve, implementation time, cost, and marginal errors (Hornstein, 2014; Hussain et al., 2016). In this way, procedures, policies, benchmarking, and performance indicators may be replicated, thereby creating expediency and accuracy in the implementation of organizational structure reform. As a result facilitated in the easy infusing these benchmarked policies to achieve overall success (Hornstein, 2014).

Therefore, it is incumbent on the public sector to ascertain the similarities of the policy both from a contextual and theoretical framework to identify possible gaps relating to political will, government capacity, and mandate that may inhibit the policy adaption (Cooper, 2014). With the adequate identification of the policy contextual gap, training, and change management, mitigating strategies can be designed and implemented to ensure successful adaption (Hornstein, 2014). Hornstein (2014) explicated that the project phases of initiation, planning, designing, approval, financing, implementation controlling, monitoring, and closing, encompasses nine knowledge areas. They include: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management,

Project Communications Management, Project Risk Management, and Project Procurement Management.

Government role in the policy implementation process is instrumental for success based on political will underpinning (Cooper, 2012). This factor varies from country to country based on the government's agenda, perceived benefits and importance associated with the policy (Bryson, 2016; Peters et al., 2017). Therefore understanding the policy processes, the influences of politics, and the role of key stakeholders can motivate, stimulate and inspire the policy process success (Peters et al., 2017). In this context, identification of best practices of policy process from developing countries can lend to the comprehension of the key players, information flow, power base, appropriate structure, administrative rules, system for development, and adapting policy from one country to another (Peters, 2017).

Bryson (2016); Mugwagwa et al. (2015), and Peters (2017) argued that governments are the key players or actors in the policy process. Therefore, it is incumbent on this institution to gather all pertinent information that will enhance learning, knowledge transfer, and develop strategies that will mitigate policy planning, design, and implementation phase errors. It is government that is responsible for the development of legislation, administrative rules and regulations, and ensures adherence of rules which are required for effective implementation of policies (Mugwagwa et al., 2015). One risk associated with adaption of knowledge based on benchmarking is the possibility of including weaknesses within the policy system. Additionally, there is the possibility of misunderstanding the strategies required to achieve, the benchmark, policy

coherence, transparency, accountability, and financing for implementing the policy. These challenges can be used as justification for inadequacies in implementation and malfunctioning of the current system adopted by developing country from developed countries (Mugwagwa et al., 2015).

According to Mugwagwa et al. (2015), it is imperative to learn all the facets of the policy process including, benchmark, policy coherence, transparency and accountability mechanism, and financing for implementing the policy. Since this process depends on collaboration, coordination, engagement, and cooperation between the key stakeholders and the environment (Bryson, 2014). Of all the stakeholders, the government is central for successful policy adaption. Especially, since the administrators are the implementers of the policy, having a fiduciary responsibility and need to understand the role of each of the stakeholders along with the process of infrastructure projects development (Bryson 2014; Mugwagwa et al., 2015). Bryson (2014), and Hussain et al. (2016) explicated the need to effectively and explicitly communicate the policy objectives, projected outcomes, origin, impact, meaning and motive that is relevant. Thereby, ensuring that the policy supports the implementation of the initiative, and incorporates the required contextual relationship (Hussain et al., 2016).

In many instances, there is the need for assimilation and prototyping which provides a preview of the interconnected deferring roles of the actors within the context of policy development, and implementation (Anderson & Holcombe, 2005; Bryson 2014; Mugwagwa et al., 2015). This activity displayed the chain of command, hierarchy, accountability, responsibility, activity flow, control points, and performance indicators

(Anderson & Holcombe 2005). As a result of presenting the anticipated input, process, output, outcomes, resources, and design of the initiative or project before commencement. The prototype shows a comprehensive depiction to facilitate understanding, and development of an appropriate structure, operation, support, and strategy for efficient implementation (Nurcahyo et al., 2015). Bryson (2016), and Cooper (2014) argued that political will, objectives and motives influence politicians', administrators', and bureaucrats' interest in determining the policies, despite being internally or externally initiated.

Agwoke (2015) asserted that although the learning process is a product of government administrative philosophy on the policy. The learning curve duration and acceptance of the policy is dependent on political will and the perceived relationship of the policy to influence anticipatory political success. Additionally, if the government anticipates direct economic benefits associated with this policy, such as the Auto Tariff implemented in Nigeria in 2015 that reduced vehicle importation by 20% or 1.2 billion within the first year (Agwoke, 2015). Agwoke (2015) explicated that during an election year, projects or policy learning curves can take the shortest possible time since the dissemination of information intent is to influence voters. With this objective, it will be the mandate of the ruling administration to present to the citizenry the benefits of the new ideologies with the intent to acquire votes and be re-elected into office (Agwoke, 2015; Kjæra & Therkildse, 2013). However, outside of this period it may take longer since the government may be convinced that there is still time for implementation (Kjæra & Therkildse, 2013). Generally, in developing countries under the Westminster model

which is the system of government in the English-speaking Caribbean islands, there are three cycle after election: year one referring to the elected year, rest which refers to years two, year three and four are pre-election years, and year five is election year under the Westminster model. These periods influenced the rate of policy and project implementation, notwithstanding the economic benefits (Hussain et al., 2016; Quinn, 2015).

Over the last two decade, there has been little information available relating to the role of scientific modeling and approaches to policy development and implementation within the developing countries of the Caribbean (Green, 2009; Hussain et al., 2016; Quinn, 2015). Similar conclusion can be formed of the policy process around the world since most policies formed are reactive instead of proactive (Bryson, 2016). In either case, the policy seldom achieved its projected outcome especially in developing countries resulting from: staffing inadequacy, government incapability, resource unavailability, system inadequacy, and inappropriate administrative rules (Schrouder, 2010). Unfortunately, there is little or no thorough planning of the policy process, from initiation, planning, design, implementation, post-implementation, and evaluation. This planning process involves the technical analysis of every phase to determine cost benefit and best practice based on scholarly theoretical construct (Hornstein 2014; Takim & Akintoye, 2002). As a result, the IAD framework is recommended to thoroughly assess, develop, and implement policies for effective governance, reformation, and project execution that will shape the government's reputation and achieve efficiencies in infrastructural capital projects (Eik-Andresen et al., 2017; Schlager & Cox, 2017).

Although these strategic objectives of policy transfer and implementation may be achieved from a political vantage point, analysis of the outcome of every stage or situation-action should be conducted to form the premise for subsequent phases (operational action situation, then collective action, finally constitution action situation) (Schlager & Cox, 2017). Notwithstanding the successes or failures of the process, it creates the premise for change, learning, development, communication, transformation, impacting knowledge, reformation, and improvement by the country adopting the policy (Hornstein 2014). These change factors impact not only the government but all the stakeholders forcing them to gravitate accept the policy, thereby influencing the processes, willingness to embrace the new philosophy, and reforming public sector governance (Mugwagwa, Edwards & De Haan 2015). Bryson (2014) argued that it is imperative to ensure complete buying-in by the key stakeholders first, since they can change and influence other stakeholders to amass support and consensus. This is accomplished through continuous collaboration, engagement, cooperation, and communication at every phase of the policy, initiation, planning, design, implementation, and post-implementation evaluation (Bryson, 2014; Eik-Andresen et al., 2017). As a result, establishing the premise for creating the protocol to guide each phases of the policy development by incorporating operational action-situation and rules, then collective action-situation and rules. Finally, constitution action-situation and rules throughout public sector infrastructural capital projects result in effective governance and administration (Bryson, 2014; Eik-Andresen et al., 2017).

International Agency's impact on developing countries infrastructure project policy formation

Form the formation of the United Nations in 1945 several agencies were developed to provide oversight to the developed, developing, and underdeveloped countries. As part of its governance agenda was funding which was administrated by two prominent agencies: the International Monetary Fund and the World Bank (Green, 2009). These agencies developed and governed the policy agendas of the United Nations relating to institutional funding and development (Elu, 2000; Green, 2009).

In the 1980s and 1990s, after the cold war, an evaluation of the developing countries in the English-speaking Caribbean was conducted to obtain an understanding of their economic status (Elu, 2000; Green, 2009). This investigative research revealed gross mismanagement, poor infrastructure, underdeveloped management systems, lack of financial resources, and incapable public servants (Green, 2009). On completion, it was the recommendation of these agencies to reform these countries to achieve economic growth by adopting the structural adjustment program (SAP) (Elu, 2000; Green, 2009). Green (2009) explicated that the structural adjustment program was derived from an identified phenomenon of mismanagement that underpinned the vision of these agencies, and incorporated in the operations of the developing country administration reformation under the structural adjustment program (SAP). The approach utilized by these lending agencies, included the exertion of legitimate pressure on developing governments by establishing parameters and guidelines within which these governments must operate. Notwithstanding the political power of governmental officials in the developing

countries, the agencies' undergirded principles recommended pressured the government to achieve the program vision (Elu, 2000). However, if the developing country failed to be successful in the implementation of the policy, it may affect the continuation of funding and further economic development (Elu, 2000; Green, 2009).

Schrouder (2010) described developing countries as being plagued by operational inefficiency, systems incapability, process inconsistencies, procedural inadequacies, and unethical practices. These characteristics were, and are prevalent in developing countries, thereby, becoming their modus operandi, despite the prevalence of extensive bureaucracy in global democracies (Green, 2009). Unfortunately, there were gross non-adherence of the bureaucratic proposition creating institutional framework and environment that inhibited the achievement of established goals, performance measuring, monitoring adequacies, and efficient executing infrastructure capital projects (Schrouder, 2010). As the agencies conducted their research, the only feasible options were to reform the public sector within the English-speaking Caribbean to achieve economic sustainability as a result introduced the Structural Adjustment Program (Green, 2009). According to Elu (2000), undergirding this program in the 1980s and 1990s was the BSC performance measurement system. This system was introduced to improve efficiency within the public sector and to attain economic development, however, it was narrowly focused (Parmenter, 2016), and failed to achieve the desired outcome (Elu, 2000; Eriksen & De Soysa, 2009; Green, 2009).

The dependency of the developing countries for funding from these agencies forced these countries to adopt the prescribed philosophy of the agencies (Eriksen & De

Soysa, 2009; Green, 2009). Elu (2000), Eriksen & De Soysa (2009), and Green (2009) contended that this approach prescribed conditions for funding to continue. Therefore, it was imperative that the public sector programs mandates were adhered to as specified by the policies and systems to obtain full compliance, and specifying any deviation will lead to funding cessation (Elu, 2000; Green, 2009). This gave the international institution full authority over the administration of the developing countries (Green, 2009). Thereby, dictated all relevant strategies to achieve established objectives, resulting in a lack of autonomy by the developing countries (Elu, 2000; Eriksen & De Soysa, 2009; Green, 2009).

Elu (2000), and Green (2009) explained that under the structural adjustment program the international agencies transferred or replicated a system of policy that was successful in another developing or a developed country. The implementation process involved the deployment of agency observers to manage every phase of SAP, and demanding concurrent monitoring and reporting of progress to obtain compliance. In some instances, it influenced legislation and structure by advocating the development of local agencies, the development of administrative rules, and initiation of training to enhance capacity (Elu, 2000; Eriksen & De Soysa, 2009; Green, 2009). Such method involved the strategy of action situation at different levels, supported by rules that govern every level and stage (Hornstein, 2014). This method is aligned with innovation, successes, and benchmarks of best practices of governments (Andrés et al., 2017). With the new strategy of BSC in the developing countries where the outcome was uncertain, the only promise or evidence of success was from the developed and developing

countries establishing the benchmarking criteria (Pilkaitė & Chmieliauskas, 2015; Ugwoke, 2015).

As a result, under the governance of the international agencies, a team of program administrators comprising of locals and international agencies official were appointed. This team established the protocol for the effective execution of the program detailing the policies, procedures, structure, administrative rules, and systems for the program success (Elu, 2000; Green, 2009). It incorporated best practices and operations of all the governments that had proven successes penetrating the core of the public sector institution (Holcombe, 2005; Nurcahyo et al., 2015). As a result, institutes financial indicators at different control points and activity flow to ensure compliance and achievement of identified goals (Eik-Andresen et al., 2017). In many cases, the goals coincided with the policy vision were fused throughout every department and the hierarchy of the public sector with a common objective of cost-effectiveness, capacity improvement, improved performance, effective management, and overall improvement (Eik-Andresen et al., 2017; Pilkaite & Chmieliauskas, 2015).

However, with the contextual and functional complexity of the public sector, prioritization must occur to harmonize the international agencies policies with the national or local to create efficiency (Green 2009; Pilkaite & Chmieliauskas, 2015). Andrés et al. (2017) posited that these challenges encountered by the public sector led to the establishment of the following benchmarks or performance indicators output, coverage, labor productivity, inputs, operating performance, service quality, and cost. According to Parmenter (2016), these financial and non-financial indicators must underpin the comprehensive

management KPIs. Eik-Andresen et al. (2017); Pilkaite & Chmieliauskas (2015) argued that project management competencies achievement happened through direct correlation between institution's ability, prioritization, coordination, decision making autonomy, portfolio balance, communication, stakeholders expectation, and management capability.

Evaluation of the IAD and the classical management methodologies

The success of the IAD action situation strategy is the product of comprehensive evaluation based on a designed protocol that includes; the quality and accuracy of the information disseminated, timeliness, trustworthiness, clarity, and understandability. The current process flawlessness focuses on: rate of completion: duration and time requirement; cost implication, operational effectiveness, and the suitableness of the policy to achieve the desired outcomes of the public sector infrastructure project (Hussain et al., 2016). It is imperative that all aspects of the policy are adapted during implementation, including the appropriate rules, including: operational level action-situation; collective action-situation, and constitutional action-situation levels rules. Failure to incorporate the policy holistically can lead to delays in its success and inefficiencies throughout the institution (Hussain et al., 2016). Parmenter (2014), and Schrouder (2010) contended that this process inefficiencies are the product of insufficient information, misinterpretation of policy and benchmarks, misunderstanding of culture and belief system of the local institution, lack of knowledge of the initiative (KPIs) by the implementers, inadequate training of the public servants, and mismanagement of the implementation process. To mitigate the potential failure of the policies implementation it is essential to incorporate scientific management approaches

(Taylor, 2011) and Lewin's change management process of unfreezing, movement or change, and refreeze (Hornstein 2014; Hussain et al., 2016). Although these barriers to policy implementation may be identified during the PEST'LE and SWOT analysis, it is critical to fully understand these factors so that circumventing strategies are incorporated, and performance indicators established to measure progress through concurrent and summative assessments (Hornstein 2014; Hussain et al., 2016).

Amidst these factors, as stated above, significance must be placed on the theoretical framework of Institutional Assessment and Development (IAD) (Schlager & Cox, 2017) and also on the Classical management theory (Taylor, 2005). These theories presented the holistic view of the assessment, reformation of policies, and the framework to reform the management structure (Sabatier, 2016). A similar approach was evident under the structural adjustment program introduced within the English-speaking Caribbean countries in the 1990s by the international agencies (Green, 2009). Under this program all policies formulated were transferred from developed countries that led to the initiation of the BSC which incorporated the theoretical techniques to address the policy formulation, conceptualization deficiencies, implementation policy, technological adaptation, institutional transfer, administrative and personnel development, administrative rule and ordinances reformation, departmental structure, and process re-engineering (Elu, 2000; Green, 2009).

Notwithstanding the inclusion of those tenets in the policy implementation process, there was evidence of process failure resulting from the narrowly focused BSC policy that emphasized financial outcomes or measures, and limited capacity (Green,

2009). As a result, it ignored critical process measures at the input, process, output, human resources, marketing, management, socio-economic factors, and stakeholder (Mensah & George, 2015). Parmenter (2017) clarified that it was imperative for policy implementation to incorporate the needs of the key stakeholders to comprehend the process outcomes to determine its success. However, because of a lack of adequate monitoring of the policy implementation process within the developing countries, most policy initiatives were deemed successful resulting in repeat and acceptance (Mensah & George 2015). With these accepted inadequacies, it was difficult to identify operation gaps or shortcomings unless the scientific management approaches such as the SWOT and PESTLE analysis were used (Hornstein, 2014). These tools evaluated the policy, system of monitoring, progress, and implementation success to determine the operational gaps (Hornstein, 2014). These gaps led to the development of strategies that mitigated policy and projects deficiencies geared towards improving efficiency and optimum utilization of public funds (Hornstein, 2014; Parmenter, 2017).

Despite the introduction of many public sectoral policies over the last decade, there had been limited empirical evidence of their successes within the English-speaking Caribbean countries (Schrouder, 2010). Although there are universally accepted principles or approaches to policy formulation such as the reactive and the proactive methodology, there are no definitive criteria for inclusion of policy initiative, relating to the appropriate time for implementation and ideal approach to utilize (Bryson, 2014). Kjæra and Therkildse (2013) contended that policies were driven by the political will of the government, and external international institutions (Elu, 2000; Green, 2009). This

may be part of a bigger subliminal agenda or higher social agenda (Green, 2009). According to Andrés et al. (2017), and Mugwagwa et al. (2015), the government is the main benefactor of these policy initiatives, and is instrumental in the initiation, selection, planning, and execution of the policy initiative which can determine the policy success. In certain circumstances, the public may not accept the policy initiatives selected by the government, or the government may have failed to deliver the desired outcomes. This would have led to protest and social unrest, inhibiting the success of the initiative and economic progress (Stanarevic & Gacic, 2017).

Eik-Andresen et al. (2017), and Pilkaite & Chmieliauskas (2015) recommended the acknowledgment and recognition of critical stakeholders' interest during the initiation, design, planning, implementation, and post-implementation review phases of the policy or project. This can be achieved through effective collaboration, engagement, administrative expertise, stakeholders' integration, and ethical practices (Bryson, 2014; Kerzner, 2017; Schoburgh, 2009). Unfortunately, unsuccessful results of infrastructure or construction projects were determined at the end from the evaluation of historical data making it difficult to identify precisely the source of the inefficiencies and the opportunity to implement mitigating strategies (Mensah & George 2016; Parmenter, 2017). Since projects are referred to a series of activities, and tasks with specific objectives to be completed within the established specifications (Kerzner 2017). It is therefore imperative for project manager to possess the capabilities to effectively manage the project by utilizing modern management systems such as KPIs to monitor every phase (Hornstein 2014).

Andrés, et al. (2017), Derakhshanalavijeh & Cardosa (2016), Durdyev et al. (2017), and Nurcahyoet al. (2015) argued that project failure was the product of design inadequacy accompanied by inadequate adherence to established protocols for the different phases, and inadequate systems of performance measure (KPIs). Although new policy initiatives such as the BSC were introduced to these developing countries, their success was inhibited by a lack of funding, adequate structure, culture, management, and public servants capacity, limited stakeholders engagement, inappropriate culture, system of control, administrative rules, knowledge, and incapability by these developing countries (Andrés, et al., 2017; Holcombe, 2005; Nurcahyo et al., 2015). Unfortunately, these limitations created the environment for policy failure (Shrouder, 2010; Woolcock, 2013), overall inefficiencies, and need for reformation (Andrés, et al., 2017; Fourie & Poggenpoel, 2017; Kaiser & Streatfeild, 2016; Lawther & Martin, 2014; Mensah & George, 2016; Parmenter, 2017; Schrouder, 2010; Siddiquee, 2014).

According to El-said (2016), Kjæra & Therkildse (2013), Mugwagwa, Edwards and De Haan (2015), and Schoburgh (2009), within developing countries policies are generally initiated by international agencies and local government departments, with the international agencies entrusted with the administration of these policies (Green 2009). These policies superseded any policy initiated by the developing country. As a result, the developing country may develop resistance because it can be perceived as a form of control as was evident under SAP (Elu, 2000; Green, 2009). This factor according to Stanarevic & Gacic (2017) negated the acceptance and willingness to implement the policy aggravating the process leading to conflict, thereby inhibiting the policy adoption

success. Within the context of the developing state, it may be perceived as pressure by foreign organizations that control the major factors of production and dictate the economic agenda of the world and those developing countries (Elu, 2000; Green, 2009; Quinn, 2015). To better adapt these agenda within the local economy the policy was sometimes modified or incorporated within the local economy, political perspective and social agenda (Elu, 2000; Green, 2009; Stanarevic & Gacic 2017). However, there were times when stakeholders' interest or pressure, and incidents or mishaps within society may initiate policies which were generally most accepted (Mensah & George, 2016; Nurcahyo et al., 2015; Peters et al., 2017; Villalba-Romero et al., 2015). Eik-Andresen et al. (2017); Villalba-Romero et al. (2015) argued that these policies were initiated from physical (e.g., housing), social (e.g., social networks), economic (e.g., income distribution), political (e.g., laws on alcohol distribution) and environment.

Similarly, both the developed and developing countries are structured by many bureaucratic processes which are undergirded by democratic principles that determine the supper structure and substructure of these governments, decisions, and policy-making process (Cooper, 2014). Although, these processes were necessary to attain policy success, it was critical to create a balance system that incorporates transparency, accountability, and separation of power (Quinn, 2015). However, this may create a level of complexities that impede policies implementation rate (Stanarevic & Gacic, 2017). Therefore, it must be reckoned that the developing countries system of government was mirrored after the developed colonizer. For example, the English-speaking Caribbean countries were colonized by England resulting in the parliamentary system of

government copied after the Westminster model (Quinn, 2015). Thereby, adapting the bureaucratic system of Westminster, inclusive of; the chain of command, policies and decision-making process, construct of parliament, legal framework, constitution, system of government, procedures for spending, approval of projects, and execution. These factors impeded the implementation process and the policy adaption rate by the developing countries (Quinn, 2015).

In the case of the Structural Adjustment Program and the BSC, this was evident (Elu, 2000). Since, governments were forced to reform its policies to accommodate the objectives of the program, resulting in economic stagnation, high government debt, and high government consumption to GDP ratio, and reduced human rights (Eriksen & De Soysa, 2009). For example, during the implementation of capital projects, funds were released in tranches throughout the different phases of the projects (initiation, planning, design, construction, and post-construction) in an effort to control and create consistency in cash flow resulting in delays because of the bureaucratic structure (Eriksen & De Soysa, 2009). This included, but was not limited to; the initiation of a project from a proactive or reactive premise and a minimum of three options must be considered for short-listing. According to Sandru et al. (2016), to mitigate these challenges adequate planning was required at every phase. For example, at the designing phase a minimum of three drawings must be submitted, and planned contingent to mitigate execution risk such as cost, time overrun, and poor quality completed (Cheng, 2014; Durdyev et al., 2013; Memon, Rahman & Karim, 2013). At the construction phase, provision needs to be made for unforeseen issues which can impede the project success. Further, all these phases

must have their bureaucratic system of approval coined into policies. For instance, three alternative projects must be submitted to Cabinet for approval, then to parliament for final selection with rational and justifications, that adhere to modern project management practices (Kaming et al., 2010; Nurcahyo et al., 2015; Pilkaitė & Chmieliauskas, 2015). These decisions are made by consensus, and the process should be repeated for all the different phases of the project (Eik-Andresen et al., 2017). In some instances, they may be considered as long-winded, frustrating and sometimes inefficient.

Similarly, under the anticipated management KPIs system for infrastructure capital projects, the system of bureaucracy presented above will be adapted with slight modifications to ensure project efficiencies. This includes the introduction of management KPIs at every control point of the different phases, as the established measurable criteria to determine performance and success at each phase (Eik-Andresen et al., 2017; Pilkaitė & Chmieliauskas, 2015). Under this contemporary scientific management approach of management KPIs (Kuhfahl et al., 2013; Nurcahyo et al., 2015), convergences are anticipated with the conventional bureaucratic system approach imposed by the developed country or agencies as described above (Eriksen & De Soysa, 2009). This convergence impeded the implementation of the new policies, structure, the system of performance measure, and procedures needed to reform the public sector (Eik-Andresen et al., 2017). During the interim of this policy implementation, there will be delays, however, over time as the scientific management approach takes precedent through training, performance measures, and evidence of improved efficiencies

implementation rate will increase (Eik-Andresen, 2017; Hornstein, 2014; Hussain et al., 2016; Nurcahyo et al., 2015).

This section advanced scholarly opinions of the rationale undergirding the reforming of the public sector infrastructure capital project on the island of Grenada. The approach utilized was the policy action-situation process, which incorporates the management KPIs philosophy as a reformation strategy or policy that is adapted into the public sector from progressive planned actions. As a result, critical analysis was conducted to ascertain the appropriateness of the adaption process, especially action strategy because of a lack of empirical evidence in the developing English-speaking Caribbean countries, such as Grenada to substantiate the success of the BSC policy adaption. Documents and studies were obtained from other international developing countries with the intent to understand the success of BSC which narrowly focused on accounting and cost performance measures (Fourie & Poggenpoel, 2017; Nurcahyo et al., 2015; Parmenter, 2017). Also, to comprehend the likelihood of management KPIs success in improving public sector infrastructure capital projects efficiencies (Eik-Andresen et al., 2017; Mensah & George, 2015; Parmenter, 2017; Pilkaitė & Chmieliauskas, 2015; Putra, 2015; Villalba-Romero et al., 2015).

Further, the findings obtained from international developing countries needed to be evaluated to determine its appropriateness for direct adaption under the IAD and scientific management framework (Ostrom, 2005). According to Hussain et al. (2016), the developing countries should utilize the action-situation for operational level and rules, the collective action-situation level and rules, and the action-situation for constitution

level and rules for policies, such as the infrastructure capital project implementation. Bryson (2016); Eik-Andresen et al. (2017), Kaming et al. (2010), Kang et al. (2016), and Mensah & George (2015), recommended the following critical factors for determining policy success: explicit communication of the management KPIs mandate, the collaboration and engagement of stakeholders, the coinciding of the government's will, vision and mandate, with the project objectives, and stakeholders' expectations. Additionally, corporation must be established between the environmental, economic, and social (EES) factors, or the people, planet and profit (Ps) and Es- environment, economics, and equity, which are the strategic pillars for policy formulation (Villalba-Romero et al., 2015). These factors culminate in the identification and inclusion of project risk mitigation strategies, which are critical in infrastructure projects. Therefore, contingency management, risk management, and scientific managerial practices are of paramount importance for project success (Ayub, Thaheem, & Din, 2016).

Significance for evaluating Management KPI policy success

The significance for evaluating management KPIs in the public sector is determined by evaluating the implementation process (Hussain et al., 2016; Kaming et al., 2010; Mensah, & George; 2016), which can improve infrastructure capital projects efficiencies. The evaluation incorporates extensive assessment of the institutional hierarchy and examines the different phases of the project to determine compliance with the established protocol, policies, procedures and structures. Ayub et al. (2016) recommended the evaluation of project risk which is a critical tenet of projects that can impede success. These evaluations identified operational gaps and areas for further

amendments in keeping with best practices and projected outcome delivery (Hornstein 2014; Hussain et al., 2016). Kang et al., (2016), and Mensah & George (2015) advocated that the evaluation should adopt two approaches to be successful: continuous and summative. The continuous approach focuses on concurrent monitoring of indicators at every control point during the policy implementation, whilst the summative refers to the assessment of indicators at the end of a phase or the entire execution of the project (Eik-Andresen et al., 2017; Kang et al., 2016; Mensah & George, 2015). Bryson, (2016), Eik-Andresen et al. (2017), Gelderman et al., (2017), Kang et al., (2016), Mensah & George (2015), and Schlager & Cox (2017) recommended continuous monitoring as the most appropriate methodology for evaluating contextual effectiveness of projects or programs advancing that it determines, progress, operational performance, and assist in developing appropriate strategies.

The evaluation will identify gaps, operational efficiencies, and inefficiencies in the area of capacity, competence, systems, procedures, policy, rules, outcomes, and structure. This can lead to further investigation by utilizing the SWOT and PESTLE, to provide an understanding of the causes of the gap with the view to develop strategies to circumvent these gaps (Bryson, 2016; Hornstein 2014; Hussain et al., 2016; Nurcahyo et al., 2015). These recommendations were derived from the assessment of internal indicators, experience, and knowledge of management KPIs (Hussain et al., 2016). In many instances, this expertise was taught by training of subordinates, supervisors, and project management team responsible for appraising human capital performance, the operations, and execution of the project (Hornstein, 2014; Nurcahyo et al., 2015). Bryson

(2016), Kerzner (2017), Kuhfahl et al. (2013), and Nurcahyo et al. (2015) asserted that it was imperative that everyone is aware of the performance measures, indicators, goals, and monitoring instruments for the project.

Further, the project implementation process must be governed by relevant policies to facilitate in the successful implementation of management KPIs throughout the institution (Buabeng-Andoh 2015; Holcombe, 2005; Hornstein 2014; Kuhfahl et al., 2018; Nurcahyo et al., 2015; Peters et al., 2017). The can be achieved within the contextual frame of the IAD and Classical Management principles (Taylor, 2011) facilitating interactions between the external and internal environment, and institutional paradigm shift (Hussain et al., 2016). Bryson (2014), and Eik-Andresen et al. (2017) recommended that all institutional initiatives align its mandate and mission with the external environment comprising of social, economic, political, technological, stakeholders will, and resources availability. These undergirding principles created the premise for interactional relationship necessary for critical alignment of resources, operational optimal capacity, and achievement of the institutional goals. Bryson (2014), Kerzner (2017), Kuhfahl et al. (2018) advocated effective communication, collaboration, corporation, control, and engagement are profound in the achievement of the project.

During the continuous and summative assessment of the different aspects of the management KPI initiative, assessment should be conducted using the IAD and Scientific management framework of established standards (Bryson, 2016; Eik-Andresen et al., 2017; Gelderman et al., 2017; Kang et al., 2016; Mensah & George, 2015). After identification of operational gaps, complete analysis, and interpretation must be advanced

utilizing the SWOT and PESTLE tools to develop risk mitigating strategies (Bryson, 2016; Hornstein 2014; Hussain et al., 2016; Nurcahyo et al., 2015). By utilizing the concurrent assessment, methodology learning happens relatively quickly, because as inefficiencies occur they are identified, corrected, then reformation happens on the 'fly,' thereby expediting the paradigm shift rate, reducing performance inefficiencies throughout the project. As a result, developing a proactive culture instead of reactive culture, minimizing the potential problem, creating a system of monitoring that provides real-time alert, foresight of possible problems, and developing mitigating contingency strategies (Eik-Andresen et al., 2017; Holcombe, 2005; Kerzner, 2017). According to Eik-Andresen et al. (2017), this was a prudent approach since it required a full understanding of the cause and effects approach of strategic implementation that guides sound decision making under the scientific management theory model. In some cases, despite the extent of the planning, there are still pitfalls in performance or strategic implementations. As a result, comprehensive evaluations are recommended after implementation (Bryson, 2016; Eik-Andresen et al., 2017; Gelderman et al., 2017; Kang et al., 2016; Mensah & George, 2015).

Eik-Andresen et al. (2017) contended that one of the major challenges of policy implementation is overstating the benefits of the project to stakeholders to facilitate acceptance. This was due to a lack of knowledge, ethics, guiding principles and policy for project selection, lack of adequate project evaluation, and inaccurate communication at the initiation phases. Therefore, it is imperative that emphasis be placed on the policy formulation instead of on the outcome, which was lacking throughout project

implementation in developing countries limiting the ability to anticipate the result, assess progress, assess risk causing unforeseen challenges such as inefficiency (Andrés, et al., 2013; Armstrong, 2012; Boxall & Macky, 2009; and Cokins, 2009). Further, implementation maps, models, protocols, and matrix must be designed providing contingences to accommodate unforeseen implementation challenges, taking into consideration possible controllable and uncontrollable internal and external environmental factors (Eik-Andresen et al., 2017; Hussain et al., 2016; Villalba-Romero et al., 2015).

Ayub et al. (2016), and Nurcahyo et al. (2015) explicated that the evaluation process comprised of the assessment of the objectives, risks, limitations, structure, procedures and policies, human resources, system capacity, internal and external environmental factors. Further, it encompassed the hierarchy of the public sector and infrastructure capital project from initiation to construction, synthesizing these factors with input, process, output, and outcome to create a scientific sustainable solution (Holcombe, 2009; Kuhfahl et al., 2018; Peters et al., 2017). This evaluation process was an important tool for data collection and analysis which justify operational gaps creating the premise for developing appropriate strategies that can substantiate existing inefficiencies (Andrés, et al., 2016; Johansen et al., 2017; Kang et al., 2016; Mensah & George, 2016; Parmenter, 2017; Schrouder, 2016; Villalba-Romero et al., 2015). Thereby, lend to the understanding of the reasons for the success or failure of the policy guiding the reformation of the public sector infrastructure capital projects (Kang et al., 2016; Mensah & George, 2016; Villalba-Romero et al., 2015).

Therefore, the process of evaluation must be conducted effectively, holistically, and incorporate the processes and the phases of the infrastructure capital project (Kang et al., 2016; Mensah & George, 2016; Villalba-Romero et al., 2015). As a result, developing an appropriate appraisal system or protocol, and that are theoretically and contextually entwined within the IAD model, and the Classical management theory. This protocol will be utilized as the undergirded principle to reform the public sector by instituting the management KPIs for public sector infrastructure capital projects (Eik-Andresen et al., 2017; Villalba-Romero et al., 2015). It will identify the KPIs along the control points where there are deviations from best practices or established benchmarked indicators. Then, evaluated concurrently to identify efficiency gaps, that is utilized for the creation of the premise for learning, training, processes improvement, operational reengineering, and technological reform (Holcombe et al, 2009; Kang et al., 2016; Mensah & George, 2016; Villalba-Romero et al., 2015). In this regard, evaluation and appraisal must be used as the platform to improve effectiveness based on the understanding derived from the processes resulting in process modifications and improvement (Kang et al., 2016; Mensah & George, 2016).

Two of the most effective evaluation techniques are the Strength, Weakness, Opportunities, and Threats (SWOT) analysis which focuses on the internal factors, and the Political, Economical, Social, Technological, Environmental and Legal (PEST'EL) model focusing on the external environmental factors (Kang et al., 2016; Mensah & George, 2016; Villalba-Romero et al., 2015). These models identify internal and external factors of the public sector which contribute to its present operations. It is these factors

that serve as a catalyst to success or determine the failure of the sector reformation policy or the reformation of infrastructure capital projects undertaken and associated policy (Eik-Andresen et al., 2017; Hornstein 2014; Kerzner 2017; Kuhfahl et al., 2018; Parmenter & David 2017; Sandru et al., 2014). It is through the process of management KPIs, measurement, and monitoring of performance, and conducting the combined analysis of the SWOT and PEST'EL that the operational contextual factors are identified, and analyzed to determine the degree of impact of every factor (Mensah & George, 2016; Nurcahyo et al., 2015; Villalba-Romero et al., 2015). Eik-Andresen (2017); Villalba-Romero et al. (2015) posited that the results from the analysis provide in-depth understanding of the processes, procedures, human capitals, management, and system capacity, financial resources, risk, internal and external environmental factors, and performance measures to comprehend the variances and effectiveness.

According to Ayub et al. (2016), Bryson (2016), and Nurcahyo et al. (2015), every variance in performance standards as identified by the management KPIs is monitored and evaluated either concurrently or cumulatively. Therefore, it is imperative that the evaluation is included as a critical formal activity during every phase, and embedded in the scope from designing and planning through to implementation or construction, post evaluation and maintenance (Holcombe, 2009; Kang et al., 2016; Mensah & George, 2016; Villalba-Romero et al., 2015). Additionally, the process of evaluation is influenced by bureaucratic structure, political agenda, key stakeholders mandate, economical infrastructure, and technological advancement (Kang et al., 2016; Mensah & George, 2016; Villalba-Romero et al. 2015).

Ayub et al. (2016), Bryson (2016), and Nurcahyo et al. (2015) contended that the outcome of the evaluation both at the infrastructure project level and or at the public sector reformation level might have consequences on the public sector and on the capital project. This may lead to major adjustments of the processes, procedures, systems, policies, administrative rules, ordinance, structure, performance measurement system such as management KPIs, public sector capacity, and overall personnel training of public servants to achieve overall public reformation (Ayub et al., 2016; Bryson, 2016; Holcombe, 2009; Kang et al., 2016; Mensah & George, 2016; Nurcahyo et al., 2015; Villalba-Romero et al., 2015).

Chapter Summary

The literature review was conducted to illuminate the theoretical fundamental conceptual frame of the phenomenon studied. The review used scholarly and peer-reviewed articles that explored or examined performance measurement within public sectors, private-public partnerships (PPP) and private sector companies to a lesser extent. Further, this chapter placed emphasis on the following: the structure of KPIs, the processes of developing and implementing KPIs, the scope of the BSC, and the efficiencies of existing performance management systems within the public sector. Additionally, the role of management KPIs on construction processes and infrastructure capital projects, the incorporation of management KPIs into policies to reform developing countries infrastructure projects and the public sector.

Extensive searches were conducted utilizing multiple databases on relevant selected keywords to obtain relevant scholarly periodicals and documentation. These

were done through numerous search engines to capture academic researches on management KPIs, IAD and classical management theory frameworks, management KPIs formation, infrastructure project efficiencies, stages of infrastructure projects, policy adaptations to reform the public sector structure, policies, and administrative rules of developing countries. Because there were limited scholarly, and empirical evidences on the English-speaking Caribbean such Grenada public sector performance measurement system, reviews were conducted on developing countries globally. As a result, a snowballing approach was utilized to compare information obtained on developing countries KPIs globally to the experience in Grenada.

Based on the literature review the undergirding principles of management KPIs for infrastructure projects cost, quality and time, must be integrated throughout infrastructure capital projects phases and activities of input, process, output, and outcome to achieve efficiency. The process of performance measure and monitoring must be governed by appropriate policies, administrative rules, procedures, and systems. This will revolutionize the development and implementation of the infrastructure project in developing countries under a holistic framework inclusive of matrixes, and project protocols. These performance management systems are geared to mitigate the impact of project risk and the consequences of cost overrun, project delays and poor quality.

However, in light of the limited contemporary scholarly material on management KPIs on public sector infrastructure capital projects in the Caribbean. There is a crucial need to conduct a qualitative case study on the effects of management KPIs on public sector infrastructure projects efficiencies on the island of Grenada, which is both timely

and strategically appropriate, as a result bridging the empirical and scholarly gap relating to infrastructure project inefficiencies in Caribbean. Thereby, established a theoretical framework that can transform public sector infrastructure capital projects efficiencies regionally, and across the globe providing the project owners and stakeholders the comfort to undertake infrastructure projects.

Chapter 3 provides a conceptual framework of the selected research process. It advanced extensive discussions and justifications for the chosen research method, design, and sampling strategy. The chapter also provides an overview of the issues of trustworthiness and ethical procedures, the role of the researcher, and method of data collection.

Chapter 3: Research Method

Introduction

Research is one of the most renowned methodologies used to understand or explore the functionality of a phenomenon (Stake, 2010). According to Patton (2015), research methods can either be qualitative, quantitative, or mixed. In either case, it is used to determine the undergirding principles, influential factors, preconditions, correlations, and level of significances of the dependent and independent variables of the phenomenon. Research may seek to understand a particular problem or event, history, or experience, or to affect policy change, or to explore a situation to obtain insights that can mitigate the effects (Rubin & Rubin, 2012). Patton (2015) added that analysis and interpretation of data should be done to provide an understanding of the findings. However, in the absence of interpretation and analysis, data's meaning is limited and may even be useless (Patton, 2015). One of the critical factors during data interpretation is the researcher's role which is combined with judgment, observations, and measurement criteria established to facilitate acceptance of the research findings (Patton, 2015).

This study sought to obtain a comprehensive understanding of management KPIs' effects on public sector infrastructure capital project efficiencies on the island of Grenada. To improve infrastructure capital projects efficiencies, and add to the scholarly information on management KPIs for developing countries in the English-speaking Caribbean and around the world. Against this background, a qualitative approach and strategic case study inquiry were used to explore infrastructure capital projects. According to Patton (2015), a case study is a preferred choice for qualitative research

when there is a need to examine a specific experiential phenomenon and innovation. The study focuses on management KPI policy on infrastructure capital projects on the island of Grenada, emphasizing the evaluation of the existing BSC performance measure system, development of a comprehensive management KPI system, and implementation of this system within a theoretical and contextual framework of IAD and classical theory.

Additionally, the study focused on the contextual challenges experienced during the implementation of infrastructure capital projects on the island of Grenada, reiterating the impact of current practices on project outcomes and the potential influences management KPIs have on these projects' efficiencies. These principles undergird the creation of policies and administrative rules that govern the operation of the public sector. The study established protocols, matrixes, guiding principles, and standards for the implementation of infrastructure capital projects in Grenada, developing countries across the English speaking Caribbean, and around the world. As a result, these protocols and matrixes can be incorporated into policies that become the governing book of knowledge for infrastructure capital projects for public sectors, including every phase: initiation, planning, designing, approval, financing, construction, post-construction review, backfilling, and maintenance (Takim & Akintoye, 2002).

Research Design

Individuals' worldviews and philosophical aptitudes influence their responses provided and forming the undergirded structure of observations, and researcher's interpretation of the findings (Babbie, 2008). According to Patton (2015), it is prudent to understand that an individual conceptualization influences the logical choice used for

exploring complex situations. Therefore, it is essential to acknowledge and explicitly state the paradigm that underpins the premise for conducting the research (Babbie, 2008; Maxwell, 2013). The views expressed by individuals are the product of their worldviews which are shaped by their individual experiences and socialization paradigms (Maxwell, 2013). It is important for researchers to articulate a research methodology and philosophy. The latter serves as the underpinning principle that governs and justifies the procedures and decisions made relating to research design, interpretation, and data collection methodology (Maxwell, 2013; Patton, 2015).

Guba & Lincoln (1989) illustrated that within qualitative methodology there are different paradigms. However, the most infamous approach that shaped my research frame is the constructivist philosophy. According to Guba & Lincoln (1989), this philosophy assumes that the paradigm of the study undergirds the proposal of the study. Additionally, the problems and solutions should not be generalized or generally infer without providing further explanation of the situation. Against this backdrop, the constructivist philosophy underpins this study that explores the roles of management KPIs on infrastructure capital projects efficiencies on the developing island of Grenada. It will evaluate public servants, administrators, stakeholders, project management, existing systems, procedures, policies, measurement system employed by developing countries, and level of inefficiencies (Patton, 2015). In light of the constructivist philosophy, successes obtained from the initiative implemented in developing countries cannot be generalized but must be viewed in the context of the individual country. Therefore, the fundamental assumption for this study is that management KPIs implementation in public

sector infrastructure capital project in Grenada are not only influenced by the context in which they are introduced, but by the existing paradigm (Guba & Lincoln, 1989).The qualitative approach was ideal for this research because it incorporates the view, ideals, and experiences of the internal and external key stakeholders involved in the infrastructure capital projects. This information was collated, transcribed, coded, categorized, and themed using thematic analysis (Stake, 2010).

Research Design Justification

According to Patton (2015), the exploration of a particular phenomenon can be conducted by using a qualitative research design and case study analysis. This approach was used to investigate the event holistically considering the functioning of the distinguished and unique elements of management KPIs, infrastructure capital projects, and the public sector. The qualitative research design is synonymous with iterative activities where a researcher and interviewer play an integral role soliciting information on a piecemeal basis through a series of interviews and literature review (Maxwell, 2013; Patton, 2014; Seidman, 2012; Turner, 2010). Ravitch & Carl (2016) asserted that the qualitative inquiry is influenced by personalities, individuals' worldviews, research situations or locality, experience, and interpretative capacity. Therefore, the fundamental component of a qualitative research design or qualitative case study approach are purposive sampling, which refers to the structured selection of critical internal and external stakeholders for qualitative data collection, and thematic analysis techniques comprised of transcription, coding, categorization, themes, and analysis (Ravitch & Carl 2016; Saldaña, 2016).

Sabatier and Weible (2014) acknowledged that the core feature of qualitative research is interpretative perception which is enshrined in the research process. These interpretations are undergirded by experiential foreknowledge of the phenomenon, personal experience, others' experiences, and information and materials obtained from periodicals and documentation (Patton, 2015). Based on the purpose and nature of this study, such an approach was adopted. According to Patton (2015), the qualitative design created the premise for interpreting the data gathered through interviews, documents, and literature review. Additionally, it provided the underpinning principles for data organization, analysis, and interpretations using coding, categorization, ranking, and thematic analysis (Meyer & Avery, 2009).

Patton (2015) explained that in qualitative studies the sample size is determined by the point of data saturation, which is based on a researcher's judgment. However, according to Maxwell (2013) sample size tends to be relatively small, because the emphasis is placed on documentation distinction and preservation. Against this backdrop, I conducted 12 extensive interviews during the data collection process. After the 12th interview, saturation was achieved; because there were noticeable similarities in the responses to critical questions. Therefore, according to Creswell (2007), Patton (2015), and Rubbin and Rubbin (2012) this represented the collection of sufficient data to facilitate analysis to draw an informed conclusion.

Research Question

Patton (2015), Rubbin and Rubbin (2012), and Stake (2010) reiterated that the fundamental role of a research question in research design is to create the premise for

selecting an adequate research methodology. According to Creswell (2016), this question should adhere to the criteria established for qualitative research questions. These criteria include, the open-ended and answerability of a problem or phenomenon inquiry, a clearly defined goal expressed by a verb demonstration of a topic of interest that creates passion, non-directional language, and a general sample group or setting. This question should create the undergirding principles of qualitative design forming the basis for the research alignment, and establishing the form, methodology, design, approach, and all other components (Creswell, 2016; Maxwell, 2013). It is undergirded by a research problem that is derived from synthesizing a social problem identified from a gap in the literature, a social ill, or experiences attained from career, which is explicated in the research purpose (Rubin & Rubin, 2012). Patton, (2015), and Stake (2010) contended that a research methodology is the product of the research question, which is the fundamental component of qualitative inquiries reflected throughout the research to achieve the required alignment.

Research question formulation can implicate the feasibility of methodology, the validity of a study, the generality and reliability, and relevance of the research that shape the inquiry of the phenomenon (Maxwell, 2013: Patton, 2015).

The central research question for this study is:

RQI: To what degree do management KPIs affect public sector roads, utilities and buildings infrastructure capital project efficiencies on the island of Grenada?

Additionally, the following two additional supplementary sub questions were formulated to amplify further and facilitate the answer to the central research question;

RQ1a: What experiences determine public servants' and stakeholders' perceptions of existing KPIs' and their effect on infrastructure capital project efficiencies in Grenada?

RQIb: To what degree do public servants and stakeholders perceive public sector infrastructure capital projects as efficient?

Researcher Responsibility

A researcher is fundamental in qualitative research because the researcher serves as the instrument through which observations, descriptions, and interpretations are executed (Maxwell, 2013; Patton, 2015; Stake, 2010). The role of the qualitative researcher is personal and subjective because the research varies based on the researcher's and participants' worldviews (Stake, 2010). As a researcher, my role was integral to the process, including data collection, organization, interpretation, analysis, and findings presentation (Patton, 2015; Rubbin & Rubbin, 2012; Stake, 2010). These roles demonstrate my influence and judgment. It commenced with the interview protocol, interview questions, participants selection, interview strategy, data organization, analysis, interpretation, and findings reporting. Notwithstanding my personal involvement I made efforts to ensure competent and objective data collection, analysis, and presentation (Patton, 2016; Stake, 2010).

According to Stake (2010), research questions facilitate objective and subjective interpretation of the research findings which are geared to achieving the research objectives. Because a researcher's worldview predominates qualitative research findings interpretation, explicitly explaining the anticipated biases that might be confronted during

the process of analysis of participants experiences, views, and perceptions is necessary (Stake, 2010).

Researcher Bias

Some biases are present in qualitative research. Consequentially, it is prudent for a researcher to mitigate the effects of these biases by identifying, analyzing, and informing the research stakeholders (Patton, 2015; Stake, 2010). While it may be impossible to eliminate or prevent the risks associated with a researcher's worldview that may affect a researcher's perceptual lens, theories, and beliefs. It is imperative that explanations and justifications are presented of the potential biases and possible mitigating strategies (Maxwell, 2013; Patton, 2015). According to Guba and Lincoln (1989), one contingent strategy is constructivism, which is an alternative to the original qualitative traditions prevalent in research based on an experiential phenomenon. Additionally, biases represent the manifestation of a researcher's opinions, which is considered odious (Guba & Lincoln, 1989). Despite their existence, a researcher's opinions are not problematic once presented, analyzed, and critiqued in keeping with the established standards and ethical criteria for qualitative research (Guba & Lincoln, 1989).

One ethical criterion for qualitative inquiry necessary for research quality threatened by biases is trustworthiness. Biases create researcher subjectivity that can influence the choice of data for emphasis in the analysis, the establishment of the research goals and perceptions, and the selection of data most appropriately aligned to the adopted theory (Maxwell, 2013). These biases are the products of predispositions that can manifest in mistakes and data inaccuracies (Stake, 2013). However, the objective of

qualitative research is not to eliminate bias influences, but to understand, explain, and optimize its use (Maxwell, 2010). Although there may be data errors resulting from the biases, beliefs, and perceptions, the primary objective of the researcher is not to eliminate biases, but to mitigate the effect of these biases (Stake, 2010). To reduce these effects, it is imperative to establish more appropriate research strategies, ensure triangulation, reflexivity, and maintain alignment with the process of validation and verification (Stake, 2010).

According to Stake (2010), some of the shortcomings of research are the research question, participants, research methodology, data collection approach, analysis process, and researcher's interpretation technique selection which are hinged to the researcher's worldview. These personal interest or choices must be approached with care because they can affect the overall study. Therefore, the predispositions or idiosyncrasies that create subjectivity should be carefully stated, defined, explained, and critically reviewed in the context of research protocols, frameworks, and instruments (Stake, 2010). Additionally, close attention should be placed on monitoring the research process, and outcome against explicitly stated standards.

My research was framed against these strategies and techniques forming the undergirding principles for a bias-mitigating strategy. The case study approach focused on the roles of management KPIs in public sector infrastructure capital project efficiencies on the island of Grenada. Specific emphasis was placed on the research's reliability, validity, trustworthiness, and credibility. As a result, little predisposition or opinion was employed during the study with the intent to mitigate the impact, while

achieving the above criteria. According to Guba and Lincoln (1989), the fundamental issue is not the predisposition or opinion alone or prior knowledge, but the manner or approach used during the exploration of the phenomenon. However, because of my experience with the event during my tenure working in the quasi-public sector, public sector, and private sector, my predisposition and opinion were influenced.

Being a senior executive, business analyst, management, and project consultant for over 20 years both on the island of Grenada and in the United States, the analysis, management, auditing the project, and development of business policies, procedures, and systems were my principal activities. Operating in these capacities, furnished me with insightful information on these institutions infrastructure capital project procedures. As a result, firsthand knowledge was gathered on public project inefficiencies, and internal and external project risks. This created the premise for developing a comprehensive project performance measurement system, re-engineering project management structure, and reforming project policies, administrative rules, procedures, and performance measures to facilitate contingency planning. This created a roadmap for public sector reform regarding infrastructure capital projects implementation in Grenada, other English-speaking Caribbean, and developing countries globally. This premise led to the overarching principle of my research study with the view to explore the impact of management KPIs on infrastructure capital project efficiencies on the island of Grenada.

Research Methodology

The method I used in the data collection process was a qualitative case study inquiry determined by the research question. As a result, the method I selected was based

on its suitability and my preference. Maxwell (2013) clarified that the purpose of a study, the theoretical and conceptual framework, and the philosophical orientation prescribed, and researcher's role and importance in the study influencing the research methodology choice. This created the correlation and alignment between the research question, the researcher, and the data collection approach as a result establishing the research question that forms the blueprint for data collection.

Additionally, the methodology is contingent on the research question, the phenomenon, the stakeholders, and the likely effectiveness of strategy within the context of the research study (Rubin and Rubin, 2012). In light of the above statement, my philosophical orientation of constructivist-interpretivist, together with the study purpose, research goals, and interest to explore the degree to which management KPIs affect public sector infrastructure project efficiency on the island of Grenada, the qualitative inquiry was selected as the most aligned and suitable methodology to answer the research question.

Further, it was imperative that the data collection methodology incorporated extensive documentation or periodicals review, and interviews (email and telephone). The participants included senior and junior public servants, project team embers, quasi-public sector administrators, and key stakeholders on the island. These individuals have a vested interest that is affected either directly or indirectly by infrastructure capital projects undertaken by the public sector. The findings will be used for the development of government-wide protocols, matrices, policies, and strategies that will positively transform the public sector capital projects implementation.

Qualitative Inquiry Strategy

Snowballing through purposive sampling strategy, coding, and thematic analysis was used in conducting my qualitative case study (Stake, 2010). This process is divided into seven main sections: organization and preparation, identification of the framework or approach, data sorting to create a frame, conducting descriptive analysis or examination, categorization, tabulation, and recombination (Rubin and Rubin, 2012; Saldaña, 2016). According to Patton (2015), and Yin (2014), the qualitative case study is the most appropriate strategy for exploring a complex phenomenon to obtain a better understanding. Yin (2014) contended that case study is used as the researcher seeks to answer how, why, and what of the research question to comprehend and explain a phenomenon.

Patton (2015) argued that system theory which is characterized by mechanistic/linear and organic/systemic construction, holistic thinking, interdependent, synthetic thinking, functional and system approach/ thinking, team-oriented, collaborative, and exploratory is fundamental in qualitative case study inquiry. Ravitch and Carl (2016) clarified that qualitative case study research utilizes case study analysis, observation, and interview to collect data by thorough reviewing of documentation, monitoring, consultation, and interrogation of participants to obtain information about a phenomenon.

In conclusion, the case study is an empirical inquiry to understand contextual factors of an existential phenomenon, utilized to clarify and explicate the critical factors through theoretical frameworks (Yin, 2014). These frameworks seek to evaluate the

correctness of the theoretical construct and preposition of the phenomenon with the view to rationalized and justify its relevance. According to Patton (2015), the conceptual framework of the case study is beneficial since it was previously utilized to establish the premise for data collection and analysis. Additionally, Yin (2014) opined that based on the case study intellectual history and contributions to knowledge and the transformation of research theories credence had been attributed to this framework.

The research strategy strength is reinforced by documents, interviews, and observation the bedrock of qualitative case study (Patton, 2015). This benefit has encapsulated my research becoming my research objectives which focused on the role of management KPIs on infrastructure capital project efficiency on the island of Grenada. The BSC performance measure that was introduced in the English-speaking Caribbean such as Grenada has been presented by SAP and incorporated throughout the public sector (Elu, 2000; Green, 2009). According to Ostrom (2005), the IAD is the appropriate framework for assessing an existential intervention with the objective to reform and re-engineer policies, administrative rules, and ordinances geared to enhance operations.

This framework coincided with the classical scientific management principles where the management infrastructures are analyzed to identify gaps, or inefficiencies and development of the most appropriate strategies (Taylor, 2005). Although there are little empirical justifications to substantiate the methodology utilized under SAP, the IAD and the scientific management theory will be used in my research to explore the existing performance measurement system. Additionally, the study will critically evaluate the existential performance measure roles in infrastructure capital projects inefficiencies with

the objective to develop mitigating strategies, protocols, matrix, policies, rules, systems, and ordinances that will reform the public sector operations. Thereby, revolutionizing infrastructure capital projects implementation on the island of Grenada, throughout the developing countries within the Caribbean, and across the world.

As stated above, case study research approach is appropriate for evaluating and conducting an extensive examination of an existing phenomenon that involves human elements (Patton, 2015). Patton (2015) affirmed that the case study inquiry has been a successful inquiry strategy for research that evaluates, and explores rich data provided by participants from an experiential event, phenomenon, or intervention. It is imperative that this case study research adhere to the criteria specified for qualitative case study research as prescribed by the Institutional Review Board (IRB) (Rubin and Rubin, 2012). This institution established specific boundaries, procedures, and ethical practices for the study based on the nature of the study, location, and population inclusive of the government ministry involved in infrastructure capital projects on Grenada. The data collected explained the process of the infrastructure project from initiation to post implementation review, highlighting areas of inefficiencies, causes, limitations, and the need for comprehensive management KPIs for the regulation and monitoring of capital project implementation on the island of Grenada.

Sampling Strategy

Ravitch & Carl (2016) explicated that the purpose of qualitative research is to solidify an understanding of a phenomenon contextual preposition. The phenomenon of interest is infrastructure capital project inefficiencies. This is incorporated into the

research question indirectly since the research is qualitative and non-directional (Houghton, Casey, Shaw & Murphy, 2013). Thus, resulting in the selection of the purposeful sampling strategy with a snowballing approach, which are features of qualitative research design (Rubin & Rubin 2012). According to Guest, Bunce & Johnson (2006), the criteria of inclusion and exclusion are critical in qualitative research because it provides a guideline as to who should be included and excluded from the sample. These are explained and decided in the research design phase of the purposive sampling strategy for implementation during data collection (Patton, 2015).

Creswell (2007), and Patton (2015) contended that it is imperative to provide the information needed to illuminate and understand research problem and present clarity of the researched phenomenon. Creswell (2007), Patton (2015), and Rubin & Rubin (2012) argued that the initial step in the sampling process is criterion sampling which refers to participants' choice based on established specifications. This includes key stakeholders who are affected by infrastructure capital projects, both the owners of the project (government of Grenada, project management), and those focus on the outcome (end users or citizens of Grenada) were interviewed. Because of my experience within the public and quasi-public sector access was sought from the government of Grenada, ministry of communication and works, and infrastructural planning department and NAWASA to interview project managers, subordinates, and some commercial and residential customers. Then snowballing technique was utilized to connect gains and build on insights obtained during the data collection phase. The snowballing technique added relevant participants and facilitated in the identification and selection of informed

participants based on the initial interviewees (Creswell, 2007; Patton, 2015; Rubin & Rubin, 2012).

The size of the sample in qualitative case study research was based on the principle to attain relevant data, and theoretical saturation while maintaining objectivity, validity, reliability, and adequate representation of the population (Patton, 2015). According to Patton (2015), sample size is relative or 'it depends,' which is a relative answer based on the reasonability of the different key research stakeholders like the dissertation committee preference, access to participants, resources, and question importance to the research. In some instances, only one respondent can suffice (Patton, 2010). Additionally, the quality of the sample group and the nature of the studies determined the sample size and saturation point. In some instances, a sample size of 19 is considered a moot point, however, can be considered adequate if the sample size attained an excellent range of response to the research question. Similarly, Patton (2015) contended that the sample group and saturation could be categorized by study level graduate students between 12 and 60, with 30 being the mean. Patton (2015) contended that there is no governing rule undergirding sampling size for qualitative inquiry because the size is dependent on the researcher's objectives, the state of the interviewees, objectives of the interview, time, resources availability, and credibility of the collection sources. Although the size of sampling for qualitative inquiry might be relatively small for the criteria of generalization and reliability, a small sample sized can be used and be valuable once the sample is information-rich and saturation can be achieved (Creswell, 2007; Patton, 2015)

According to Creswell (2007), the small sample size in the case study is generally sufficient for thematic analysis. As it relates to the establishment of saturation, it is considered a point at which no further insights are provided by additional information obtained from interviewing participants (Creswell, 2007; Patton, 2015). Therefore, to attain saturation, it is recommended that a total of 10 to 12 interviews be conducted to conceptualize the case study (Creswell, 2007). Of paramount importance, is the need for the researcher to access unknown participants and take the initiative, establish contact, and requisite interviews, which were the steps taken during my interviews in Grenada. First, samples were obtained from the management of the government department of works, planning, and infrastructure development, quasi-public sector management, and commercial and residential citizens. These participants were selected because of their involvement either directly or indirectly in the implementation of infrastructure projects or were affected by the outcome of these projects. Patton (2015) advanced that the true essence of the phenomenon or experience is obtained only from individuals who can advance their perspective because they have experienced the phenomenon. In light of the participant's role, they were adequately positioned to elucidate the issues addressed by the study and provided the relevant rich information that facilitated in understanding the phenomenon (Patton, 2015).

The process involved the recruitment of participants through an official request for participation in the study sent via e-mail. This process provided an overview of the principal aspect of the study, including the study problem, purpose, and justification for participation, detailed requirements, and expectations (Rubin & Rubin, 2012). The

utilization of e-mail in research and data collection has gain prominence over the last decade since it is a cost-effective and prudent method for contacting participants (Seidman, 2013). Meho (2016) asserted that e-mail is a viable alternative to phone and person to person interview. However, skepticism may arise from the use of e-mail, especially receipt of the e-mail from unknown contacts. These e-mails may be disregarded initially, since potential participants may deem the e-mail message impersonal (Meho, 2016; Seidman, 2013). Therefore, follow-up telephone calls were made to personalize the request, ensure receipt, provide the explanation on the interview process, and clarity of the issues as necessary (Marshall & Rossman, 2011; Meho, 2016).

Data Collection Approach

According to Patton (2015), data collection for the qualitative case study research encompasses several sources with the objective to attain data saturation and answering the research question. In the case of my study, data was collected from the following sources: (a) Periodicals or documents from publicly accessed records such as public sector manual and policies; reports compiled by international development agencies such as the IMF, World Bank and ECCB; reports and material available on the websites of Government of Grenada and NAWASA, and the department of communication, works, and infrastructural development. (b) Key stakeholders including the public service administrators, infrastructure capital projects executives, project workers, and commercial and residential citizens affected by the outcome of the project. (3) Follow-up discussions either via phone or e-mail with participants previous interviewed to validate the collected data (Creswell, 2007).

Interviews are one of the formidable approaches to obtain information during research since it is deemed as the most important sources in the case study (Patton, 2015; Stake, 2010; Turner, 2010). This process facilitates in the gathering of information that provides access to the perceptions and opinions of interviewees that cannot be attained by observation and other means (Patton, 2015; Rubin and Rubin, 2012). Seidman (2013) agreed that an interview is one of the compelling techniques utilized during the qualitative inquiry that assist researchers to gain an understanding of the phenomenon through the perceptions of participants who experience the event. It provided necessary and sufficient information that led to adequate interpretation and analysis. The interview questions that were utilized in the qualitative research were opened-ended meaning that participants were given the opportunity to include their knowledge, ideas, and experiences to answer the questions, as they present the 'it' or 'truth' of the recounted experience of the phenomenon (Patton, 2015).

Conversely, the quantitative research utilizes surveys and questionnaires designed using closed questions. These questions are general and abstract opinions, whereas, the qualitative interview technique focuses on specific events or actions with open-ended questions (Maxwell, 2013). The interview method utilized during my research included e-mail, calls via Skype or telephone, or by WhatsApp to gather primary data. According to Maxwell (2013), although the research question articulated a summative expectation of the study, the interview questions undergirded the research question, and solicited detailed answers to facilitate illumination and understanding of the phenomenon. During

the interview, the participants were given the opportunity to express their opinions about the event, to recount the experience and share insights (Yin, 2014).

Maxwell (2013), and Patton (2015) affirmed that a thorough understanding of the context of the research is fundamental for the development of the interview questions. These questions were geared towards gaining illumination and justification for the adoption of the management KPIs for public sector infrastructure capital projects efficiencies in developing countries, such as Grenada. This information may lead to the reformation of policies, procedures, management systems, administrative rules, performance management system, development of project matrix, and protocols. The research assessed the role of management KPIs in similar developing countries and the level of success achieved.

Despite the profound excellence and advantages of the interview technique utilized in qualitative inquiry data collection, there may be some limitations. These include distortion of some of the results due to political reasons and job security, personal biases of participants, frustration of the interviewees based on the work environment, participants lack knowledge on the topic, refusal to answer all the questions in the interview, lack of interviewer and participants rapport, and emotional predisposition of the participants (Patton, 2015). According to Rubin and Rubin (2014), during the interview design and conducting the interview, the interviewer must utilize reflexivity to ensure the relevance of the answer. As a result information gathered during the meeting was triangulated with the publicly available periodicals on management KPIs implementation for infrastructure projects on the island of Grenada. These periodicals

were rich sources of information that assist in the illumination of the phenomenon (Patton, 2015). Therefore, these documentations were examined during data collection to corroborate the findings of management KPIs effects on public sector infrastructural capital projects on the developing island of Grenada.

Research Instruments

For the data collection process, a standardized opened-ended interview protocol was developed for the method of data collection. According to Patton (2015), this approach facilitated the thorough analysis of data because of its systematic responses enabling efficient transcribing, coding, categorization, and thematic analysis. This interview protocol was available to allow evaluation of its content and to ensure its adequate utilization during the collection process. This instrument was incorporated into an interview guide or protocol which created the interview framework or interview blueprint. Although it may offer a form of standardization, it flexibility enabled autonomy for the interviewer and researcher. However, it can lead to subjectivity because the researcher and interviewer utilize judgment during the data collection and interpretation process. Thereby, creating qualitative and interpretative variances deriving from the interviewer and researcher predisposition, and the depth and breadth of the information collected (Patton, 2015).

The standardized framework ensures credibility and reliability because it guides the data collection process creating consistency in the information collected. Although every individual interviewed was a unique case and data source with its perspectives and opinion, information consistency was maintained through its standardized approach

(Patton, 2015; Turner, 2010). This approach did not allow for impetuous exploration of paralleled issues nor relevant to the interview, therefore restricted the exploration of interviewees' peculiarities and differences during the research (Patton, 2016). This limitation was mitigated by follow-up telephone discussion to clarify issues and validate response as deemed relevant. According to Patton (2015), and Ravitch & Carl (2016), the standardized approach with an open-ended interview protocol detailing the interview questions prepared for exploring the phenomenon was utilized. This protocol provided a summative outlook of the interviewing process and the systematic probing pertinent for the questions to be answered.

Patton (2015) affirmed that the incorporation of probing questions within the protocol reduced the need for the researcher and interviewee subjectivity during the data collection process. In light of this, careful consideration was given to the formulation of the interview questions, and efforts were made to include sub-questions to clarify probing questions as was necessary. These questions were designed based on the research approach, the examinable issues, literature review, and past research. Patton (2015) argued that these probing questions and sub-questions focused on creating prioritization of issues that facilitate the optimum utilization of time since the prescribed allocated time per interview was 45 minutes.

The e-mail interview was forwarded for review by the interviewee and facilitated the written transcription, but the telephone interview which took 45 minutes was conducted and transcribed. A total of 13 questions were included in the protocol. The interview questions were e-mailed to the participants because I am currently residing in

the USA and my schedule does not grant me the flexibility to visit Grenada, then followed by telephone, WhatsApp and Skype discussions. These interviews were electronically recorded to ensure accurate transcription during the analysis phase. The conversations were then subsequently compared with the e-mailed responses received from the participants where applicable. The public periodicals and documents utilized were obtained from the Government's and NAWASA's website, internal reports, regional and international agencies. This complete data collection process was done over a period of two months inclusive of collection and validation.

Data Analysis

Data analysis refers to the thorough search of data to identify similarities, consistency, association, correlations, connections, and degree of significances (Patton, 2015; Stake, 2010). According to Maxwell (2013), design within the context of qualitative study stipulates the process of data analysis and creates the blueprint or roadmap for the research structure and analysis process. The utilization of qualitative data analysis strategy as detailed in the analysis plan was geared to validate and verify the data by ascertaining similarities of illuminations (Patton, 2015). Despite there is no unique or correct approach to analyze qualitative data, the use of qualitative data analysis should be adequately planned and modified based on the research question (Maxwell, 2013). The analysis strategy should be able to mitigate validity threats and reliability challenges that can negatively impact the research findings and conclusion.

These challenges undergirded data analysis and formed the fundamental acceptable approach for qualitative studies analysis which continues to gain popularity. It

is known as thematic analysis which is defined as interconnected systematic conclusive data comparison (Attride-Stirling, 2001). This process was utilized in my dissertation, and comprised four key elements as stated above; the collection and organization of data in a chronological manner for ease of use and interpretation (Meyer & Avery, 2009). This first phase utilized columns and rows to form table and charts for visual depiction and further analysis; Second, the analysis of data involved coding, categorization, memoing, and theming to form data coherency (Ritchie & Lewis, 2003); Third, interpretation, development of discussion, and conclusion of data (this was enabled by code analysis), (Meyer & Avery, 2009); and final, action plan to operationalize conclusion to effect social change. Therefore, it was important to thoroughly follow systematic prescribed steps which were incorporated in the analysis plan, namely; reading the narrative responses from the emailed interviewee, listening the interview tapes, and transcribing the telephone interview which was subsequently validated; data coding and categorization; memoing, and themes (Maxwell, 2013; Patton, 2015). The reading of the interview response, listening of the interview tape, and the transcription were the initial components of data analysis which facilitated data understanding.

According to Patton (2015), and Rubin & Rubin (2014), there are two approaches to transcription, namely; formative or verbatim and summative. The formative or verbatim is the progressive assessment and transcribing of the interview recorded response to the question which are done directly by the researcher or the interviewer. Whereas, the summative approach refers to the process of reviewing the interviewees' responses at the conclusion of the interview, then summarized the responses content

(Halcomb & Davidson, 2006). This approach can result in several errors, both omission, and transposition. Even if it is done by the researcher who developed the research and utilized extensive judgment, there is still the possibility of errors which is only mitigated after several editing and reviewing efforts by the researcher (Halcomb & Davidson, 2006). During the formative approach, transcribing commenced by the researcher during the interview ensuring the validity, variability, and accuracy of data collection (Rubin & Rubin, 2012). Patton (2015) asserted that the formative approach allows validation of the recorded transcript, resulting in the elimination of errors. This approach adds to the credibility and trustworthiness of the findings, the research, and proposed research recommendations.

During transcription, the actual content of the interview is rewritten and reorganized logically to create a sequential flow of information for further analysis (Maxwell, 2013; Patton, 2015; Rubin and Rubin 2014). According to Maxwell (2013), and Rubin and Rubin (2014), the researcher is provided an opportunity for analysis during listening to the interview tapes before transcription. Therefore, it is recommended that memos and notes should be generated based on the information collected from listening and reading to ensure consistency and accuracy in the information gathered to develop tentative ideas from the data (Maxwell, 2013). These ideas highlight relationship and significance in the data that forms tentative categories for coding and use in the data analysis.

Secondly, coding and categorization of the qualitative data based on established patterns, classifications, similarities, and data consistency (Maxwell, 2013; Patton, 2015;

Stake, 2010). Coding is defined as the process of segmenting data based on units of similarities for which a code is assigned for ease reference (Maxwell, 2013; Patton, 2015; Rubin and Rubin, 2014). It is identified as the main strategy for categorizing qualitative data (Maxwell, 2013). Coding involves the arranging and rearranging of the theme into categories for further comparison of the data categories to develop theoretical concepts. Similarly, categorization refers to the identification of ideas relationship based on standard features or themes identified through contrast (Maxwell, 2013). During the process of coding, the data were sorted and categorized based on the research question, topics associated with the problem statement, and theme, as detailed (Maxwell 2013; Patton 2015; Stake, 2010). Then the data was categorized and assigned labels that represent each category's idea creating the premise for inter and extra category examination and comparison (Maxwell, 2013).

Further, Rubin & Rubin (2016) defined coding as the undergirded element in qualitative data analysis providing the platform for data comprehension and natural interpretation of findings. It is this premise that led to the categorization and creation of patterns for further investigation. The coding method selection for qualitative data analysis is based on cost, accessibility, and time. There are several recommended approaches appropriate for data analysis inclusive of Value Coding, Descriptive Coding, and Vivo Coding to name a few (Rubin & Rubin, 2016).

Over the course of the study, there was continuous modification of the categories and themes establishing new meaning based on the availability of new information (Rubin & Rubin 2014; Stake, 2010). Categories were divided into two types, namely;

organizational and theoretical categories (Maxwell, 2013). Organizational category refers to general issues or topics that the researcher uses to categorized and organized the data for investigation. Conversely, theoretical categories relate to the participant statement or action content relating to the study or phenomenon (Maxwell, 2013). As much as theoretical categories are important, generally there are times the researcher only utilizes organizational categories. However, it is recommended that the researcher commences the qualitative research with the organizational categorization then conclude with the theoretical categories to develop the most appropriate conclusion (Maxwell, 2013). As a result, this technique identified actual connections between topics with little emphasis on the similarities and differences (Maxwell, 2013; Patton, 2015). It was these data categories created from contextual relationship that were displayed during thematic analysis (Maxwell, 2013), forming the premise for my data analysis approach. Additionally, notes were made from relevant and pertinent information obtained from the periodicals and documentation reviewed during the interview. These were also categorized and coded for further data analysis and interpretation, and created the premise for forming conclusions of the findings.

The analytical tool utilized for my dissertation was Microsoft excel since it is familiar, mathematical framed, flexibility and cost-effectiveness (Meyer & Avery, 2009). Additionally, it was ideal for the execution of the following key functions of qualitative analysis, coding, categorization, memoing, and theming (Patton, 2015). According to Rubin and Rubin (2014), and Yin (2014), computer software utilization in qualitative data analysis prominence and popularity has increased over the last decade. Yin (2014)

agreed that the software simplifies the process of coding and categorizing of data collected from qualitative interviews and periodicals obtained during the review. Since the software is a tool, then it is the responsibility of the researcher to complete the analysis and to ensure data quality (Yin, 2014).

After the interview data was collected, columns and rows were created to form table and charts to present a visual depiction for further analysis inclusive of coding, categorization, memoing, and theming to form data coherency (Ritchie & Lewis, 2003). Subsequently, interpretation and development of discussion and conclusion of data were developed to enable code analysis (Meyer & Avery, 2009). Then an action plan was prepared to operationalize conclusion to effect social change. Stake (2010) reinforced that the qualitative research process is iterative comprising data collection, information analysis and segmentation or sorting of data based on themes, interpretation of the categories or themes and synthesizing the information through reflexivity to the research question. Additionally, Stake (2010) explained that the iterative process was encapsulated in the final report presenting the in-depth understanding of the research problem and phenomenon explored. In the case of my research, the iterative process was utilized to explore the issue of management KPIs impact on infrastructural capital projects efficiencies on the island of Grenada.

Although one of the limitations with using Excel as an analytical tool for my research was that it requires the manual creation and labeling of several column and rows. It created the flexibility to manipulate the data by easy access to information cutting and pasting. This process was repeated for each interview and periodical until

completion of the transcript for analysis. The columns and rows were created to capture the attributes and context of the findings to simplify interpretation and analysis. After preparation, it became easier to identify the patterns and similarities in the responses to ascertain the topics or categories. Critical to the analysis was the labeling of the rows and columns to create a systematic and logical linkage of information flowing throughout the interview. As a result, a structural worksheet was developed which created ease in referencing the topics and categories (Meyer & Avery, 2009). Therefore, it established the undergirding principles for codes, categories, memos, and themes which were aligned with the research question of the discussion and conclusion section of the research (Maxwell, 2013; Patton 2015). Additionally, once the transcription was completed and the columns and rows created, similarities and connections were color-coded to extract topics and categories. As a result, set the stage for further analysis, weighting or ranking, linkages or connectivity, and deducing themes that assisted in the formulation of the conclusion (Meyer & Avery, 2009).

Research of Trustworthiness

Guba and Lincoln (1989) asserted that the issue of quality and trust of qualitative studies are the products of credibility, transferability, dependability, and confirmability. Within the epistemological and ontological constructivist paradigm, the meaning is brought to these criteria through a thorough assessment of the internal and external validity, reliability and objectivity of the research. This assessment is geared towards exploring the study applicability in the context of the established criteria to determine its trustworthiness. Generally, a limitation of the qualitative research is its inherent personal

predisposition which creates inherent subjectivity (Patton, 2015; Stake, 2010). Based on the established criteria and the derived constructivist paradigm, the factors of credibility, transferability, dependability, and confirmability undergird my study. Therefore, were incorporated in the planning and executing. According to Guba and Lincoln (1989), the reconstruction of reality by participants is undergirded by the criterion of credibility. Therefore, it underpins the attributes of the participants and the researcher. Guba and Lincoln (1989) recommended that the most appropriate assessment method for evaluating this criterion are, progressive subjectivity, audit trail, peer debriefing, and member checking.

Additionally, Creswell (2007), Guba and Lincoln (1989), Patton (2015), and Stake (2010), stated that membership checking technique is one of the critical strategies that enhance qualitative study's credibility. It involves the validation and ratification of the draft transcribed interview content by the participant (Patton, 2015; Stake, 2010). As mitigating strategies for trustworthiness are member checking, memos, notes preparation for monitoring progress, and reviewing and explaining the interview content to the participants before the commencement of the interview. The reconstruction process involved reflexivity throughout the interview and study as progress is recorded to ensure contextual correctness (Guba & Lincoln, 1989; Patton, 2015).

According to Guba & Lincoln (1989), the strategy of reflexivity and continuous monitoring are referred to as progressive subjectivity, which is a critical component for interview recording and experiential reconstruction. The strategy of progressive subjectivity was utilized to ensure that the participants' constructions were adequately

integrated to achieve accurate representation in the findings. These findings are integral to the research, forming the conclusion and representing collaborative efforts between the participants and the researcher (Guba & Lincoln, 1989; Patton, 2015).

Another criterion is transferability, which refers to the migration of judgment and applicability of study content to similar environment or circumstances (Guba & Lincoln, 1989). According to Guba and Lincoln (1989), and Patton (2015) transferability criterion strategy is addressed through thorough documentation of the institution's environment, cultural milieu, plus place, time, and context of the study. Additionally, a range of views were solicited through the interviewing of a cross-section of stakeholders to obtain diverse views relating to the issue or phenomenon. Although the objective of transferability is not a generalization, the detailed description of the findings facilitates in effective transferability and adoption of the study content (Guba & Lincoln, 1989).

The dependability criterion was addressed through the documentation of the methodological framework utilized. This methodology recognized the scholarly impact and utilization which created consistency in the approach and scholarly dependable practices, increasing the research confidence. Whereas, confirmability criterion was infused throughout the study by careful coding and documentation, with specific emphasis on the constructions developed in the study, coupled with the effort to create an audit trail of data to their sources and the premise for making informed conclusions (Guba & Lincoln, 1989; Patton, 2015). An additional strategy to achieve trustworthiness is the triangulation of data source (Creswell, 2007; Stake, 2010). According to Maxwell (2013), triangulation refers to a strategy that asserts the credibility and accuracy in the

interpretation of data expressed by the participants in the interview. Stake (2010) posited that triangulation serves to increase the confidences of the researcher in the information obtained during the interview. This triangulation is achieved through collaborating the various sources and interview findings (Creswell, 2007; Patton, 2015). As it relates to my research, from inception, and during the planning, process triangulation was maintained form the study's outline to its assumptions to create alignments that were relevant for the study success (Guba & Lincoln, 1989).

Research Ethical Framework

Every scholarly research undergirded fundamental ethical issues incorporated throughout the research process (Patton, 2015). These issues are very prevalent when the study includes human subjects, as in the case of qualitative research (Marshall and Rossman, 2011; Patton, 2015; Rudestam & Newton 2015). Therefore, it is critical to admonish participant importance in the research and recognize the personal interaction that is present during the inquiry. As a result, the participants' in the study became integral to the research, as such, fully respected with concurrence to their right and human dignity (Rubin & Rubin, 2014). According to Rubin & Rubin (2012), it is important that all efforts are made to protect privacy and anonymity of the participants; as a result, the participant's information must be preserved and protected, and not divulged without the written consent of the participant. In light of this fact, the researcher should devise a plan for addressing potential concerns anticipated from the participants relating to the interview process (Maxwell, 2013; Rubin & Rubin, 2015).

Maxwell (2013), and Rubin & Rubin (2014) emphasized that the following factors affect interviews: ambiguous study objectives and purpose; limited understanding of research objectives; political power; and power and status differences within the institution, perception, and fear of possible consequences of partaking in the interview. Being aware of these research challenges the Institutional Review Board (IRB) of the University has established rules that guide the data collection process. It stipulates that approval must be solicited and granted by the IRB board before the commencement of data collection. As a result, a mitigating strategy to deal with ethical issues was the development of informed consent forms which were signed by participants before the interview. Further, the nature and purpose of the interview was detailed and advanced to the participants before commencement of the study, statement of the information gathered use and storage, a nondisclosure statement was also advanced (Rubin & Rubin, 2014; Seidman, 2013), additionally, the information included transcriptions and checking for ease of review (Stake, 2010).

Rubin & Rubin (2014) advocated that efforts should be made at every stage of the interview process to protect the participants from harm. Additionally, participants were reassured that the information gathered during the interview would be maintained with the strictest confidence and protectively stored. As a result, it would be handled with utmost trust and would not be divulged without the permission of the participants (Rudestam & Newton, 2014). During the data collection process, the information gathered has been stored electronically on a computer and password protected. Files created from the interview and audio files transcribed were systematically backed up and

duplicated on an external hard drive to avoid potential loss of information (Creswell, 2007; Stake, 2010). Subsequently, a comprehensive database was created which detailed the data collected, the sources, and the dates and times of collection (Creswell, 2007; Rubin & Rubin 2015). After the gathering of the data and utilization of information in the study, it was stored in a secure area at my residence in the United States. A critical component of research is the decision making process, but of more importance is the objective to better understand the contextual functioning of the study (Stake, 2010).

In the context of my research, the aim was to explore the role of management KPIs in public sector infrastructure capital projects efficiency on the island of Grenada. Against this background, the study examined the contextual complexity of the public sector institution, infrastructure capital projects implementation, policies, project performance measurement and monitoring, project risk and project management from interviews and periodicals. These information collected were treated with strictest confidence and password protected stored in multiple places to prevent accidental lost and divergence. The researcher has full responsibility for securing the password and was the only person with access to the data. Based on the insights gained, it is safe to conclude that the study may contribute to the overall improvement of public sector infrastructure projects management on the island of Grenada, and throughout developing countries in the region and around the world. With the objective to obtain a more comprehensive understanding of performance measurement, designing appropriate matrix and protocols, as explained and presented in the study the following were aligned: the research methodology, the

research design, data collection, analysis strategies and techniques, and interpretation strategy.

Chapter Summary

This chapter is known as the methodology chapter because it provided the rationale for selecting and utilizing the qualitative research design. In this study, a case study was conducted on the public sector to explore the impact of management KPIs on infrastructure capital project efficiency on the island of Grenada. The qualitative tradition and design were used to develop the underpinning constructivist philosophy. Additionally, in my effort to obtain understanding and illumination of the effects of management KPIs on infrastructure projects, a purposively selected sampling with an element of snowballing was used. This method incorporated open-ended interview questions, together with a review of publicly accessible periodicals and documents.

The chapter emphasized the existence of subjectivity in the qualitative research approach associated with the predisposition of the researcher. This subjectivity was due to the integral role the researcher played in the qualitative research and the need for independent judgment in the process. Resulting in the creation of a biased environment, that led to the questionable profound issue of trustworthiness in qualitative research which includes the following criteria: credibility, reliability, generality, dependability and transferability. To adequately address the issue of trustworthiness, subjectivity, and biases, a mitigating strategy of full personal disclosure, anonymity, data sources triangulation, reflexivity and adherence to the IRB research standards that satisfied the criteria of credibility, dependability, and transferability were implemented. It was the qualitative

methodology that established the undergirding principles for the selection of the data collection approach and analysis technique. These approaches were adequately aligned to answer the research question that explored the effects of management KPIs on public sector infrastructure capital projects on the island of Grenada.

Chapter 4, which is the next chapter provided the conceptual frame for the data collection and detailed the blueprint for the interview process. With emphasis placed on the challenges encountered during the data collection process and discuss the participant's demography, findings presentation, case study, and the data analysis steps undertaken.

Chapter 4: Results

Introduction

The purpose of this qualitative case study was to understand the role of management KPIs in developing countries' public sector roads and buildings infrastructure capital project efficiency on the island of Grenada. The study emphasized the exploration of management KPIs in public sector infrastructure capital projects to acquire higher illumination and to determine the degree of performance measures on these infrastructure projects efficiencies. To achieve the study purpose, the following central research question was addressed.

RQ1: To what degree does management KPIs affect public sector roads, utilities, bridges, and buildings infrastructure capital project efficiency on the island of Grenada? Additionally, two sub-questions were used to further amplify the central research question:

RQ1a: What experiences determine public servants' and stakeholders' perceptions of existing KPI effects on infrastructure capital project efficiencies in Grenada?

RQ1b: To what degree do public servants and stakeholders perceive public sector infrastructure capital projects as efficient?

Chapter 4 presents the findings of the study including data gathering, methodology, process, analysis, and interpretation. In the chapter I explain the appropriateness of these methods and techniques, and summarize the findings.

The Interview Instrument

I did not use a pilot study because the inclusion criteria were understood by the quasi-public sector and the government administrators during the initial identification of potential participants. As a result, purposeful sampling and snowballing made it easy to identify potential participants who were contacted via e-mail and subsequent phone calls. Because the individuals identified were expert technicians the interview questions were appropriate with limited explanation. This was validated through the interview and the adequacy of the responses to the interview questions in the instrument.

I developed the interview instrument based on the research question, with a view to obtain responses to the central research question. The instrument I used was a semi-structured interview with open-ended questions designed to solicit information from the participants (Rudestam & Newton, 2016). Prior to conducting the interview, I obtained written consent from the Permanent Secretary in the Department of Public Administration after authorization from the Prime Minister, and the General Manager of NAWASA. This primary data collection methodology created the blue print for interviewing the participants. According to Rubin and Rubin (2014), and Rudestam and Newton (2016), research instruments need to be relevant in order to attain accurate data and research alignment to determine viability, relevance, transparency, credibility, reliability, and dependability.

The design of the research instrument and the sequence of the interview questions were geared to answer the sub-questions, and the summation of these responses answered the general research question. Rubin and Rubin (2014), and Rudestam and Newton (2016) asserted that the questions should assist the researcher in developing a

comprehensive understanding of the research topic and provide validation of the literature review. Against this objective, I designed the interview instrument to incorporate the research question and sub questions before data collection commenced. The interview process involved participants who were either directly or indirectly involved in public sector infrastructure capital projects on the island of Grenada. These individuals included project team members of the public sector, and quasi-public sector (Administrators, Engineers, Architects, Project Managers/Supervisors), and external stakeholders either directly or indirectly affected by these infrastructure capital project outcomes.

Since the interview instrument was designed to obtain relevant information during the data collection process it was imperative to ensure that the setting was maintained and findings were accurately documented. Therefore, potential participants were emailed a copy of the research questions, and I made phone calls and WhatsApp calls to these potential participants to confirm and validate the provided contact information, and provided clarity on interview questions. This interview method was uniquely designed using a semi-structured approach, and the 13 interview questions were written to obtain responses to answer the research questions. Further, the instrument utilized a simplistic interview questioning technique linking questions asymmetrically to create appropriate response relations to mitigate possible challenges and optimize the opportunities based on participants' uniqueness. The responses obtained were transcribed, organized, and categorized to ensure systematic findings conclusion formation, analysis, and

interpretation, further, creating the alignment of the data gathered to the research goals as prescribed in the research questions.

Setting

According to Parmenter (2016), and Villalba-Romero et al. (2015), both developed and developing countries have been plagued with financial constraints in the aftermath of 2008-2009 which affected infrastructure projects and economic growth. The latter issues forced developed countries such as Spain, Greece, Portugal, and the United Kingdom to institute adequate systems for road infrastructure project sustainability including comprehensive performance indicators, measures, and control (Villalba-Romero et al., 2015). Similarly, in developing countries such as Malaysia, Ghana, Tanzania, Uganda, Senegal, Mozambique, Nigeria, Cuba, Indonesia, Taiwan, Zimbabwe, Cambodia and the English speaking Caribbean countries SAP was introduced with the objective of creating sustainable economic growth through a BSC performance measure in the 190s and 1990s (Elu, 2000; Green, 2009). The BSC method which narrowly focused on financial outcomes was proven inadequate (Anderson & Holcombe, 2006; Andrés, et al., 2017; Buabeng-Andoh, 2015; Cheng, 2014; Durdyev et al., 2017; Elu, 2000; Green, 2009; Kaiser and Streatfeild, 2014; Kaming , Olomolaiye , Holt & Harris, 2010; Kjæra & Therkildse, 2013; Parmenter, 2016; Quinn, 2015; Schrouder, 2010). Scholars evaluated the performance of these developing countries using BSC and recommended a more comprehensive performance measure such as management KPIs. Eik-Andresen et al. (2015) contended that construction project delays and inefficiencies

were also associated with inadequate performance measures, thereby justifying the need for comprehensive management KPIs on infrastructure capital projects.

The inefficiencies in public sector infrastructure capital projects were present in developing countries both internationally and in the English speaking Caribbean. These challenges derived from inadequate performance measures, lack of performance monitoring, technology, and inadequate capacity to effectively manage the projects. Further, there were unclear objectives and governance frameworks, inadequate communication between stakeholder's project owner, and within government units, and an inability to balance the project objective and outcome. There was incapability to monitor the critical phases of project input, process, output, and outcome at different phases and sub-phases: initiation, planning, design, approval, financing, construction, closure, and maintenance (Parmenter, 2016; Villalba-Romero et al., 2015).

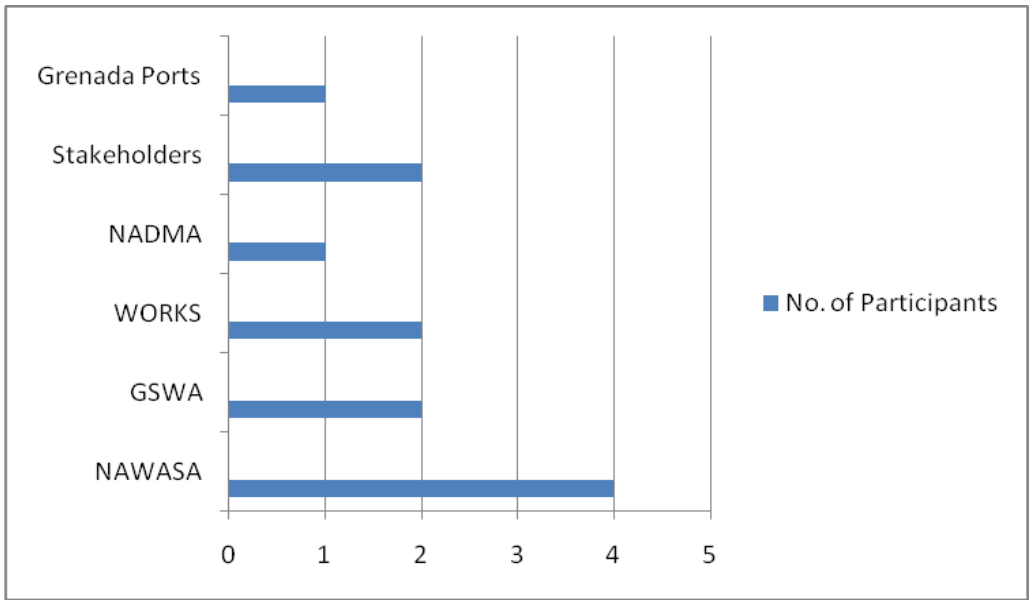
The data collection process involved a thorough review of publicly accessible documents, reports, and periodicals on infrastructure projects undertaken by the public sector of Grenada. Despite the lack of scholarly evidence indicating the impact of management KPIs on infrastructure capital projects efficiencies in Grenada, scholarly documents were obtained from developing countries internationally and snowballed to Grenada. There was an inherent gap, creating the ideal opportunity for exploring this topic in Grenada, which can later be snowballed to other Caribbean island. I employed a purposeful sampling strategy to choose the appropriate participants to generate adequate data to answer the research questions. These participants included individuals who were both directly and indirectly involved in public sector infrastructure capital projects in

Grenada. They were knowledgeable, independent thinkers who long to see transformation in the execution of public sector infrastructure capital projects in order to obtain infrastructure development, efficiency, optimization of collected taxes, and overall economic growth.

Demographics

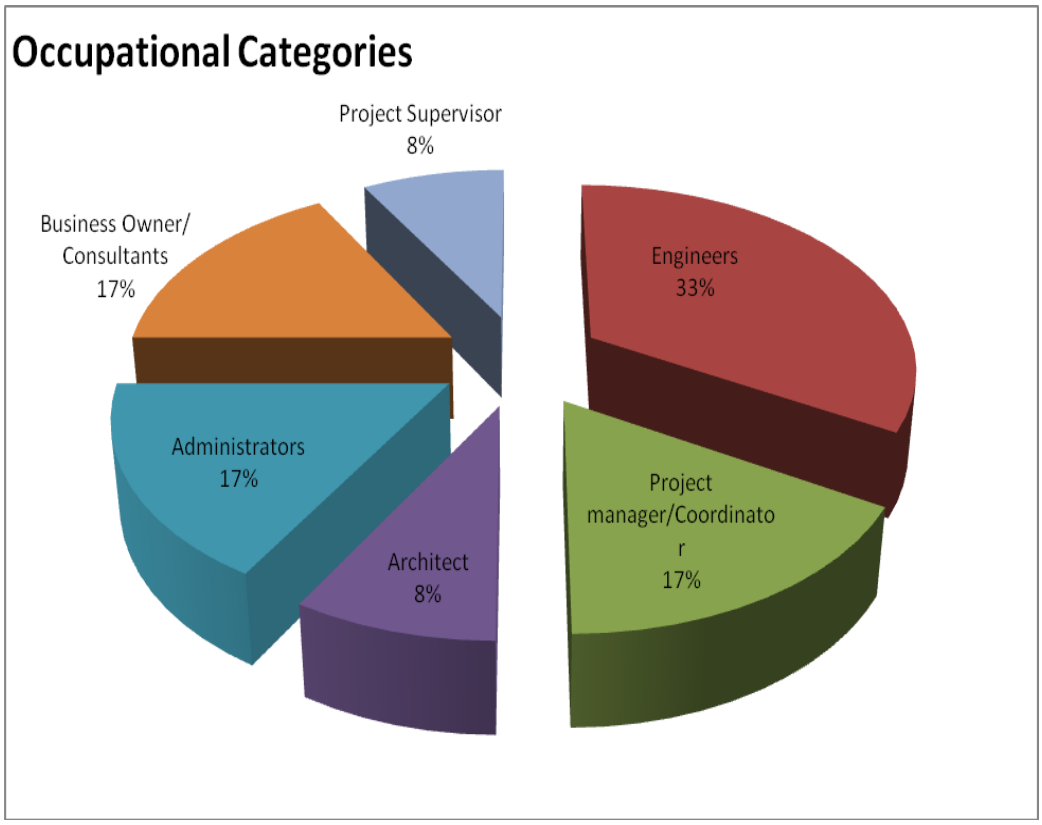
Participant selection was undergirded by individuals' direct or indirect involvement in public sector infrastructure capital project implementation in Grenada. Because infrastructure capital projects are the largest investment subsector of developing countries there is a need for performance measures to improve efficiency (Public-Private Infrastructure Advisory Facility, 2014). It is also evident that during every economic cycle, there are numerous infrastructure capital projects including road, bridges, utilities and buildings across the island. These projects are undertaken by the private sector, the public sector or PPP (PPIAF, 2014). Against this backdrop, I selected interview participants from the management and subordinates of the public and quasi-public sector, project team members, and stakeholders (see Figure 1).

Figure 1. Participant response distribution by sectors in Grenada



I followed the established protocol for this study by interviewing 12 participants. These participants included individuals from the government department of Communications, Infrastructure development, Works and Planning, and its agencies with the largest contingent of six participants; the quasi-public sector (NAWASA) with four participants; and external stakeholders with two participants. Despite the distribution of 20 interviews invitations to the captioned institutions, only 15 were favorable. Oral interviews were conducted with 11 participants and an e-mail interview was conducted with one participant (Figure 2).

Figure 2. Occupational categorization of interview participants.



These participants represented a cross-section of professionals from various backgrounds including engineering, project management, architecture, supervisory technicians, civil society, and administrators. The objective of this cross-sectional participation was to obtain varying perspective, to achieve enriched data collected and adding to the research credibility and reliability.

Data Collection

The main sources of data were publicly available documentation, periodicals, and comprehensive qualitative interviews of the cross-section of participants. The data gathered answered the central research question and the sub-questions forming this study and underpinning the conclusions reached.

Documentation Review- Grenada Government

An important phase of the data gathering process was documentation review related to public sector infrastructure capital projects performance measurements and inefficiencies in Grenada. During this phase, I reviewed and analyzed publicly accessible documents, reports, policies, and periodicals on the websites of government departments, published in newspapers, and government and agency newsletters. Special emphasis was placed on government capital projects budgets, project evaluations, draft policies enacted or not enacted, legislation (e.g. acts of Parliament) and Grenada PPP Policy 2017, which advocated transparency, accountability, efficiency, sustainability, fiscal responsibility, resource optimization, and environmental and social sustainability. The polices, laws, legislations, and administrative rules I reviewed furnished relevant information justifying the purpose of the research, and the possible impact of management KPIs or performance measures on public sector infrastructure capital projects. For example, I reviewed and analyzed policies on infrastructure capital projects and related administrative rules from the ministries of Infrastructure Development, Public Utilities, Energy, Transportation, and Implementation rules to determine the effects or roles of KPIs.

According to the mission, visions, and responsibilities of the government ministries of Infrastructure Development, Public Utilities, Energy, Transportation, and Implementation the functions of the department are delineated by an act of parliament. The ministry's mission; "To protect and enhance the Nation's investment in infrastructure," is translated into the following responsibilities:-

- Implementation of Road Maintenance Programs;

- Ongoing preventive maintenance of all Roads, Bridges, and Government Buildings;
- Provision of engineering and architectural support to Government /ministries, non-Ministerial Departments, and Statutory Bodies
- Management of Electrical Inspections island-wide and examinations for eligible electricians;
- Management of Road Network;
- Management of Markets;
- Ensuring that commercial and residential are constructed in compliance with the Building Code
- Developing plans for the constructive development of the country, and
- Implementation of policies and directives of the cabinet

Under the government ministry there are several agencies, such as NAWASA, Grenada Solid Waste Management Authority, Grenada Ports Authority, and National Disaster Management Authority. The ministry's administrative division is headed by the permanent secretary. The Permanent Secretary provides policy advice and ensures the implementation of policies and directives from the Cabinet. Further, the Permanent Secretary is responsible for the overall management of the ministry programs and resources. The ministry, divisions and departments are governed by established policies, process, and procedures for operations, including the implementation of public sector infrastructure capital projects. These responsibilities are included in the departments' operational manuals and the job descriptions of the employees.

In 2010, a proposed Regional Partnership Strategy between the Organization of Eastern Caribbean States and World Bank focused on Building Resilience Enhancing Competitiveness and Stimulating Sustainable Growth was developed. This strategy was geared toward improving fiscal and debt sustainability, increasing efficiency, and transparency of public spending and service delivery, sustaining macroeconomic and financial stability, strengthening policy coordination and economic management, and rationalizing social safety net programs and improving targeting systems (GOVGD, n.d). It was envisaged that this policy would be crucial in strengthening the abilities of the Organization of Eastern Caribbean States and its resilience to external risks, creating the platform for medium term growth (Grenada Economic and Social Development Policy Loan and Credit Program, 2010). This blanket strategy for the Organization of Eastern Caribbean States which Grenada is a part of, called for comprehensive performance monitoring and measurement in order to optimize public spending, and increase efficiency, and transparency (GOVGD, n.d). Additionally, the periodicals and documents provided relevant data for the study, and served as a source of supportive and comparative data obtained during the interview for the analysis phase of the study. The results of the document review and data collected from the interview were coded, organized, categorized, and analyzed to establish convergence and alignment.

Documentation Review

NAWASA is the lone premier water company providing excellent water supply and waste disposal services to customers on the island of Grenada. In order to achieve a healthy and productive nation, NAWASA incorporated its mandate into its mission

statement. ‘To provide customers with a safe, adequate and reliable water supply and safe disposal of waste water, in a viable and efficient manner, that meet and exceed customer expectations, and ensures the development of our organization, communities and our nation’ (National Water and Sewerage Act, 1990).

NAWASA is an agent of the Government of Grenada, operating within the business frame of a statutory body (Quasi-Public Sector). NAWASA is accountable to the Ministry of Communications, Works, Physical Development, Public Utilities, and ICT, for the efficient distribution of potable water and safe disposal of waste water. To adequately achieve these objectives NAWASA invested in its first major infrastructure capital project Observatory Reservoir Construction in the 1950s. In the next sixty five years NAWASA invested in 30 water supply facilities, and undertook numerous capital projects geared towards achieving its mandate and adding value to the citizenry of Grenada. From the publicly reviewed documentation of projects undertaken by NAWASA it is clear to conclude that there was extensive planning, designing, construction, alpha and beta testing, and closure. However, the institution of adequate project governance through the utilization of a comprehensive performance measurement and monitoring system could not have been determined. Additionally, some of the projects undertaken since 2016 are still recorded partly completed to date (NAWASA, n.d).

For example, Springs Gardens Water Treatment Plant with an estimated value of $1.8 million and a clear scope of sedimentation tank construction to reduce turbidity, operators’ quarter construction, and access road was earmarked to be completed within

eight months of commencement. To date, it is recorded as 95% completed. The major question that evolves is whether the project incompletion resulted from inadequate performance measure, monitoring or reporting. The findings attained were aligned to the interview questions developed to determine the root cause of infrastructure capital project inefficiencies. Another is Mt. Agnes Water Treatment System, with its objective 'To provide an adequate and reliable supply of potable water to the areas of Mt. Agnes, Marlmount, Pomme Rose, La Tante, and Petit Experence in St. David's,' and a scope to acquire land; dam rehabilitation; construction of sedimentation basin, sand filters and clear-well, and installation of pipes and fittings. This project was budgeted for a sum of $1.4 million to be undertaken in 2016, but to date recorded a 98% completion. Further, the project reported results justified the interview questions and the undergirding theme of the research which seeks to obtain an illumination of the role of management KPIs on infrastructure capital project inefficiencies (NAWASA, n.d).

Interviews

As stated above, the snowballing technique was utilized to select participants. Initially, potential participants were identified by NAWASA and the government administrators based on the inclusion criteria. A total of 12 participants were interviewed. The composite of the sample included six participants from the government of Grenada (GSWA-2; Grenada Ports of Authority-1; Works-2, NAGMA-1), four from NAWASA and two commercial resident of Grenada. These participants were recommended based on their direct or indirect involvement in infrastructure capital projects, and were directly affected by project implementation. Subsequently, email invitations were submitted to the

potential participants followed by a telephone call, which introduced and explained the study, interview process, and study purpose. After accepting the invitation, by returning an email stating 'I consent,' the interview plans were forwarded to these individuals and an appropriate time was established for conducting the interview. The interview later commenced on the established date and time. On completion of the semi-structured interview, referral was solicited on potential participants to be contacted for the interviews. Although face-to-face interview would have been ideal, the existing constraint to travel to Grenada prohibited this approach for the study. However, these individuals were emailed the questions, and subsequently called via telephone and WhatsApp to be interviewed. The contents of the oral interviews were recorded on a recorder and stored on a desktop for the designated period of five years.

Based on my conversation and interaction with the individuals during the interview there was inherent willingness by the participants to participate in the interview with no physical or psychological distress, discomfort, and inhibition of their freedom. Further, there were no instances of reluctance and withdrawals from participants during the process. The participants candidly and freely expressed themselves during the interview providing in-depth explanations and information on their experience during infrastructure capital projects implementation and the existing system of performance measurement under the BSC. The interview lasted an average of 45 minutes per participant, during the process the participants maintained their enthusiasm and were totally engaged expanding on issues as were deemed necessary.

There were 13 questions in the interview instrument, some of the questions are closely aligned and were all answered. Prior to the interview commencement an email invitation was forwarded to the sample group together with an overview of the research. It presented the notion of management KPIs role on public sector infrastructure capital projects efficiencies, and the main characteristic of a comprehensive performance measurement system. The study synopsis incorporated the key components of management KPIs inclusive of quality, scope, cost, time, human resources, and finance within infrastructure capital projects phases on the island of Grenada with the view to improve efficiencies. Inclusive in the interview were questions pertaining to recommendation and reformation of the public sector infrastructure capital projects process and improvement of its performance measurement technique by introducing the comprehensive management KPIs system to improve efficiencies.

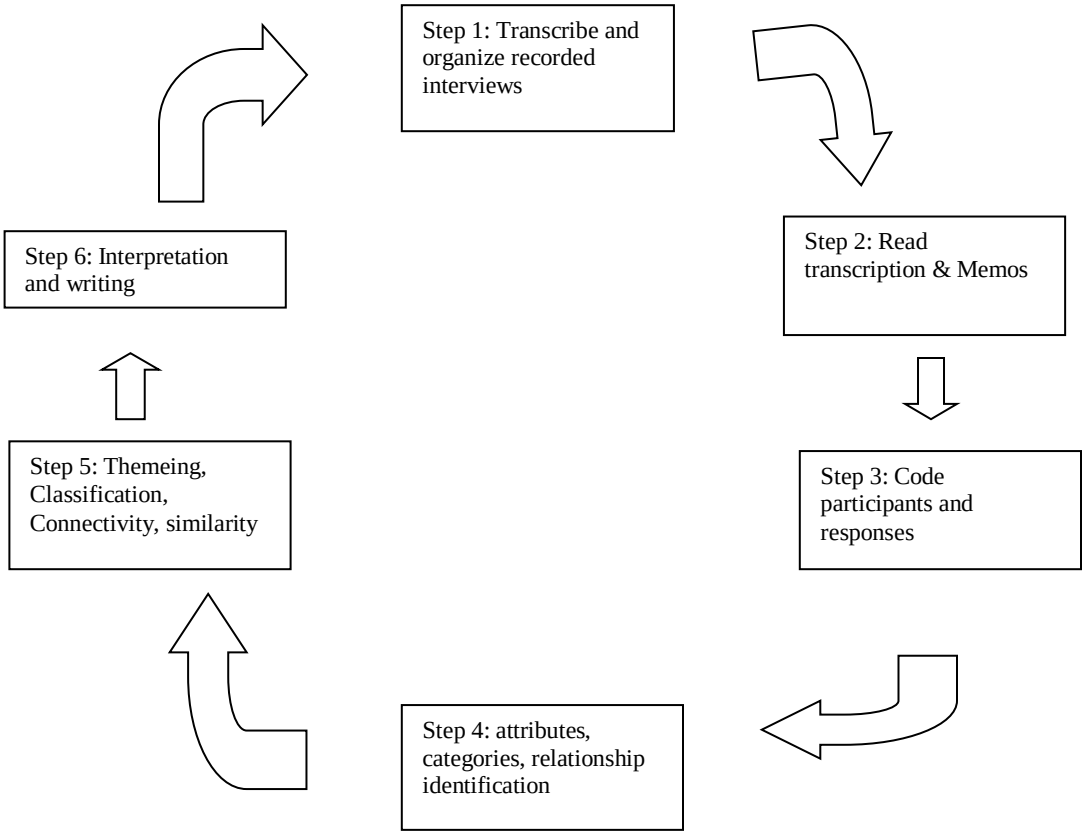
These questions were supported unanimously by the participants indicating the urgent need for the comprehensive management KPIs system, and reiterating that the current system of measures is inadequate, limited, and narrowly focused. Further, participants elucidated that the performance measurement framework was established by the external funding agencies such as the World Bank and Caribbean Development Bank, unfortunately, was not fully utilized. The system of management KPIs was explained to the participants in an effort to obtain more accurate answers to the interview questions and fitted recommendations. Overall, the participant, presented responses that clearly indicated the challenges encountered by the public sector in the execution of infrastructure projects and inadequacies with the current performance measure both in the

public sector and quasi- public sector. The findings were synonymous with developing and developed countries around the world, not only in Grenada and rest of the English speaking Caribbean.

Data Analysis

The analysis of the data involved manual coding developed in Excel software (see Figure 4). The transcription of the interviews presented undergirding issues associated with infrastructure capital projects advanced by respondents. At the conclusion of the interviews, identifiable recurring words and phrases were identified and organized. According to Saldaña (2013), description is the foundation of qualitative inquiry; therefore the process of descriptive coding advocated was adopted in this process. The first step of descriptive coding involves the first cycle coding method, which details participants' responses creating descriptive annotations related to the topic, issues, and recorded attributed found in the selected text for further pursuit. Figure 3 shows the data analysis and interpretative process which serves as a blueprint for this research.

Figure 3. Data analysis and interpretation process.



According to Saldaña (2013), description presents seen and heard data in a readably format for ease of coding, categorization, theming, and interpretation. Further, any noticeable details and critical anomalies from the interview surfaced during the interviews were recorded in memos for future actions and possible inclusion in the data analysis and interpretation (see Table 1).

Table 1

Descriptive Coding Matrix (Excerpts from Qualitative Interviews)

Excerpts from responses	Themes
We need adequate supervision, costs & time overruns so we can do it more efficiently, ammmmm.. and the National OHS (Organizational Health and Safety) policy & legislation, and the availability of more advanced project equipment,	Supervision /management
…..but the KPIs will even make the project more efficient improve, improving ROI, since the triple constraint, time, cost and quality could be even cut down,	Reformation
…..because of our market we do not bring a particular piece of equipment because there is no cost benefits, the lack of the acceptable, & use of new, efficient technologies……	Modernization
……..thus, eliminating problems such as errors and corrections of issues causing delays.	Efficiency maximization
….. the negative influence of non-technical political whims, because the minister may say that he wants that done,……..	Politics
Not aware of existing infrastructure project performance measurement systems. That is something new… …….. there is a rock and a hard place because of acceptance, it is top down and is required.	Resistance
…..the triple constraints again negatively affecting the project (time, cost and quality) if not effectively managed	Monitoring and control
……Management KPIs is a good initiative to be objectively governed, and objective management KPI, the need for acceptance from the top down,	Comprehensive KPIs

Codes were assigned to the participants and the responses provided utilizing Excel software. These codes were further classified and analyzed to determine patterns, connectivity, similarities and attributes. Using Excel, the transcripts were organized in

columns and rows creating classifications over individual worksheets, where every worksheet represents one participant. Within the worksheets are the questions and responses provided by each participant and coded accordingly; participants 1 was coded as 1XN or G meaning first participant, X representing his or her name and N or G representing NAWASA or Government of Grenada. Q1 represents question one, and 1XNSR meaning first participants from NAWASA survey response. Following the coding of the transcript, any critical issues identified during the interview were color coded to create classifications, categories and recurrent words which formed the basis for determining theme during the first cycle (See Figure 4).

Figure 4. Words Collage

The second cycle commenced with reviewing the categories and emergent classifications derived from cycle one. These classifications will be further analyzed with critical attention placed on key points, attributes, issues, differences, and peculiarities expressed by the participants. At the end of the second cycle some additional general themes emerged which created connectivity between the participants forming patterns and responses linkages. During this process emerged relationships, connectivity,

peculiarities, attributes, and differences were further examined and coded to determine whether they were adequate or significant to be included as critical emergent themes that created association and influence.

Figure 5, presents a snapshot of Excel coding of participants' recommendations based on the explored phenomenon. At the end of the final cycle (cycle three), several categories and themes had been manually created within Excel software in order to create diagrams and generate reports that will facilitate in the analysis and interpretation of the data and answer the research questions (See Figure 5).

Figure 5. Sample coding, findings, categorization, themes and analysis.

Date	Participant Codes	Data
4/13/2019	Q1	Capital projects are a critical component of public sector activities annually, what are your thoughts regarding government and their agencies approach to these projects implementation?
	X9NSR1	…….a general rule, that the public sector is less effective than the private sector. I think that the government needs to work hard on eliminating some of the inherent wastages, by improving their, processes, delays in planning during the process. They should treat projects as a private sector philosophy. Generally, the public sector have wastages and needs to eliminate wastages.
		Category Cycle 1 General rule, the public sector is less effective than the private sector I think that the government needs to work hard on eliminating some of the inherent wastages, improving processes, delays in planning during the process They should treat projects as a private sector philosophy The public sector have wastages Need to eliminate wastage
		Emerging Patterns Cycle 2 **Meaning, connections, contrasting** Public sector is less effective than the private sector Government needs to work hard on inherent wastages, improving processes, delays in planning during the process private sector philosophy The public sector have wastages

Need to eliminate wastage

Emerging Patterns: Cycle 3
Themes

Reformation
Government improvement
Efficiency
Planning/Monitoring and control
Paradigm shift
Re-engineering
Processes improvement

Evidence of Trustworthiness

The research guide presented a systematic approach to ensure the attainment of credibility of the findings and participants realities were reconstructed in the transcription of the interview (Guba & Lincoln, 1998). According to Creswell (2007), Guba & Lincoln (1998) and Stake (2010), one of the approve approach to ascertain credibility is content validation through members-checking or peer-reviewing of the interview transcripts. This activity involves the returning of the summarized transcripts to the participants to verify content. During the interview process frequent monitoring, reflexivity, triangulation, auditing, and analysis were done with peculiarities and anomalies notated in memos. Further, observations, thoughts, challenges, and emotional displays during the reconstruction process were recorded as deemed necessary (Guba & Lincoln, 1989). Guba and Lincoln (1989) described this developmental process as progressive subjectivity which ensured that the constructions were accurately integrated and represented in the findings. As a result, it created the premise for collaboration between

the participants and the researcher, and proper integration with the conclusion deduced from the findings of the interview (Guba & Lincoln, 1989).

As it relates to the issue of transferability, applicability, dependability, generalization, and conformity which are all undergirded criterion of trustworthiness. Collective efforts were employed through reflexivity, alignment, and triangulation during the interview (Guba & Lincoln, 1989). According to Guba & Lincoln (1989), transferability was addressed by incorporating a cross-section of internal and external stakeholders affected by public sector infrastructure capital projects (Project team members, project managers, engineers, architect, project coordinators, administrators and business owners), and thorough documentation of interview context, date, and institution. Special emphasis was placed on the similarities, connectedness, differences, and peculiarities provided by the participants during the interviews. As such, it was a challenge to obtain generalization in the research findings based on the contextual issue explored and the deductive insights from the study, and the premise for applying and transferring the study context to the Caribbean and developing countries around the world (Guba & Lincoln, 1989).

In an effort to maintain dependability of the research content there were accurate documentation and recording of the research process development. This included such issues as research methodology, participants' selection, interview settings, challenges and opportunities, discussions extension, ideas, and opinions (Guba & Lincoln, 1989). Based on the interview plan the data collection approach utilized two sources: responses from the open-ended research questions, and gathering information from public periodicals,

reports, policies, laws, and administrative rules. Although, the face-to-face interviews were not feasible at the time, the telephone interview provided voice tone that indicated topic comfort, operational challenges, reluctant, and willingness to participate (Creswell, 2007; Rubin and Rubin, 2014). Additionally, embedded within the interview guide is the researcher's declaration, which detailed the underpinning assumptions, possible anticipated position and influence on the study (Guba & Lincoln, 1989).

Confirmability was infused throughout the data collection process by meticulous coding and documentation, with specific emphasis on the constructions developed in the study, coupled with the effort to create data audit trail by connecting participants' information to the sources and the premise for forming informed conclusions (Guba & Lincoln, 1989; Patton, 2015). Additionally, triangulation was achieved through collaborating the various sources and interview findings (Creswell, 2007; Patton, 2015). This strategy was utilized to obtain overall trustworthiness by ensuring credibility, and accuracy in the interpretation of the data expressed by the participants in the interview.

Results

The 13 interview questions included in the interview guide were undergirded by the central research question, and two sub-questions. These interview questions were designed to capture responses from the participants geared towards answering the general and the two supplemental questions. The interview instrument which consisted of 13 questions were classified under the three framing questions with the intent to obtain sufficient data that will facilitate in answering these questions.

RQ 1: To what degree does management KPIs affect public sector infrastructure capital projects efficiencies in Grenada?

Participants were selected based on active involvement in infrastructure capital project development and implementation (Project team members), and are directly affected by capital projects (external stakeholders) in Grenada. During the interview, participants were asked to explain the government and government agencies' approach to the development and implementation of infrastructure capital projects. The process and system of governance involved were examined to determine the extent to which performance measures were utilized and possibility for reforming the performance measurement system for infrastructure capital projects to introduce a comprehensive management KPIs system. Apart from the 11 or 91.6% of participants who adamantly admitted that there is a system of performance measurement only one dissented, but the 12 participants or 100% supported the need for a comprehensive management KPIs for Infrastructure capital projects. Of this amount, 83% stated that management KPIs will most likely improve project efficiency, thereby re-enforced the need for a holistic/comprehensive objective management KPIs system see figure 6 and 7.

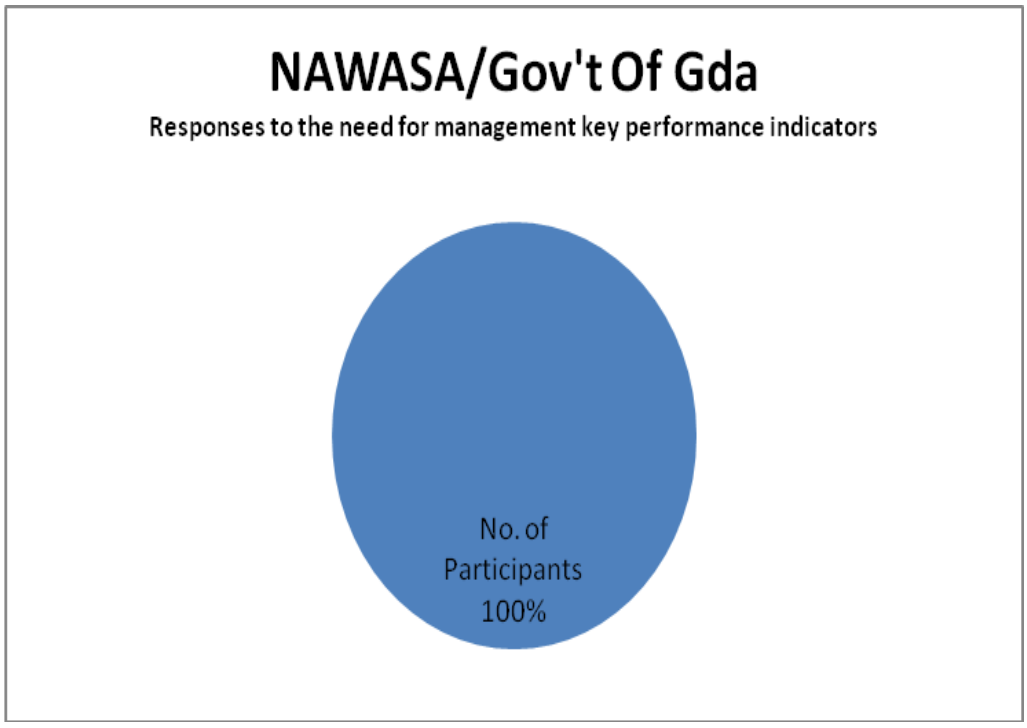


Figure 6. Responses supporting management KPIs for Infrastructure Projects.

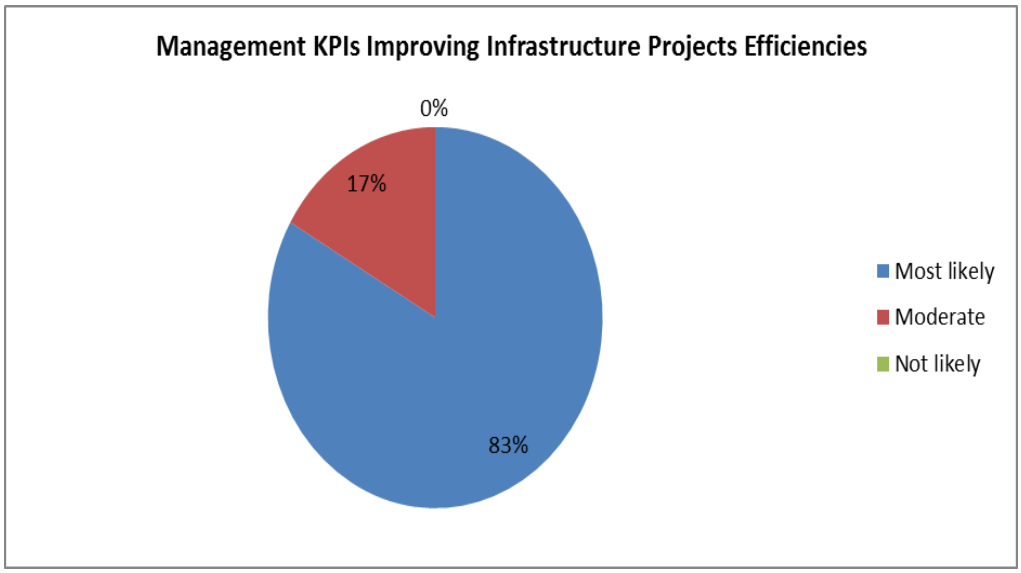


Figure 7. Degree of management KPIs effect on Infrastructure projects efficiencies.

A wide range of responses were provided including the need for an effective and comprehensive project performance management system, explicitly stating that the current system is inconsistent, subjective, and the need for a holistic objective comprehensive KPI system not only a financial and non-financial indicators framework, but one that is fully compliant to a monitoring and evaluating (M&E) governance framework, the need for effective communication, risk analysis and management, effective management, infrastructure project policies, effective data collection, and proactive operation. Unfortunately, it was revealed that the existing system is inadequate and does not encompass the entire project spectrum. Further, there is the need for improve project efficiency and effectiveness, and improving technical competences which will circumvent project delays, improve quality, reduce cost, maximize ROI, improve resources physical and personnel utilization, staff safety, country attractiveness, optimization of funds, and donors and stakeholders' satisfaction.

The government of Grenada and the National Water and Sewerage Authority legislative framework provided these institutions with the mandates for efficient implementations of infrastructure capital projects. Therefore, these projects can be initiated from a pull (reactive) or push (proactive) system (Bryson, 2016). Within the context of Grenada, the infrastructure projects are generally initiated by the government or its agencies based on socioeconomic needs or by international agencies. These projects are then presented to the Government's Ministry of Communications, Works, Physical Development, Public Utilities and ICT, and its agencies such as NAWASA for execution after obtaining funding. These capital projects are necessary for the achievement of these

institutions' mission statement which is geared to adding value to their operations and constituents. For example, the ministry's summarized mission; 'To protect and enhance the nation's investment in infrastructure' can be translated into the following responsibilities:- Implementation of Road Maintenance Programs;

- Ongoing preventative maintenance of all Roads, Bridges, and Government Buildings;
- Provision of engineering and architectural support to Government /ministries, non-Ministerial Departments, and Statutory Bodies
- Management of Electrical Inspections Island wide and conduct examinations for eligible Electricians;
- Management of Road Network;
- Management of Markets;
- Ensuring that buildings to be constructed whether commercial or residential are built in compliance with the Building Code
- Developing plans for the constructive development of the country, and
- Implementation of policies and directives of Cabinet (Act of parliament).

NAWASA's mission:- 'To provide customers with a safe, adequate and reliable water supply and safe disposal of waste water, in a viable and efficient manner, that meet and exceed customer expectations, and ensures the development of our organization, communities and our nation' (National Water and Sewerage Authority Act, 1990).

Despite the variances in participants' responses, there were clear outlines obtained from the documentation review detailing the responsibility of the government of Grenada

and NAWASA to effectively and efficiently implement infrastructure capital projects on the island of Grenada to achieve their mandates. In this light, it is necessary for these institutions to develop and institute a comprehensive performance measurement system (financial and non-financial) that can adequately monitor and control project performance and progress to attain project quality, budget, schedule, ROI, stakeholders' satisfaction and efficient utilization of resources. As a result, ensures taxpayers' and external agencies' funds are optimized, project owners' outcome achieved and societal value added through the efficient implementation of infrastructure projects. The following interview responses were provided:-

> R1. A good initiative to be objectively governed, and objective management KPI, the need for acceptance from the top down, health and safety which will captured the risk outside must be considered and must be accepted from the top down not compromising cost a proper system for cost and quality not cost for quality, and everything must be seen as a project… It would attract the attention of credible international project funding agencies, when they see that you are accountable and transparency, there will be more efficient and optimization of project and tax payers funds and economic growth. Grenada would have more purpose-driven & efficient projects executed, this is a bottom up approach, needs for safety and health and performance measure throughout the project.
>
> R2. Am… improving efficiencies through KPIs at the end of the day how do we measure that? It is through measuring and monitoring. We see for example, to run 20 kilos of pipes for a period of 3 months, at the end of the period once the project

is finished. Customer is getting water but no one goes back to do a survey, we don't pay particular attention at the mapping and workshops SOPs (Standard Operating Procedures). There is a need for policy documentation, for projects, guidelines, legal quality, cost, time and human resources, (before, during, after). ...Efficiency, time budget and schedule. This is very important and the requirements of the stakeholders, at the end of the day everybody is satisfy. A better awareness, and the government projects will be transformed. Policies, will include KPIs and enhance overall project success.

R3. …I think it is a good thing that will benefit the government...Improve accountability and transparency, project success and efficiencies.

R4. I think those are welcome, also we need to get more buying in and delivering, and therefore the performance measurement system is welcome. There is a wide gap in performance measurement at the moment...Am, better efficiencies the optimum use of limited resources, better meeting the needs of the community and improving the standard of live of the community, positive impact, in terms of a, in developing the set scale base to ensure that the projects will achieve the set objectives. There is a gap and improving project oversight.

R5. Yes I think, this is a great thing, the whole facet of thing from disaster management and overall governance. There is a need for project performance indicators to identify variance, deviance, overall management of all resources constraint, PSI strength of concrete and we need to be detail as possible manage change order, time scheduling, resulting in delays and adverse impact on the

identified triple constraints. Continuous inspection, and testing at every phase and approval. Planning Budgeting, time scheduling, goals and baseline…..Performance indicators are as signal of variances, measuring time, quality, performance, efficiencies and overall progress monitoring. This project auditing during the progress to ensure project efficiencies, project gain and investment attractiveness, fund optimization.

R6. You know these are critical, and important for identifying that the project is successful. For example you can build a house and end up with a shop, the indicators determine the outcome. If there are no indicators then we cannot determine the project success. These KPIs a Key and very, very important, to show that you have done what you set out to do a system like that are so relevant in project measure. If you have not met those criteria we should not move forward, or the needs for mitigating strategies. When you reach what you set out to do... There is improve efficiencies, and the project be more relevant , improve project, greater accountability, meeting project objectives these will save time and must be included in the project scope. I have seen times when you cannot measure it you do not know where you are going. Therefore, it creates a better al round system for project implementation.

R7. KPI will only identify the strengths and weaknesses, but will be a huge help in determining where the project is heading and what the actual outcome is. The indicators will then be used to make the necessary adjustment that will increase the overall performance of public sector capital infrastructure projects….

Avoidance of learnt errors for future project, Cost savings from improvement in budgeting, scheduling and scoping, Improvement in the country's corruption index rating, Improved ability to source foreign funding, Better transparency to all stakeholders.

R8. That is, there is really need for reformation. In time pass there was a system for public sector reformation. There is the need for performance measurement within the public sector the KPIs must be a critical component of the reformation…. As I said, we need to optimize the system and spending which is getting most from spending less. We are able to complete a project with less resources, there are some any things to be done but with the level of efficiency we can get one and a half projects completed instead of completing one.

R9. There is a need, but some can be difficult. They must be manageable, monitoring and control. No system for comprehensive technological monitoring and control. The KPIs are required M&E…. If we improve our measurement system we put ourselves in a better position to attract funding. Monitor and evaluate performance, good candidates for funding, becoming more attractive, better manage our project, and data will be used for future planning.

R10. This is a system that should be instituted by all bodies governing projects of this nature… Reduction in cost overruns, Reduce schedule overruns, Produce tangible performance techniques that can be a catalyst for better decision making through documented experiences… The governance process requires refining and reforming to increase efficiency; Efficiencies that will reduce project over runs,

improve quality and manage costs and variations. What must be clearly defined for each project are the measures of project success or failure as well as the ability of the project to mitigate the outlined issue….

R11. That's necessary, that is something that should be implemented. We have to know that from the time the project was initiated, written and during planning that the KPIs are incorporated. This will significantly enhance the effectiveness of the project and overall efficiencies. And will maximize the benefits that we will get, therefore it is absolutely necessary to have these projects evaluated from the get go from writing the project to implementation and even after the implementation…. Well I think that if there is reform, then we can better maximize the outcomes of future projects, so you will know how to approach future projects, more learning, learn a lot more and enhance the project, We can learn a lot process will enhance, we will attract more monies for the country, the population will benefit more, better infrastructure development in the country, And then we will be able to establish policies that can guide the project process. This will enhance the processes and guide project implementation procedures, policies, administrative rules, standards.

R12. I mean.., identification of project needs. Ensure that there is a sustainability analysis and project adequacy, feasibility study, viability studies, proper projects on feasibility trends. There is the need project success is dependent on other projects, there is the need for risk analysis. The opportunity cost, financial analysis. Capability of the project to justify the cost, project prioritization. Should

be a large project or several smaller projects. All the associated cost, asking the question that, who will pay back for the project…. I would advocate these things it is the only way to determine that a project is successful. It is proof of the project failure and success. They are working tools that everybody should understand the indicators and it must be analyzed. They will guide in making adequate, timely and informed decision…. Cost saving, setting a system of accountability for the funding received, building reputation and a system of governance. Maximization of funds utilized. Following the system of project implementation, form initiation to maintenance for project implementation and monitoring, developing the skills of local professionals on project management, to ensure that projects are successful.

RQ 2: What experiences determine public servants' and stakeholders' perception of existing KPIs effect on infrastructure capital project efficiencies in Grenada?

In some instances, lending agencies such as the World Bank and the Eastern Caribbean Central Bank (ECCB) highlight the achievements, successes and challenges of the government of Grenada and NAWASA's capital projects. Notwithstanding these challenges, the National Water and Sewerage Authority (NAWASA) continued to undertake major infrastructure projects in Grenada. In 2019 through to 2023, an earmarked infrastructure project in the tune of US$42 million will be undertaken. This Water Resiliency Project and Climate Change initiative which is part of the larger climate change initiative by the government of Grenada will enhance water supply and add value to the nation's citizenry. The Water Resiliency project is based on a partnership between

the government of Grenada and the Green Climate Fund (GCF), with the objective of enabling Grenada to meet its global Sustainable Development Goals for water. This is one of the major projects in 2019 to be undertaken by the government, but will be executed by NAWASA (Fraser, 2018).

With this project on the horizon, it is imperative to recount pass challenges encountered by the government during capital projects development and implementation. According to the World Bank report (2006), the Emergency Recovery Project undertaken by the government of Grenada in the aftermath of hurricane Ivan in 2004 was successful in most parts, because of the project oversight provided by the World Bank management team and the economies of scales benefits from implementing similar regional projects. One can deduce that without the contemporary management or scientific management principles introduced by the international agency (World Bank) which include performance measurement, monitoring, control and evaluation system the project would not have been successful. However, according to the ICR Review, overall the project had moderate success resulting from inadequate prioritization of work, lack of adequate planning resulted in materials shortages, lack of result framework or performance indicators or baselines making it impossible to monitor the project and determine success (World Bank, 2010, ICRR13307).

When the participants were asked about their experience with infrastructure capital projects that shaped their perception of the existing performance measure during project development and implementation, the participants easily recounted providing insightful explanations on events that influenced their worldview. In many instances, the

participants responses revealed that perceptions were developed from project inefficiencies and failures experienced over the last decade resulting from inadequate project management, undefined scope, unclear baselines/goals, project governance, planning, performance measure and control, monitoring and evaluation (M&E), inadequate risk planning, ineffective communications, procurement, high cost of financing, weather, inadequate technology and modern equipment, human resource adequacy, lack of technical skills, project design, project delays, cost overrun, challenging quality, low ROI, and resource utilization. However, there were instances of project successes which were sporadic, but accepted by these institutions as the norm because of the projects necessity. In this light, notwithstanding the expressed experiential challenges and shortcomings of infrastructure projects, these projects may still be perceived as successful since it satisfied its overall objective even though the projects were inefficient (Floris & Benvie, 2019). The following interview responses were provided:-

> R1. Not only is the quality of the goals/baselines poor, but the communication of what exist is also poor…. They are not very adequate: They are very basic in their construct, which mostly measures time and cost. The Lack of Project Governance Frameworks for managing projects in statutory bodies and public entities….
>
> R2. Now…I am going back to experience. The Southern water Supply Project was a $20m Euros project, then we looking at 20KM of pipe of different sizes and water structure and treatment plan. At the end of the project there must have an evaluation aspect of it. One of the thing that we are looking at is that wherever the

pipes pass we look at the health districts especially during the dry season the outbreak of diarrhea. But we were unable to obtain statistics to substantiate this, so a project ends but a project does not end at the last nail driven. There is a monitoring and evaluation component.... In the case of NAWASA there are certain goals and targets, for example the distribution of quality portable water to customers in Hope, back to the mission, one of the water treatment process is the slow sand filters, therefore when it rains there is problem. Is like I need some rain water and I am at the driest parts in china, little rain is problem, but more rain is problem also. Turbidity problem and little rain results in drought problem. You can invest several million dollars and the system can still be the same. We say WAR- Where Are We? The variations in cost, especially in civil works. We can use a unit price contract or a fixed cost contract, for example if we need to build this tank for $100,000, this is a fixed cost contract, the process is a problem, and time spent on activities is a problem, you excavate 20 feet down, then we identify challenges, which were not included in planning. Now, lot of money must be spent upfront to conduct relevant analysis. But some time the government does not see it like that….

R3. I think there is still work to be done on it, I think that they do communicate but not as extensively as they should. I don't think that it is that effective because they are not using the system to correct individual performance.

R4. Am, I think they are pretty well outline, am there is always room for improvement, the baseline should be communicating and the baselines should be

incorporated in the job Description and Departments goals. These things are done currently but should improve… There is room for improvement, there are issues of communication, inefficiencies.

R5. Well, we do a lot. That a way we should get, in that skill we need to improve. Communication, when projects are coming on stream we need, when the community comes out with a project the projects may be undertaken without defined scope. Therefore, continuous communication is required throughout the project that passes a very important point. In terms of intra-communication every one work within their little slow (Own world). Little or no communication. The ministry of work is responsible for all project implementation, therefore technical oversight is required. BIM is being looked at, an app is critical for this information, data is critical for implementation and the BIM is critical. There is a need for data collection, record keeping which will cause problem with projects…. A few things are so striking, and are not so measurable. There is academics in them, every measure established must be re-evaluated over time. They must be SMART, we have constraints which must be analyzed and must be practical.

R6. Am, I am not sure of a project performance measurement system. The funding agency will have a system, but not too sure at the government level. I believe that there is a system, because I have heard that there is an implementation rate of 40%, therefore I assume there is a system of tracking. If there is a CDB or World Bank these agencies do the monitoring….Am.. not sure

that the social projects like the lighting of playground, when you are looking at project that can be quantified then financial indicators are required, but other project like building a school that is considered a social project I am not sure as to how much performance measures that can be looked at for example a playground, I am not sure about the nonfinancial baseline. The social value can be calculated, that is what I am seeing is not calculated in Grenada. There are some benefits to it, but no one can put a value to the benefits….

R7. I my judgment two have some of the basic, but in this modern world we lack some of the contemporary performance measurement systems which lead to constraints. I think there are need for a better system and reformation. Am a… to some extent they are communicated. To the consultants and the community and it is implemented. And there are folks (Stakeholders) that are ignorant of the implementation. There is a general job description and the base lines, but if there is a specific project and individuals are recruited just for this project then the job description will include these goals and baselines. I think to an extend enough information is shared.

R8. Monitoring process lacking, framework Exist…. The monitoring and controlling process needs to be done, and the information obtained must be utilized to make decision. Frameworks needs to be properly managed, an M&E unit that focuses only on projects…. The result framework, have both financial and non-financial. There is a disbursement plan over the duration of the project. I am not aware of detailed financial analyses, and the KPIs and I don't think that

these are done at the project level. There should be there, but more the strategic and project management level, at the using the facility. For the projects that I managed, there were no financial indicators. I do not have knowledge of indicator types for other projects….

R9. In general government institution it is minimal, however in agencies such as NAWASA, although there is much room for improvement, performance measurement is implemented in most capital expense projects during the implementation and operational phases of the project. Non-financial indicators are utilized in most to all projects. Financial indicators are used in projects of larger size, cost and duration…From my experience, these detailed aspects of infrastructure projects are usually discussed with the design team, and at management level and communications to some extent. However, other internal departments such as administration, finance and revenue are not fully aware of such project details and policies. Stakeholders affected by the project are usually informed on potential effects of the project on them. Usually a presentation is made via meetings, radio or other broadcasting and social media platforms…

R10. From my experience the performance measurement is not strong, because the performance measures should be included in the beginning. You should have it during planning, however from my experience it occurs after implementation or half way through…. That is an area that needs enhancement. I think that stakeholders must be involved, there is the need for stakeholders' involvement during the planning phase. Making the implementation easier. There are times

when this does not happen, limiting acceptance. Therefore, the communication is very important. There is room for improvement, there has been some effort to use this model the former model is not that successful.

R11. Not aware of existing infrastructural project performance measurement systems. That is something new, for example in NAWASA that is something new and just coming in and there is a rock and a hard place because of acceptance, it is top down and is required…. Yea, as I said it was done effectively, because the baselines and so are with the deliverables and what's is the am…. the whole focus of the project, through the media, for example in our jurisdiction here….in parliament when they are selling the project at the political level, they will say why they want to have the project, when the project is in execution, we have signage both for publicity and requirements when it comes to funding agencies, for the political slant to, for you cannot have a project without a political slant…

R12. Am…based on my knowledge, there are capital project for revenue and social projects. The social projects have all the social benefits. The projects that have financial generation the financial indicators are established. Then the impact is established to ensure that the infrastructure but also the investment must benefit the population. I agree, one of the problem is that in a small country that we do not have the capacity to translate the non-financial into dollar values. This is lacking: therefore a SIA should be done with the EIA to calculate the non-financial values and indicators....There are some measures…. However, the funding agencies established the project governance and the project performance

criteria and sometimes they provide the performance indicators and oversight for NAWASA. One of the big problem is that we do not collect data in this countries to measure, the KPIs makes it mandatory to collect data. There are times the financing agencies demand the collection of data, however overtime the process falls by the wayside by NAWASA and the government.

RQ 3: To what degree do public servants and stakeholders perceive public sector infrastructure capital project as efficient?

From the responses, it was illuminated that public servants and stakeholders perceived the public sector infrastructure capital projects in the context of Grenada as inefficient and plagued by several challenges. The challenges that led to the project inefficiencies were present throughout the project phases (Initiation, planning, designing, approval, financing, construction, closure, maintenance) and were directly impacted by input, process (people, policies, technology), output, and outcome. These challenges can be categorized as inappropriate project governance, ineffective management and supervision, inadequate performance measurement and monitoring, lack of clear baselines and goals, inefficient utilization of resources, lack of technology, ineffective or lack of adequate risk management and planning, ineffective communication, stakeholders' influences, and political influences as affirmed by the participants. The manifestation of these challenges were evident in the project quality, schedule, cost, ROI, resources utilization (physical or people), and community or stakeholders satisfaction, notwithstanding these institutions legislative mandates. These issues justified the premise to develop the comprehensive management KPIs system as a mitigating strategy to

reduce these challenges and associated impacts. As detailed in the legislature, and explicated in the institutions' mission statements, these infrastructure projects were implemented to achieve the institutional missions, and sustainable economic development through the delivery of goods and services to the nation citizenry. Unfortunately, these projects were deemed inefficient both in developed and developing countries because they experienced the following issues, which may be remedied by the recommended KPIs techniques (See table 2). Additionally, figure 8 depicts participants' responses to the existence of infrastructure projects inefficiencies in Grenada. Of the total participants interviewed, 42% stated that infrastructure capital projects are most likely inefficient, whereas 50% indicated partly inefficient and 8% not inefficient.

Table 2

Project inefficiencies Ver*sus KPIs Remedies*

Causes of infrastructure Project failure	Management KPI remedies
Cost overrun	Budget or Baselines, Earned Value versus Planned Value, Cost performance index
Inadequate quality	Scope, inspection, certification, approval, communication, goals
Delays	Baselines, earned time versus planned time, schedule performance index
Inadequate return on investment	Financial return or economic return, financial ratios, Economic indicators
Physical resources under-utilization	Efficiency or activity ratios asset turnover (working capital, fixed asset or total asset), material turnover, debtor days and creditors days, procurement scheduling
Human/personnel resources utilization	Human resources ratios (personnel to yield ratio, productivity ratio, personnel utilization ratio or HR efficiency ratio), operating performance ratio (sales/ employee or earned value/employees versus planned value/employees),
Stakeholders outcomes misrepresented	Outcome versus output, communication, cost versus benefits, stakeholder satisfaction versus dissatisfaction, SIA, cost benefits analysis

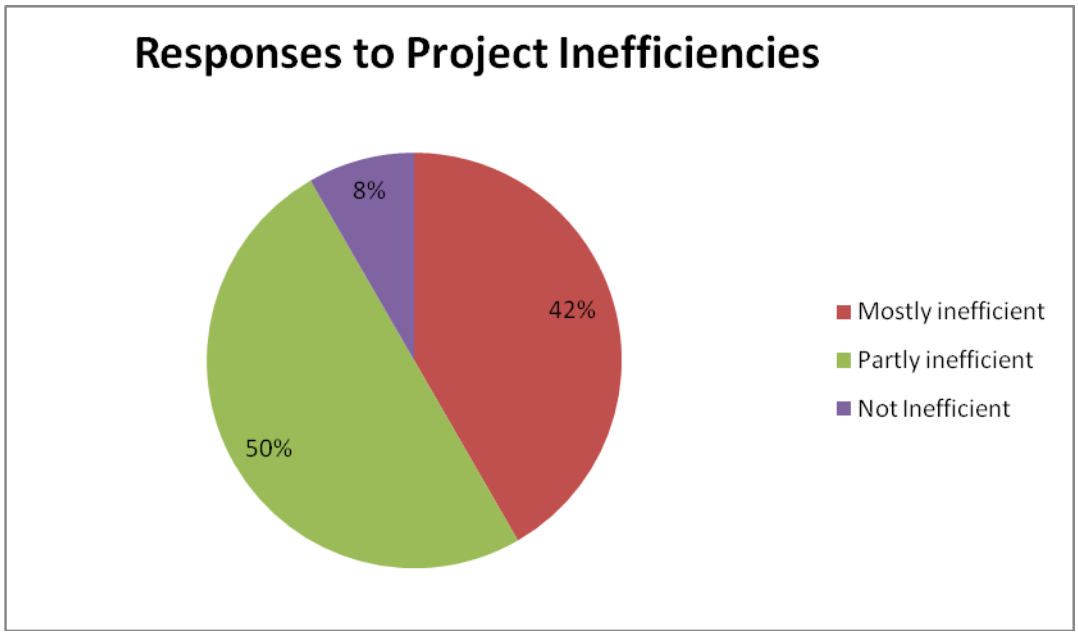


Figure 8. Participants Responses to Project Inefficiencies.

In many instances, projects undertaken by the government and NAWASA experienced delays, administrative challenges, quality, and cost overrun. These projects ranged from roads, buildings, bridges, water projects, and PPP projects experiencing a lack of adequate governance, policies, administrative rules, political-will and system of performance measures. The delays in these projects affected the functioning of business, citizens' mobility, adequate distribution of water, equitable distribution of goods and services, projects ROI (Economic Rate of Return-ERR, and the Financial Rate of Return –FRR), and economic growth. For example, under the Grenada government CBI (Citizen by Investment) program which generated approximately EC$80 million in 2018, there was the failed CBI-Shrimp Farm project. This CBI project encountered administrative challenges resulted in legislative changes to the CBI law within Grenada. The justification for the law according to the Prime Minister was to attract more persons to

partake in the program, while maintaining security. Adding, that since the world is dynamic and highly competitive, and developing countries have modified the program to ensure that more people qualified under the CBI program. Thereby, the government of Grenada made changes to be very competitive without compromising security (Straker, 2018).

Another strategy highlighted as crucial for infrastructural projects successes which was established as the Caribbean roadmap is (PPP) public-private partnership. According to the PPIAF 2014 report, of the 11 Caribbean countries reviewed nine of these countries utilizing PPP, but only Jamaica, and Trinidad and Tobago have adequate PPP policies, dedicated unit or department for PPP, and defined roles. Unfortunately, the 11 countries possessed inadequate laws, and detailed guidelines despite their varying degrees of experiences in PPP. In short, the introduction of PPP is a fundamental strategy to reduce infrastructure project inefficiencies, reduce cost, improve accountability and transparency, introduce private sector philosophy, improve resource utilization, and projects ROI. However, within the region these PPP projects lacked adequate project governance, proper estimation, technology, technically trained staff, efficient contemporary management techniques, risk management, policies, adequate monitoring and evaluation (M&E) framework, data collection system, and performance indicators and measures resulting in these projects still encountering inefficiencies (PPIAF Report, 2014).

Participants were asked to provide an explanation as to the degree to which infrastructure capital projects executed by the government of Grenada and NAWASA as

being efficient. This question solicited participants' perception of infrastructure capital projects efficiencies over the last decade based on their opinion formulated by experience and expertise. The following interview responses were provided:-

R1. They are not very adequate. They are very basic in their construct, which mostly measures time and cost. The Lack of Project Governance Frameworks for managing projects in statutory bodies and public entities…. I perceive it to be fairly ok, from the perspective that most projects are eventually completed within reasonably good time, cost and scope and meet the need for which it was designed. But much effort is needed for a higher level of success….Improper budgeting, therefore projects fail because they have to be refinanced, which sometimes take a very long time. Inadequate supervision throughout the life cycle of the project. Proper closure off of projects; carrying all activities to the end, and documentation of lessons learnt…..Infrastructure projects can be more efficient if more emphasis is placed on: Planning and scheduling, Monitoring and controlling of project schedule, budget and scope, Risk management

R2. Am, in the area of project we need to embark on additional skills, getting different guys at different levels. One of the key is getting a project charter on par. Policies, and managing the hole program…. We, I am looking from the Government side there is a problem with Human Resources. Especially, within the Engineering and technical feel. When we look at most of the scholarships, everybody wants to be a lawyer or accountant. We are lacking technical skills… Now , be it large or small, the level of skilled work force here in Grenada, we just

sent out tenders for the repairs of 16" diameter pipes mains lines outflow lines and we must outsource this skills because we don't have the skills locally…. Well ok. Let me talk about my experience hers. I look at the efficiency but what I call efficiency is time, quality, cost the triple constraint, you cannot have efficiency and don't have quality because you won't have a satisfy customer.

R3. The bureaucracy…. They can do better, there is room for improvement, how would you explain? they don't monitor enough, in the monitoring and controlling. …I think the slow pace at which things are done. What do you thing of the quality of the human resources? I think the quality of the human resources are good….Lack of accountability…. I think not holding people accountable…..

R4. Amm…I think that in Grenada, different between the outputs that is delivered for the value of the project. I think that sometime the money that is spent on the project and value of the project. There is room for improvement in aligning the value of the project and the cost of the project. At the end of the day what is delivered have to satisfy the intent objectives. The planned value and the actual value have a large variance….. Am…. repeat, am there is room for improvement, the government initiate and the department of implementation provides oversight. In generally there is fare system of governance… I think it is completion, Delay or time, there is the challenge of the prerequisite skills for the project, there might be certain skills and machinery that are not available, so those are bad….. It's being able to articulate the scope of the project effectively, being able to have control and monitoring systems, in some cases there is break down, inadequate

skills, lack of identifying problems, project delays and keeping to schedule, there is a lot of room for improvement, miss communication, goals are not clear.

R5. Public Service Investment Participation, there are individuals, but adequate staffing is required. Need for correct monitoring and controlling, adequate cash flow management, adequate funding. We can do more in governance, we have a 70% delivery but the effectiveness is not determined neither efficiency. Also needed is collection of adequate data for future planning and management…. Taking things for granted, personnel/ human factors, square pegs in the round hole. The right person must be hired for the right job, I keep saying that I don't know why we are concentrating on so many administrative staff, what we find is that some of the technical persons are placed in administrative positions. And they waste their talent, therefore the technical faculties must be focus on. Some of the persons just graduate from college and do not have the transferable skills…. But when you look at project cost and management, we are doing wonders with the limited human resources we have. We have individuals with expert skills, but just insufficient personnel, however we are working miracles with our limitations, and when the consultants come down here we give them all the answers. The local knowledge is so vital over the international opinion, the whole idea of local information must be incorporate. The local expertise is needed.

R6. NAWASA, it does not cover all the major areas of the project. As stated earlier the funding agencies look at the performance measures for their interest. Project should be of a long term nature. We are seeing occasions when the same

project or similar projects must be done or repeated. For example the maintenance, there is a lot of room for improvement, although they say that the delivery rate is 40% which may be deemed efficient, but it is not. There are areas where project failure is evident. If we look at a project in Waste management as compared to a project in education if something goes wrong there problem is more evident in waste management than education. Therefore there is room for performance and project efficiency to increase….The nonuse or non-functionality of some of the capital projects soon after completion. And I remember the southern water project …, after before the completion of the project there were areas of the system that were not functioning properly. The project in Mamma Canes now the project was nonfunctional after one year. This is of serious concern. These testing are required, alpha and beta testing, monitoring after completion for a period of at least one year….Well, as I mentioned before is that the scope has to be well defined, where the project need is detailed and incorporated. What we are trying to achieve, there are data that can be acquired to make that decision. Lack of data that must be current, not non relevant data, not 20 years old, since things have changed significantly.

R7. Alright as I mentioned earlier, variance between the implementation and established standards, because of a lack of professional staff. So for example there is a need to put water in a particular area and but we had to pump and there is a negative ROI because of a lack of adequate planning. These projects…. and based there are times where the stakeholders' desires are not achieved, financial

planning. Real time planning to improve efficiencies, Continuous analysis correct deviations, we need all financial tools and nonfinancial tools….. Well, I will give it an average rating. I think that there is need for improvement. This is driven by the culture, the utilization of money. The public sector must perceive these projects as their own, justifying the needs for management KPIs which must be within the entire public sector. These must be included into the employees' job description. Matrix must be utilized to monitor and control…. Am… well some of the challenges that I experienced, when you start the project implementation there are situations where some contingency operation is required but lacking which is a challenges there is the issue of overtime most of these are present. There is the issue of environmental factors such as rain. These are factors that create variances, and the need for geologist testing. There is a case in NAWASA where columns were required for a project which passed in a swamp and the engineers were required to design an appropriate column, unfortunately because of the poor design the column started to move, this posed a challenge for the project. Therefore, the planning process needs to improve…. Well the things this is similar to above, time, approval time, out dated data, all these things will contribute to efficiencies, outside influences, you may have that during the implementation of the project there is change of scope, change order. Person wanted to move things from point A or B.

R8. On paper the structure is not a bad one. However the compliance is the problem. Best practice is not established, the focus in what is done not on how it

is done. Better governance is needed. Better planning is required in project design and development. Monitoring and evaluation during implementation is limited and not institutionalized…. Lack of and/ or limited counterpart funding. Government not being able to meet its obligations in cash or kind. Contract renewal was a very slow process with uncertainty of renewal…. Time taken by stakeholders to review and approve reports and project deliverables can be very lengthy and iterative. Limited technical capacity and subject matter experts to effectively review and approve/ critique deliverables. Stakeholders are sometimes not able to clearly articulate what they need and thus development of scope of works and TORs can be delayed. Budget shortfalls due to poor cost estimation/ budgeting. Relocation and re-assignment of key stakeholders during project life cycle, created lack of continuity. Lack of institutional knowledge and poor record keeping. Lack of support from project beneficiaries and decision makers. Absence of site clerks on major civil works projects to be limited capacity within the ministry of works. Limited capacity to deliver deliverables, poor budgeting, resulting in several project short fall…. Projects needs properly planned from inception and best practice project management principles….. Project monitoring and evaluation is also key. Efficiencies are also realized with effective contract management, supervision and quality control

R9. Projects that implement good practices in their design phase have the greatest advantage to meet targets and objective in the implementation phase. Projects at local level are being executed and managed according to design requirements but

usually run beyond outlined project duration, cost and in some instance are of a lesser quality that originally expected…. Experiences of formulating project schedules, tailoring contracts to suit best outcome, setting realistic deadlines, localizing project context for best realistic result, setting tangible performance indicators. Limit Financial Capacity – Finances are the driving force behind all capital projects. In many cases internal funding and in some cases external funding can only mitigate portions of overall goes and objectives, Limit Data Collection and Sharing, Improper Management, Method of Execution (non-best practices), Lack of Inter-Department Communication…Lacks Performance Measurement and KPIs, Standard Operating Procedures for Project Management Frameworks, and Proper Planning

R10. Generally there is room for improvement, these projects are needed and necessary, and improve the infrastructure of our country. But there must be a structure in place where the projects are free from political interference, am personal objectives and structure in place to prevent people steal from the project, leakages and personal influences. These are required to enhance the implementation. To maximize the use of the funds…. Am, I would say the length of time it takes to get the project approve, for example from the start of writing the project to obtaining approval, including amendments. During that time changes could have happen, environment, administrative and a number of other changes, risk, inflation…. This will enhance performance therefore time getting the approval and implementation of those things needs to be looked at to

maximize resources utilization….. My opinion is that the human capital, their knowledge and skills to execute the project properly that's one challenge. There is the policy level, where the policy people have their opinion as to how the project should be implemented, which may be outside the process. Yes, I think that there is a lack of system to achieve effective governance, it is somewhat weak….There are times that have way through the project, you find out that there are rules that are not properly explained, so I think that the governance structure much is desired in terms of the implementation of these projects.

R11. I think that it is not all efficient, there is a new law in Grenada for procurement, an according to the cost of the project the government gives autonomy to the agent to proceed with the purchasing, but if it is above the government tenders board must approve it, but this is not always adhered to. The project I just told you, the government gave its blessings but after all the planning the making of the project was not above board. There is a need for objectivity, and efficient project management, real objectivity. The need for objectivity in the bidder-selection and project management…. As I say earlier, if the politicians waited on the technocrats are there was proper time or project scheduling may be the ministers may not have had the cause to determine that we have to pour the road. But since, what I have seen again when there is the choice of a contract they only look at the cost not the quality of the contractors, and ability to deliver on that cost, but is based on friendship …. To date the project is still incomplete and no one is held accountable, so there is a 'C' word that can describe that….other

thing to say, the lack of Environmental impact of projects (EIA). …We need adequate supervision, Costs & Time overruns so we can do it more efficiently, ammmmm…, and the National OSHE policy & legislation, and the availability of more advanced project equipment, because of our market we do not bring a particular piece of equipment because there are no cost benefits, the lack of the acceptance & use of new, efficient technologies.

R12. Most of the project goes out to international tenders since we do not have the capability locally. So I will talk about the international tenders, one of the major challenge is technological development. As a small country we do not have these required technologies, project delays not finished on time. The foreigners and consultants communication and ensuring the projects can be maintained by the local. We do not have the skills and technological development as developed countries and developing schedules, we do not have the ability to maintain. May be not, we do not manage these projects efficiently, lacking governance. We do not have the IT competences to maintain. The reporting, scheduling, and the financial impacts of delays and schedules deficiencies are not adequate. These factors affect the good governance of projects…. Okay. We have the inputs and outputs of the projects. Inputs are the physical resources and the outputs are the benefits. What we must considered is that the maintenance of the project for the next 10 years. A case in point is the desalination plant in Carriacou, financed by CCCC, the contract stated what have to be done but NAWASA did not have the financing to maintain and do distribution system to ensure the outputs are

> realized. The inputs and outputs must be considered. The SIA should be established in the planning and must be compared at the actual output…. Therefore there must be total commitment, before fulfilling the prerequisite. The conditions to obtain funding is stringent an as a company we must have internal systems to ensure that there are adequate systems to obtain funding from the Caribbean Development Bank (CDB) and the World Bank.

The respondents highlighted some issues relating to institutional norms, culture, lack of defined scope, adequate personnel (recording the highest percentage), management, performance measures, policies, baselines, and practices that can be considered barriers to infrastructure capital projects success. Some of these challenges arose from ineffective inter and intra-communication with stakeholders and project members respectively, inadequate reporting and projects monitoring, inadequate appraisal system, unclear personal and team phase goals, inadequate baselines, inefficient performance monitoring. Others factors may include lack of technology, planning, political will, financing, risk planning mitigation strategies, budgeting, triple constraint (cost, time, quality), project governance, project accountability and transparency, adequate goals and baseline establishment, data, skills, procurement, and environmental factors (see Figure 3).

Some of the responses provided by participants relating to recommended improvement to the infrastructure projects development and implementation process include: improve inter and intra project communication, establishment of project baselines KPIs, converting baselines into clearly defined understandable project unit and

personal SMART goals, improvement of project data collection activities, political support, identification and analysis of project risk and development of mitigating strategies, established adequate procurement policies, conducting continuous project inspection and reporting, established SMART goals, conducting EIA (Environment Impact Assessment), SIA (Social Impact Assessment) and PEST'LE (Political, Economical, Social, Technological, Legal and environmental) analysis, frequent analysis and auditing of project processes and outcomes, established alternative sources of finance, and establishment of appropriate management KPIs to improve project governance at the different phases of the project (initiation, planning, designing, construction/execution, Alpha testing, Bata testing, approval, maintenance, and closure). Some of the major challenges/barriers and possible solutions identified from the participants associated with infrastructure projects are highlighted in Table 3 and Figure 9.

Table 3

Perceived Challenges to Infrastructure Project Success versus Recommended Solutions

Challenges to project success	Recommended solutions
Ineffective inter-communication and intra-communication	Improve inter-and- intra project communication
Inadequate reporting and projects monitoring	Improvement of project data collection activities and reporting
Inadequate appraisal system	Frequent analysis and auditing of project processes and outcomes
Unclear personal and team phase goals	Converting baselines into clearly defined understandable project unit and personal SMART goals
Inefficient performance monitoring/Control	Frequent monitoring and analysis
Inadequate baselines	Establishment of project baseline KPIs
lack of technology	Introduction of BIM
Lack of planning,	Effective project planning, designing and implementation KPIs/Standards/Manual
Lack of political will	Solicit political support
Lack of financing	Establish sources of financing annually
Lack of risk planning and mitigation strategies,	Identification and analysis of project risk and development of mitigating
Lack of project governance	Establishment of appropriate management KPIs to improve project governance at the different phases of the project (initiation, planning, designing, construction/execution, Alpha testing, Bata testing, approval, maintenance, and closure).
Lack of project accountability and transparency	Concurrent evaluation, continuous project inspection and reporting

Lack of adequate goals	Establish SMART phase goals
Inadequate system of procurement	Establish adequate procurement policies
Environmental factors	Conduct EIA, SIA for the project and PEST'LE analysis
Human resource capacity	Adequate training
Health and Safety	Health and safety policy
Modern Equipment/Systems	Acquisition and utilization
Lengthy decision making & approval process	Decision making KPIs
Change order	Accurate planning and communication
Lack of data	Improve data collection

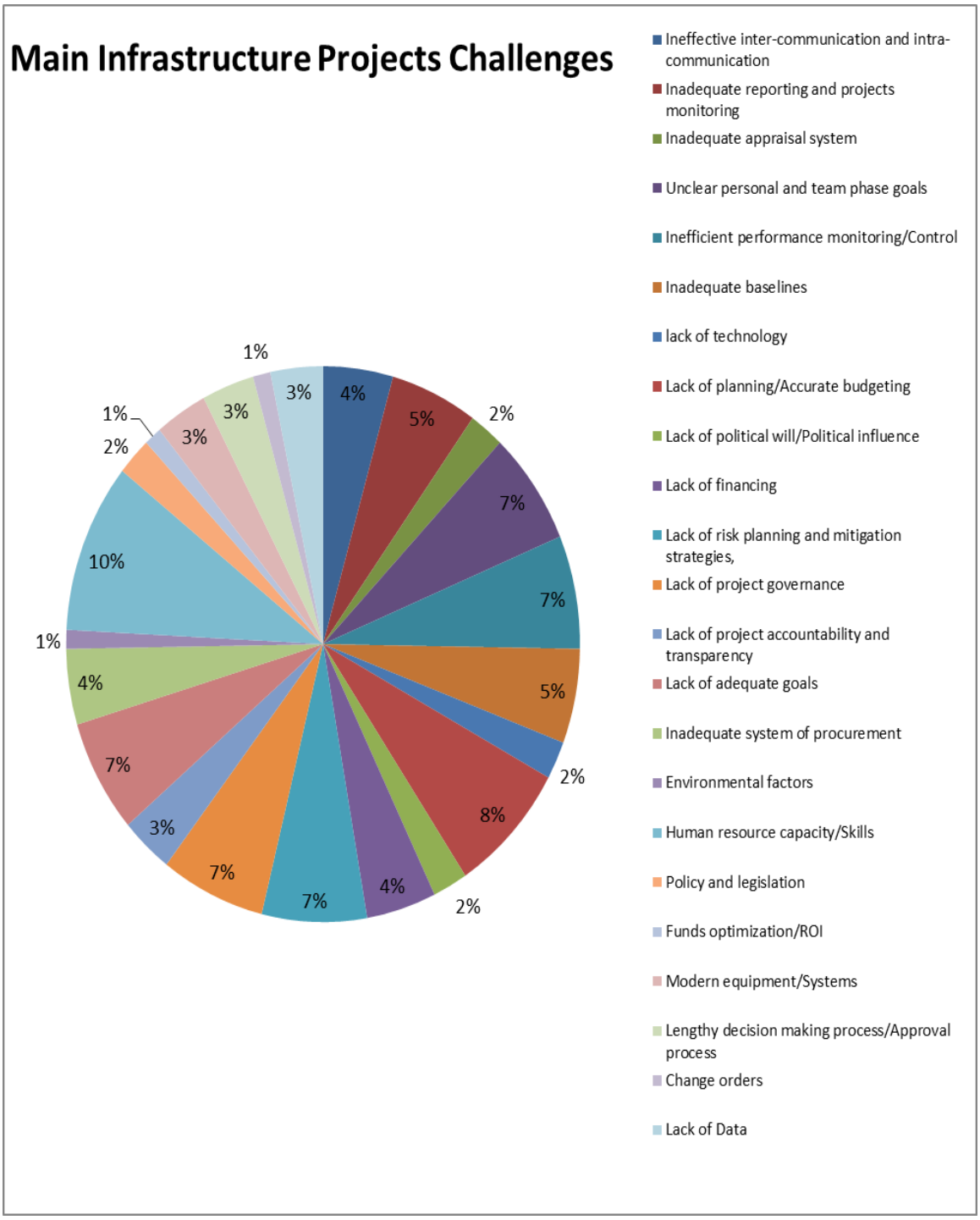


Figure 9. Main Infrastructure Projects Challenges

Discussion on the Findings

The central research question of the study sought to explore the degree to which management KPIs influence infrastructure capital project efficiencies in developing countries such as Grenada. To adequately answer the central question, examination was conducted on several critical areas of infrastructure projects implementation. These included: the need to obtain clarity on the process of infrastructure projects development and implementation to obtain in-depth understanding of the process, reviewing publicly accessible documentations and reports from agencies on the government and NAWASA. In this light, there was the need to solicit explanations to obtain an illumination of the existing performance measure, with the intent to justify the need to introduce a comprehensive performance measurement system throughout every phase and sub-phase of infrastructure capital projects, geared to improving overall project efficiency. Thereby, creating the need to infuse private sector philosophy within the public sector that are geared towards improving productivity, accountability, transparency and performance by introducing comprehensive management KPIs. As a result, established the need for professional expertise, project auditing, evaluation, risk management, institution of performance related pay (PRP), effective monitoring and controlling during the project to ensure optimum utilization of funds and resources. This paradigm shift may ensure the alignment of the project objective and outcome, stimulating the need to achieve project objectives and outcome, the need to ensure the conditionality and stipulations for funding by donors are adhered to, align projects development to the legislations and policies, and

the need to effectively establish and communicate project objectives to internal and external stakeholders.

Since the government has a fiduciary responsibility as mandated by law to ensure optimum utilization of public funds (Bryson, 2016), there are some enabling factors supporting incorporating private sector performance measurement philosophy into policies within the public sector and cascaded throughout government departments, government administrators, agencies, and public servants responsible for infrastructure capital project. The latter policy should undergird the government's, departments' and individuals' objectives, be reflected in job description, and incorporated in project contracts. Therefore, becoming integrated into the political will throughout the functioning of the government (Siddiquee, 2014). To achieve the fiduciary responsibility of taxpayers' funds optimization, there in the need to establish an adequate system of performance measure through comprehensive management KPIs. These KPIs should be incorporated within the policies, administrative rules of the government and its agencies, or there may be the potent need to establish a department or agency to provide independent management KPIs oversight on public sector infrastructure capital projects throughout the island of Grenada.

Notwithstanding the enabling strategic factors for infrastructure projects success, many of the macro or strategic factors which may inhibit the performance measurement policy success may include: sudden fading of enthusiasm present during the initiation, conceptualization, and planning policies for social change within the public sector without the political-will (Siddiquee, 2014). These inhibitors may be prevalent in

instances where it was perceived by the administrators that there were no real political or electoral advantages. Additionally, in instances where there was little expert oversight, or international influence, or changes in government regime, or transferred out of administrators from positions of influence may all serve as barriers to the policy success (Takim & Akintoye, 2002). As the performance policies are reformed these critical challenges need to be understood and mitigating strategies developed as deemed necessary. Willingness to change, in many instances a shift in operational paradigm is inhibited because of anticipatory risk, uncertainty, or unwillingness to adopt. These are the challenges associated with change which may perturb infrastructure project policies reformation both at the micro and macro level which needs to be managed effectively.

Some non-strategic or micro identifiable challenges which perturb infrastructure capital project efficiencies include: project risk, underestimation of projects cost and time, triple constraint mismanagement, environmental factors, inadequate tendering selection, inadequate and unclear baselines/goals, lack of adequate supervision, inadequate performance measure (KPIs), accountability policies for non-performance, unofficial criteria for procurement, lack of project control and monitoring, inadequate project reporting, lack of independent inspection, ineffective communication, unethical practices, lack of department capacity, premature compensation, and lack of stakeholders participation, insight, oversight, and awareness.

In this regard, international agencies such as the World Bank, IMF, and other donor institutions highlighted several insights and recommendations for governments on the implementation of infrastructure capital projects. These include; institutional capacity

improvement, skills standardization and accessibility need to achieve quality output, adequate control and budget management, and activities scheduling; the need for adequate contemporary management system, organizational structure, and division of labor to ensure efficiencies during project development and implementation (IADB, 2011). Additionally, there is the need for institutional assessment and strengthening of the public sector prior to commencement of the management KPIs to ensure accurate internal design, cost estimation and scheduling geared to optimizing infrastructure projects efficiencies (IADB, 2011). This process may involve comprehensive reformation of the infrastructure project development process, project units and teams, including the department of Communication and Works, Planning, and Infrastructure, the linkage departments, and agencies because of affiliations.

Despite the several challenges as captioned, infrastructure capital projects over the last decade recorded some successes in the area of reduced cost overrun, duration, and improved project quality in Grenada. This was a direct result from the hiring of a project manager within the department of Communication and Works, Planning, and Infrastructure, and NAWASA responsible for infrastructure projects. The role of the manager entails planning, organizing, controlling, coordinating, and reporting the project implementation. The project manager approach improved management of projects nationally resulting from the adherence of some of the contemporary project management principles. From the findings, participants perceived performance measurement as contributing to improved efficiencies in infrastructure capital projects. The participants recommended the need for a more comprehensively designed performance measure and

monitoring system that encompasses the phases of the project and the hierarchy of the project team. The responses obtained from the interviews confirmed to the findings from literature and studies conducted in other developing countries on infrastructure capital projects. Based on participants' responses, it was the view that a new performance measure system was instituted under the home grown (SAP) instituted in 2010 (GOVGD, n.d). Despite the successes recorded from the introduction of the performance measure under the locally initiated SAP by the Government of Grenada. There has been evidence of contextual challenges emanating from ineffective communication of project objectives and outcomes to the stakeholders, which resulted from failure to establish clear KPIs at the different phases of the project, and within the project team staffing for effective performance measuring and monitoring. Also, inadequate policies for governing the KPIs or goals of the project, and lack of necessary internal and external stakeholders' engagement, political and institutional constraint, program ownership, and a lack of key structural measures were additional contextual challenges. This was evident after a loan of $28m was awarded to the Government of Grenada for economic development failed to achieve its objectives.

This created the need for reformation and modernization of the internal processes of infrastructure projects by introducing comprehensive performance measures. Further, there is the need for political stability, institutional strengthening and policies aligned to KPIs implementation, political will, and committed leadership for the KPIs program success. Senior administrators' tardiness and reluctance in timely decision making, and unclear objectives outside of the criteria of SMART created delays, cost overrun, and

lack of quality in infrastructure projects. In this light, summative and concurrent monitoring of the program implementation and the policy of infrastructure capital projects KPIs are recommended. Since these challenges create barriers to policy implementation and effective performance measure in Grenada, it is critical to ensure institution of the recommended comprehensive management KPIs performance measurement, holistic monitoring and control system, and appropriate governing policies and administrative rules.

The participants suggested that performance measurement should be the undergirding principles of the job and position description, reward system such as the (Performance Related Pay- PRP) on every project undertaken by the government. Further, there is the need to bolster competence and capacity of the public service through KPIs training, procurement process, resources availability, governed by policies and legislation. The majority of the participants was dissatisfied with the public sector execution of infrastructure capital projects, and supported a comprehensive management KPIs that can ensure the achievement of both the project objectives and outcomes. Additionally, the need for effective communication throughout the project both internally and externally, monitoring and evaluation (M&E), risks mitigating strategies, political support, training, technology and clearly defined goals and baselines are required. These were some of the recommendations for improving infrastructure capital projects efficiencies through management KPIs (see Tables #3&4). The participants further emphasized the need for: an accountability and transparency framework (CM- Capacity Mapping); stronger advocacy; consultation; clearer understandable project vision;

engagement, and participation from key stakeholders, thorough consideration of the project outcome and objective throughout the project phases; detailed project scope and nature, well-defined contracts which are derived from the project policy; adequate financial and human resources; the need for effective project risk management; the need for concurrent and summative monitoring performance through KPIs models; need to evaluate and audit every project phase during and upon completion; need for adequate and transparent bidding and approval process; the need for reporting successes and failures determined by performance indicators; the need to develop mitigating strategies to ensure project efficiencies and success; and the need to develop adequate policies and rules to ensure the KPIs and capital projects are effective.

Table 4

Recommended Infrastructure Projects Strategies by Participants Responses

Recommended Solutions	participants
Improve inter and intra project communication	4
Improvement of project data collection activities and reporting	5
Increase analysis and auditing of project processes and outcomes	2
Converting baselines into clearly defined understandable project unit and personal SMART goals	7
Frequent monitoring and analysis	6
Establishment of project baselines KPIs	5
Introduction of BIM (Building information modeling)	2
Effective project planning, designing and implementation, KPIs/Standards/Manual	7
Solicit political support	2
Establish alternative sources of financing annually	4
Identification and analysis of project risk and development of mitigating strategies	6
Establishment of appropriate management KPIs to improve project governance at the different phases of the project (initiation, planning, designing, construction/execution, Alpha testing, Bata testing, approval, maintenance, and closure).	6
Concurrent evaluation, continuous project inspection and reporting	3
Establish SMART phase goals	5
Establish adequate procurement policies	4

Conduct EIA, SIA and PEST'LE analysis for the project	2
Adequate training	9
Health and safety policy	2
Funds Solicitation/ ROI/Contingency planning	2
Acquisition of technology	3
Decision making KPIs/ Expedite approval process	3
Accurate planning and communication	1
Improve data collection	3

All the participants during the interview recommended modernization of the performance monitoring and evaluation system. This findings concurred to the recommendations from the IMF and World Bank under the initial SAP, and most recently under the home grown SAP (Elu, 2000; Grenada - Economic and Social Development Policy Loan and Credit Program, 2010). The report called for performance evaluations and monitoring institution within the public sector operations inclusive of the infrastructure capital projects phases. The policy specified public sector improved governance and economic development through improving efficient utilization of tax collected, reduce waste, improve public service deliverables and mitigating the impact of the world economic downturn (Grenada - Economic and Social Development Policy Loan and Credit Program, 2010). The participants added the need to include a comprehensive management performance measure with SMART criteria established objectives and indicators such as the KPIs.

The GRPF (Grenada Reformation Project Fund) program recommended the establishment of operational policies that govern the reformed public sector which encompassed the structure, procedures, processes, performance measures, and management. The need for post-construction audit of the entire process and sub-processes of every phase to determine the efficient use of resources and adherence to modern management principles, such as accountability, transparency, PRP, SWOT, PESTL'E, monitoring, and control. The evaluation of the processes will be conducted in accordance with establish KPIs and other operating outcomes and objectives. This evaluation should be part of the public sector policy, operational manual, project estimations, budget, sector units' objectives, departments' objectives, and job description of staffs.

The recommendations deriving from the interview responses and documents review provided the principles for improving efficiencies and reforming the public sector infrastructure capital projects implementations. Despite the fact that there has been evidence of success in infrastructure projects resulting from management KPIs, clear evidence of this in the context of Grenada is insufficient. In this regard, it is important to consider the recommendations for developing a comprehensive management KPI policy to reform government infrastructure project governance to achieve efficiency and success.

Chapter Summary

The process of data collection revealed profound insights on the impact and influence of management KPIs on infrastructure capital projects on developing countries such as Grenada. The central question sought to determine, to what degree management

KPIs affect the success or efficiency of infrastructure capital projects was answered. Additionally, the instituted performance measurement policies implemented by developing countries such as Grenada in the 1980s, 1990s, and again in 2010, had been successful in the context of the government's and stakeholders' mandates, despite its limitability.

The document review and the transcriptions of the responses to the open-ended questions from the 12 participants of my qualitative interviews provided the data utilized in this study. This data gathered was password protected stored, manually coded in preparation for analysis and interpretation utilizing Microsoft Excel. Chapter 5 presents the analysis and interpretation to the research including the conclusions derived from the data collected. It culminates with both academic and practical recommendations for developing countries public sector infrastructure capital project development and implementation arising from the study. The chapter concludes with discussion, provisions of policies, protocol, matrix, and framework relevant for infrastructure capital project reformation and positive social change within developing countries globally.

Chapter 5: Discussion, Conclusion, and Recommendation

Introduction

This qualitative case study sought to reach a deeper understanding of the influences of management KPIs on public sector infrastructure capital project efficiencies in Grenada. The objectives of the research include obtaining illumination of the role of management KPI on infrastructure projects throughout the different phases: initiation or visioning, planning, designing, approval, financing, construction or implementation, closure, and maintenance. The technique of performance measurement and monitoring through the BSC system had become integral under the Structural Adjustment Program of the 1990s and 1980s. However, the technique focused narrowly on the financial and basic non-financial measures, creating a need for a comprehensive system of performance monitoring. The KPI system of performance measurement is currently the system of choice for infrastructure project implementation in developing countries, such as Grenada.

Despite the use of the BSC in Grenada and the English speaking Caribbean during the 1980s and 1990s, there has been limited scholarly studies based on empirical evidence on the impact of BSC on infrastructure project and operation efficiencies in these countries. Pioneering studies have been conducted over the last two decades on the BSC system implemented in small English-speaking developing countries (Elu, 2000; Green, 2009; Schroulder, 2010; Quinn, 2015). On a global scale, several studies have been conducted on management KPIs in developing countries (Anderson & Holcombe, 2006; Andrés, et al., 2017; Buabeng-Andoh, 2015; Cheng, 2014; Durdyev et al., 2017;

Eik-Andresen et al., 2015; Fourie & Poggenpoel, 2017; Kjæra & Therkildse, 2013; Pilkaite & Chmieliauskas, 2015; Siddiquee, 2014; Takim & Akintoye, 2002). This study may stimulate further scholarly interest on management KPIs impact to improve efficiencies and optimal utilization of taxpayer dollars in small developing states of the English-speaking Caribbean and developing countries around the world.

Interpretation of the Findings

In this study I explored the phenomenon of management KPIs impact on infrastructure capital project efficiencies using the IAD framework and classical management theory model. I incorporated the project management principle and the BSC used in developed and developing countries (Anderson & Holcombe, 2006; Britton Woods Report, 2014; Durdyev et al., 2017; Elu, 2000; Green, 2009; Kaming et al., 2010; Mensah & George, 2015; Pilkaitė & Chmieliauskas, 2015; Schrouder, 2010; Siddiquee, 2014). Nonetheless, the current performance measures employed by these countries vary because they are influenced by politics, culture, economics, environment, and stakeholders, which affects the performance measure structure, role, function, objective, administrative rules, and policies (Elu, 2000; Parmenter, 2017). Profoundly identified within these countries, is the need for a comprehensive management KPIs system that is objective, fully compliant, and that encompasses both financial and nonfinancial measures.

According to Quinn (2015), where countries are governed by a parliamentary system of government like Grenada, the head of state selects the ministers responsible for the management of various ministries. These individuals are also responsible for their

constituents and infrastructure project initiations, which are necessary to achieve constituent mandates. Projects are brought to the Cabinet for approval; after approval design and implementation are carried out by Ministry of Communication and Works, either directly or through its agencies. Against this backdrop, infrastructure projects are strongly influenced by politics, with less influence by the citizenry. Similarly, NAWASA although a statutory body, operates as an agent of the government under the Ministry of Communication and Works providing water and sewerage services to the entire island. These institutions' legislation governs the operations by detailing the mandate translated to the mission, roles, and responsibilities. These entities recorded evidence of a form of performance measurement system BSC, for infrastructure projects introduced under the SAP in developing countries in the English speaking Caribbean (Elu, 2000; Green, 2009). Over the last decade, there has been evidence of project inefficiencies such as cost and time overruns, quality issues, and failure of these countries to achieve SAP objectives (Britton Woods Report, 2014).

These operational frameworks for the statutory body, agencies, and government ministry somehow supported the research findings of inefficiencies. In Grenada, the Ministry of Communications and Works are responsible for, and provide oversight for the planning, designing, implementation, and maintenance of the project, whereas the initiation or visioning is done by other ministries, agencies, and stakeholders. The ministers of the various government ministries and the general managers of the statutory bodies or quasi-public sector are accountable for the execution of projects and achievement of established policy objectives (Quinn, 2015). These administrators design

and develop operational policies for the implementation of the projects, which involves the translation or interpretation of strategic plans and administrative rules. Government project execution structure varies from country to country. For example, outsourcing, where the outsourcing company is accountable to the government or statutory body for the output, outcome, and service delivered. Project implementation functions or activities are monitored by project owners (government and regulatory authority), sponsors, funding agencies, and stakeholders for the effective and efficient execution of the project (Britton Woods Report, 2014).

Comprehensive management KPIs are anticipated to transform the public sector by creating a system of performance measurement and monitoring of financial and nonfinancial factors that can increase accountability, transparency, control, and efficiency in project management for infrastructure projects (Parmenter, 2017; Schrouder, 2010). During the interviews, participants highlighted the challenges associated with the implementation of infrastructure projects and recommended reform of the public sector by implementing a management KPIs system. These issues arose during the data collection process confirming several of the problems identified by the literature review. According to Kaiser and Streatfeild (2014), and Schrouder (2010), the BSC which is narrowly focused is incapable of adequately measuring the entire performance of operations despite the implementation of inefficiency mitigating strategies such as, the Capacity Map which involves Continuous Improvement. Although these strategies have been implemented throughout the structure and substructures within the government and

public sector, the demand for a comprehensive performance measurement and monitoring system, such as the KPI, increased (Parmenter, 2017).

These earmarked management KPIs will be implemented throughout the government and quasi-public sectors such as NAWASA's policies, department goals, jobs, and position descriptions of employees. The limitations identified in the interviews as prevalent in developing countries' public sector project implementation corroborate the assertion in the literature review. Parmenter (2017), and Schrouder (2010) provided empirical evidence on the need for management KPIs to improve overall infrastructure capital projects efficiencies through the establishment of the following performance measures, quality, cost, time (triple constraints), scope, financial, resources, and stakeholders throughout the public sector. These points were reiterated during interviews with participants including civil servants, administrators, and stakeholders. Several studies have been done on developing countries infrastructure projects KPIs effects in Africa, Europe, and Asia, but few have been conducted in the Caribbean. The common issues identified as prevalent in these developing countries were ethics, inadequate supervision and measurement, lack of transparency, politics and accountability, cost overruns, inefficiencies, poor quality, and lack of established milestones or KPIs for monitoring performance (Lawther & Martin, 2014; Mensah & George, 2012; Schrouder, 2010; Takim & Akintoye, 2002).

Eik-Andresen, et al. (2015), and Parmenter (2017) reiterated that comprehensive management KPIs are relevant because they incorporate financial and nonfinancial measures, and adopt modern management principles such as: the Performance

Evaluation, Review Techniques, Performance Related Pay, SWOT, SMART, and ratios. KPIs should encompass organization and project hierarchy, and be infused into the project policies, organizational procedures, milestones, goals, reward system, jobs, and position descriptions. Effective communication and engagement between project team, project owners, planning, organizing, collaboration, commanding, communicating, controlling, monitoring, and evaluation are essential to obtain project efficiency. The principle of management KPIs must be incorporated throughout infrastructure project phases and sub-phases from initiation to closure with every stakeholder on board. Whether the projects are executed by employees or outsourced, the KPIs will provide critical information for the development of mitigating strategies to ensure project efficiency. The KPI strategy is premised on constant M & E, control, and measuring performance by establishing indicators through the matrixes (financial and nonfinancial) and protocols which are effectively communicated (Pilkaitė & Chmieliauskas, 2015). These KPIs should be penned within the legal framework of the government and quasi-public sector to ensure a more effective system of organizational and project governance forming part of the institutions' mandate (Bryson, 2014; Eik-Andresen et al., 2015; Siddiquee, 2014). One of the challenges associated with effective implementation of KPIs lies with the balance between the political and citizenry will, project output and outcome, and project owner and stakeholders (Siddiquee, 2014).

In some cases, the politicians who generally own the project focus on the political good of the project, and forget about the needs of the citizens and the economics of the project. At times the politicians will utilize the project political advancement ignoring the

adding of value to the citizens. In other words, there are times when the project owners place emphasis only on the project output, not the outcome. These challenges can be addressed through constant communication and engagement between the stakeholders and the project owners, incorporation of the technocrats' feedbacks, and effective reporting of results and benefits to obtain symmetrical relationship (Eik-Andresen et al., 2015). In light of the examples given by the participants relating to the challenges encountered during the implementation of the infrastructure projects, what is synonymous with Grenada is the lack of adequate measures which can be used to characterize project execution. In instances, where the projects are outsourced the contracts are not well articulated, with a clearly defined scope and operational standards, financial and nonfinancial goals, policies, procedures, and operational performance indicators. As recounted by the participants, this leads to cost and time overrun, poor quality, substandard resources and resources utilization, inadequate estimation, low financial returns, and overall project inefficiencies.

In developed and developing countries, management KPIs is utilized as a strategy to improve operational and project efficiency and success. According to Siddiquee (2014) once the government is on board with the implementation of the KPI system, appropriate policies and administrative rules incorporated, appropriate implementation goals established, and a system for reward and punishment are legally binding the KPI implementation can be successful. In light of this assumption, in the event of pitfalls in the outcomes and outputs during or after implementation it can be associated to factors such as; resources capacity, communication, availability and accessibility of resources,

institutional norms and culture, and politics (Bryson, 2016; Cooper, 2014). These issues were substantiated during the interviews, where participants cited instances of project delays, cost overrun and poor qualities related to resources inadequacies, undefined scope, lack of capacity, lack of adequate supervision, inadequate policies, organizational culture, poor performance management, lack of monitoring and evaluation (M&E), politics, and lack of communication.

The process of adopting a comprehensive management KPI framework for infrastructure capital projects involves the reformation of the institution (public sector) through reengineering processes, procedures, structures, policies, and rules, through adoption of knowledge, and institutional framework. The most appropriate frameworks utilized for assessing and developing the comprehensive management KPIs system is the IAD framework (Action situation, Actors, Current rules, Physical attributes, Community attributes, Outcome, and Evaluation), and the scientific management model which utilizes contemporary management and performance measurement techniques. In some instances, the implementation is adopted from developed or developing countries where this performance measurement system has been implemented successfully (Siddiquee, 2014). The adaptation may involve the assessment and importation of a KPI policy in entirety or particular aspects from another country or institution. It may be done voluntarily, or may be imposed by an external agency such as the IMF or World Bank; through PPP programs either locally or internationally (Lawther & Martin, 2014). Generally, there is a system of benchmarking based on best practices, to reduced errors during the policy implementation (Andrés et al., 2013). The process involves conducting

a SWOT analysis of the following components of the IAD; action situation, actors, current rules or policies, resources attributes, community attributes, outcome, and evaluation. These factors are evaluated and re-engineered to reform the public sector and implement the KPI policy. Additionally, the classical management principles are utilized not only to assess the current system, but to develop new framework and method of performance measure such as PERT, PRP, SMART, Ratios within the context of management functions of planning, organizing, commanding, coordinating, monitoring, evaluating, and controlling (Taylor, 2011).

Bryson (2014), and McCarthy-Jones and Turner (2011) emphasized that in developing countries policies processes such as KPI may be society centered which refers to power relationship and social group interaction. In some instances, it may include institutional communication, state interactions, and political official perception. During the data collection process, the revelation was that projects implementations were based on earmarked needs and the objectives determined the project phases. However, with the implementation of performance measures such as the BSC and KPI within developed and developing countries success rates vary from country to country. For example, in countries like the United Kingdom, Malaysia and the English-speaking Caribbean, despite the introduction of performance measures such as the BSC, the success rate varied since it was non-comprehensive, lacking adequate monitoring and evaluations framework, culture, political will, and management competencies. The recommended system to be implemented in Grenada will be comprehensive in construct, encompassing financial and nonfinancial management KPIs, and holistically developed and

implemented with a contemporary data collection component, technologically driven, and monitoring and evaluation framework. While the findings indicated the need to adopt a comprehensive management KPI policy no contextual model was recommended, therefore the model must be emergently incorporating the premise of a successful model from a developed or developing country. During the implementation process, a critical component will be the summative and concurrent monitoring and evaluation of the KPI policy similar to the premises that undergird the comprehensive management KPIs system (Andrés et al., 2013). The evaluation process led to further examination, analysis, and questions that may lead to the development of mitigating strategies and modification. In this regards, this continuous evaluation process determines the effectiveness and contextual suitability of the KPI policy and the success of the infrastructure capital projects (Parmenter, 2017; Siddiquee, 2014). The need for continuous monitoring led to continuous improvement which was highlighted by the interview participants repeatedly.

Additionally, the findings of the study provide a deeper understanding and illumination on the roles of management KPIs on public sectors infrastructure capital projects efficiency on developing countries such as Grenada. For example, the management KPIs will be established throughout the phases and sub-phases at control points of the project's critical path. These indicators will be utilized to measure, monitor, evaluate, and control performance to ensure quality achievement, cost attainment, schedule achievement, resources optimization and ROI attainment, which summarizes the overall infrastructure capital project efficiency. These efficiency measures above are incorporated within the triple constraint (quality, cost, time), scope, physical resources,

human resources, and financial indicators forming the appropriate framework, structure, matrix, protocol, policies, and job descriptions. Performance management technique incorporates a cross-section of experts, administrators, and stakeholders at varying knowledge and educational background. The management KPI model amplifies, revolutionizes, and reforms the existing system of measure by re-engineering processes, engaging the direct and indirect stakeholders during the development of KPIs, effectively communicating and reporting, collective evaluation, and development of mitigating strategies. The latter issues were supported by the interview participants and were recommended improvement which can be considered practical, worthy of consideration, and realistic. Although in several developed and developing countries performance measurement systems have been implemented, several projects continue to be unsuccessful or inefficient (Eik-Andresen et al., 2015; Parmenter, 2017; Siddiquee, 2014). Therefore, both scholars and the interview participants strongly recommended a comprehensive management KPIs to improve infrastructural capital project efficiency.

Limitations of the Study

This study adopted a qualitative case study approach which explored the role of management KPIs on public sector infrastructure capital projects efficiencies in Grenada. The objective of the study is to obtain an illumination or a deeper understanding of the existing system of performance measure and possible develop a comprehensive management KPI model, matrix policy, and protocols for infrastructure projects. However, there were several limitations associated with the study.

Firstly, the nature of the study and the choice of methodology selected to explore the phenomenon. In light of the phenomenon, the nature of the study, and the chosen methodological approach, the qualitative case study was the most appropriate approach. Similarly, the data collection and analysis techniques were undergirded by the study nature and purpose. The above methodology, approach, and techniques were the source of the limitations. According to Stake (2010), case study is an appropriate strategy for conducting inquiries within a defined framework where there is a need to obtain an in-depth understanding of the issue. This was evident in this study that explores the impact of management KPIs on public sector infrastructure project efficiencies. Additionally, the purposive sampling strategy was employed for the recruitment of candidates who satisfied the established participatory criteria for the study (Creswell, 2007; Patton, 2014).

Following the initial discussions with the administrators and engineers of the government and NAWASA, an initial list of project team members was obtained to be recruited for the interviews. Subsequently, the snowballing sampling technique was utilized for recruiting additional candidates based on the recommendations of the initial participants. According to Creswell (2007), and Patton (2014), these individuals must satisfy the inclusion criteria established for the study. Although the participants may be relatively few, during the in-depth interview an array of quality and collaborative information was gathered. This was evident with the similarity of responses to critical questions dealing with the contribution of management KPIs in infrastructure projects, the current state of the public sector and quasi-public sector infrastructure capital projects

implementations, the structure of the existing performance measurement system, and some of the constraints or inefficiency factors relating to these projects. As a result, a decision was taken to proceed to the analysis and interpretative phase of the study after no new information was forthcoming at the 12th interview (saturation point).

Second, the data source presents another limitation of the study. The limitation relates to the reviewing of publicly available documentation or periodicals and the conducting of qualitative interviews. Given the tight financial constraint and the limited time frame to complete the exploratory study, the most appropriated method used to interview participants was telephone and email interviews. Although, face to face was ideal for observing the behavior and obtaining a contextual snapshot during the interview this was not done and may be considered one of the study limitation. Within the qualitative tradition, and the purpose of the study which captures the transferability and adaptation of the findings, and the development of appropriate matrix and protocols, credibility is achieved when there are connectivity and collaboration with the information obtained. Noteworthy, the criteria of generalizability which is very important is not one of the undergirding rules under qualitative traditions since individuals behavior varies despite similar phenomenological exposure.

At the different stages of the interview process, checks were established to ensure the trustworthiness and credibility of the research findings. For instance, before and during the interview commencement my prior experience as a senior executive within the quasi-public sector, management, and project consulting was disclosed. The participants' credentials were checked and validated during the interview to ensure that these

candidates are eligible based on the selected criteria. The informed consent documents were agreed to and signed by the participants before the commencement of the interviews. Additionally, the critical role as the researcher, nature of the research, purpose of the study, the voluntary view of their participation with no financial benefits, the right to withdraw from the process at any time during the interview, the potential risk involved, was reiterated together with nonmonetary benefits. Throughout the research process, triangulation, and member checking were integral to mitigate potential bias associated with the data source utilized.

Recommendations for Further Research

This study on the influences of management KPIs on public sector infrastructure capital projects efficiency on developing countries such as Grenada was exploratory. The purpose of the study was to obtain illumination or in-depth understanding of the role of comprehensive (financial and non-financial) management KPIs as a strategic policy for improving infrastructure capital projects efficiencies. Through the process of monitoring, evaluation, and measuring performance throughout the different phases (initiation, planning, designing, implementation, closure, maintenance, and approval), development of appropriate policies, administrative rules, matrix, and protocols for the developing countries such as Grenada is necessary. One of the critical components of the infrastructure project that needs to be explored is the role of governments in achieving infrastructure project successes or efficiency. This is relevant since, without the political will, or support by the government to optimize the use of public funds through the

practical adding of value to society, infrastructure projects success or efficiency can be impossible (Siddiquee, 2014).

Practical Recommendations

Based on the findings of the study, many infrastructure capital projects executed both by the quasi-private and public sectors realized inefficiencies. These findings provided extensive evidence justifying the need for a comprehensive performance measurement system of project governance (KPIs), which form the undergirding principle for the effective execution of government and agencies infrastructure projects. Eik-Andresen et al. (2015), Mensah & George (2012), Takim & Akintoye (2002), Siddiquee (2014), and Schroulder (2010) observed that while there is evidence of non-holistic performance measure system such as the BSC within developing countries, there are little empirical data available on the role of individual countries government and politics on the success of infrastructure capital project. This observation is applicable for developing countries regionally and globally creating the need for scholarly research on the role of governments and politics on infrastructure capital projects efficiencies or successes in Caribbean countries. Researching this identified gap would provide useful information that could lead to the development of appropriate policies, legislation, ordinance that can reform government roles, ensuring accountability for infrastructure project.

According to Siddiquee (2014), successful projects undertaken by government agencies were possible through the attainment of support from the politicians. The Political will encouraged a system of accountability, transparency, communication, and

motivation that undergirded the relevant policies for effective governance. The findings of the future research together with the management KPIs policies will revolutionize future public sector infrastructure capital project both in developed and developing countries. The current exploratory case study highlighted some of the experiential issues relating to performance measurement and management KPIs techniques supporting the implementation of the comprehensive system in Grenada. During the interview, valuable insights and recommendations were provided by the participants based on their expertise and experiences to improve infrastructure capital projects efficiencies. One such technique is the introduction of comprehensive KPIs to monitor, evaluate, measure, and control the efficiencies of the infrastructure projects. These recommendations should be considered worthy for further discussion and utilization in the development of performance measurement and monitoring strategies such as policies, procedures, structure, and administrative rules for the efficient governing and implementation of infrastructure capital projects.

Recommendations for Further Research

There have been limited scholarly studies focused on infrastructure capital projects performance measurement and management KPIs strategies within the Caribbean. In this regards, this study was intended to fill the literature gap and initiate interest in this unique project management strategic area. Further, the study supports the modification of existing performance measurement strategies employed in the Caribbean such as the BSC, and builds on scholarly research conducted in the 2000s on the BSC implementation within the Caribbean after the introduction of SAP in the 1980s and

1990s (Elu, 2000; Green, 2009; and Schrouder, 2010). Despite the utilization of the BSC as the lone performance measure and monitoring system utilized by the English-speaking developing Caribbean countries, there is a lack of empirical research on the role of the government on the effectiveness of performance measures on infrastructure projects.

According to Bryson (2014), governments have a fiduciary responsibility to ensure that value is added to its citizenry through the provision of goods and services. One government objective is to optimize the use of taxpayers' monies by ensuring that the most appropriate economic plan is developed and efficiency strategies deployed (Mikesell, 2016). Any infringement of these mandates must be deemed as inappropriate and can lead to inefficiency, economic delay, and impede infrastructure growth. Therefore, it is prudent that the government employ sustainable economic development strategies, scientific management principles, ethical practices, political support, administrative supervision, a system of reward and punishment, legislation or administrative rules, policies, and continuous assessments policies during project execution (Siddiquee, 2014). Further, determining the government's role in the successful or efficient implementation of public sector's infrastructure capital project is critical, without which the project's success can be impossible. As a result, justifying the need for scholarly research geared towards obtaining an in-depth understanding of the role of government in infrastructure project efficiency in developing countries within the English-speaking Caribbean, and around the world.

Implications for Social Change

The effective administration of society is undergirded by public policies which are either generated by a push or pull system (Bryson, 2014). The objective of public policy is to improve the wellbeing and lives of the citizenry through effective governance, and efficient value-adding processes to the public products and services. This study is geared to institute positive social change arising from information obtained from the assessment of performance measurement policies on infrastructure capital projects within the public sector of Grenada. It is anticipated that the findings of the study will provide insights on the barriers and challenges to infrastructure capital project efficiencies from initiation to implementation. The study explored the possible utilization of the management KPIs as a mitigating strategic tool for the efficient implementation of infrastructure capital projects in developing countries such as Grenada, which is undergirded by previous research, and grounded by the evidence gathered from data collection.

The research findings may initiate discussion and redirection of government's attention to policy reformation and system reengineering strategies that may improve project efficiencies. Further, the findings provide the framework, matrix, and protocols that may overcome the contextual challenges throughout the various phases of infrastructure capital projects development and implementation that result in inefficiencies (Parmenter, 2017). Based on the cultural, technological, sociological, socioeconomics similarities of the English-speaking Caribbean and developing countries around the world, it is possible to conclude that the research findings can be appropriately transferred to the developing countries regionally and globally. Notwithstanding that the

research findings are grounded in infrastructure projects implementations experiences of Grenada, it may be relevant and significant for developing countries within the Caribbean and around the world.

Conclusion

Management KPIs can be regarded as the bedrock of project efficiency and success, positive ROI, cost savings, quality, timely delivery, and performance excellence. The comprehensive management KPIs are usually associated with private sector entities and considered a private sector philosophy. The incorporation of private sector philosophy within the public sector for the implementation of infrastructure projects can provide the framework to guide the project ensuring efficient monitoring, evaluation, and control of the project's triple constraints (cost, time, and quality). The latter philosophy results in, reforming infrastructure projects implementation, re-engineering processes, revising policies and administrative rules, improving the government and the quasi-public sector project efficiencies (Parmenter, 2017). The use of management KPIs was popularized within the context of public sector reformation policies and administration in the 1980s and 1990s during the era of the Structural Adjustment Program) which introduced the BSC (Elu, 2000; Green, 2009; Parmenter, 2017; Takim & Akintoye 2002). Within the context of the English-speaking Caribbean countries, in the 80s and 90s and to date, the external funding agents such as the International Monetary Fund, World Bank and Caribbean Development Bank financed most of the infrastructure capital projects undertaken by these countries. These institutions initially introduced the BSC under the structural adjustment program and modified the BSC system into a monitoring and

evaluation framework which incorporates some KPIs which are used to provide effective project management oversight for infrastructure projects (Britton Woods Report, 2014).

Notwithstanding the modification of the BSC by the international and regional funding agencies, the developing countries of the Caribbean continue to suffer from non-compliance to the modern performance measurement framework. As a result, these countries continue to experience projects inefficiencies and delays impeding the rate of economic growth (Britton Woods Report, 2014). Schroulder (2010) reinforced that the procurement framework utilized by the English-speaking developing countries of the Caribbean experiences unethical issues, unfairness, lack of public trust, ineffectiveness, and inefficiency issues affecting project overall efficiencies. The Capacity Mapping (CM) strategy was introduced as a mitigating strategy to reduce project inefficiencies. Although this system strives to track public funds from extraction or collection to disbursement, it lacked a comprehensive management KPIs system to monitor, evaluate and effectively track the fund's utilization (Kaiser & Streatfeild, 2016). Another recommended strategy was the root-cause methodology which advocates conducting thorough analysis and investigation into the input, process, output, and outcome to determine the cause of the inefficiency. The system shifts the focus from the outcome to the entire project implementation process or the project lifecycle and the relevant components focusing on the need for monitoring, evaluating and controlling (Fourie & Poggenpoel, 2017). The systematic evaluation of the input, process, output, and outcome of every phase and sub-phases of the infrastructure projects is reliant on empirical data not conjecture information, which would lead to an effective evaluation, monitoring,

controlling, and future planning (Bryson, 2016). However, with the absence of detailed documented empirical information on management KPIs for infrastructure capital projects implemented, or detailed performance by the public sector, or empirical data on past projects on Grenada. There is the need for evidence-based planning, best practices monitoring, and evaluation, and a comprehensive management KPIs system, policies, protocols, matrix, procedures, and administrative rules in Grenada and developing countries regionally and internationally. Additionally, a lack of adequate technically skilled employees and local labor force also imped project efficiencies which indicates the need for technical training. In light of this, it is anticipated that this study may serve to stimulate further interest to research the phenomenon of infrastructural project efficiency, and the role of management KPIs utilization within public sector, government administrators' influence, and policies in developing countries globally and regionally such as Grenada.

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Appendix A

Invitation to participate in Study

Hello, XXXX

. **Requesting to participate in my dissertation research study**

I am Kelvin Michael George, a Walden University Ph.D. candidate. As part of my dissertation study, I am conducting research interviews with infrastructure capital projects administrators, project team members (Engineers, Architect, Project Managers, Employees, Project coordinators, and Consultants) and implementers employed with the government of Grenada, NAWASA and external stakeholders directly or indirectly involved. Therefore, I'm seeking your participation in the interview which will occur within the next week. Will you be interested in participating in this interview?

Below is the list of 13 interview questions to be answered, which I will like you to review and or return to me within three days of receipt. The oral interview process should take no more than 45 minutes of your time.

Please let me know if you would like to participate, by returning the attached Consent Letter via email or responding 'I consent' to this email.

You can contact me by phone XXX, or e-mail XXX if you have any questions.

Appendix B

Invitation to participate in study statement

Good afternoon _____.

Thank you very much for accepting my request to participate in my interview. The purpose of this interview is to understand the functioning of the performance measures utilizes by the public sector on capital projects, which is a part of my Ph.D. final project requirement. The interview should last about 45 minutes. After the interview, I will analyze your answers to determine if there is a need for any follow-up questions. Ultimately to obtain an in-depth understanding of infrastructure capital project process, existing performance measurement system, and to develop a comprehensive management KPI system, policies, protocol, and matrix for implementation. The information will be shared with my Research Committee Chair, Walden University, the IRB, the institution, and included in my dissertation. However, I will de-identify you in my documents, and no one will be able to identify you with your response to maintain anonymity.

You can choose to stop this interview at any time. Also, I need to let you know that this interview will be recorded for transcription purposes. The final interpretative transcript will be emailed to you. Can we proceed?

Thanks, Kelvin.

Appendix C

Research interview questions

Sq1 Infrastructure capital projects are a critical component of public sector activities annually, what are your thoughts regarding government and their agencies approach to these projects implementation?

Sq2 What is the process involved in public sector infrastructure capital projects developed and implemented by the government?

Sq3 Does the established goals/baselines and performance measures include both financial and nonfinancial indicators?

Sq4 How effectively are infrastructural projects goals/baselines and policies communicated to employees and stakeholders?

Sq5 What are the major challenges encountered during the implementation of infrastructure capital projects in Grenada?

Sq6 What are your thoughts on the major causes of infrastructure project efficiencies?

Sq7 How adequate are the existing infrastructure project performance measurement system?

Sq8 How frequently does the project supervisor measure, evaluate, and audit project progress, and employees' performance?

Sq9 What experiences over the last decade (10 years) affected you either directly or indirectly during the execution of public sector infrastructure capital projects?

Sq10 How do you perceive the overall governance (development and implementation) of public sector infrastructure capital project executed by the government, its agencies and NAWASA?

Sq11 What changes would you recommend during the development and execution of public sector infrastructure capital projects to improve project efficiency?

Sq12 What are your thoughts regarding reforming the performance measurement system by instituting comprehensive management Key performance indicators (KPIs) to improve capital project efficiencies?

Sq13 What are some of the anticipated benefits associated with reforming the performance measurement system on public sector infrastructure capital project?

Do you have any questions for me? Thank you for your time. Goodbye.

Appendix D

Theoretical Frameworks Relation & KPI processes

IAD Framework	Ranking	Project KPIs Equivalent	Scientific Mgt/Tools/Functions
Action Situation	1	**Process**	**SWOT/PEST'LE /Risk Analysis**
Actors	2	**Employees**	**PRP/PMS/HRMS**
Rulers (Existing)	3	**Policies**	**PERT/PEST'LE**
Community attributes	4	**Stakeholders**	**TQM/PESTLE**
Physical and Material attributes/Resources	5	**Resources/Input**	**ROI/ KPIs**
Outcome	6	**Outcome/Output**	**ROI/RATIOS/TQM**
Evaluation	7	**KPI / Performance measures/Eval.**	**TQM, KPIs, Goals (SMART), PRP, PERT,RATIOS, ROI**

SWOT-Strength Weaknesses Opportunity and Strength

PESTLE- Political Economical Social Technological Legal and Environmental

PRP-Performance related pay

PMS-Performance Management System

HRS-Human Resource Management System

PERT-Performance Evaluation Review Techniques

TQM-Total Quality Management

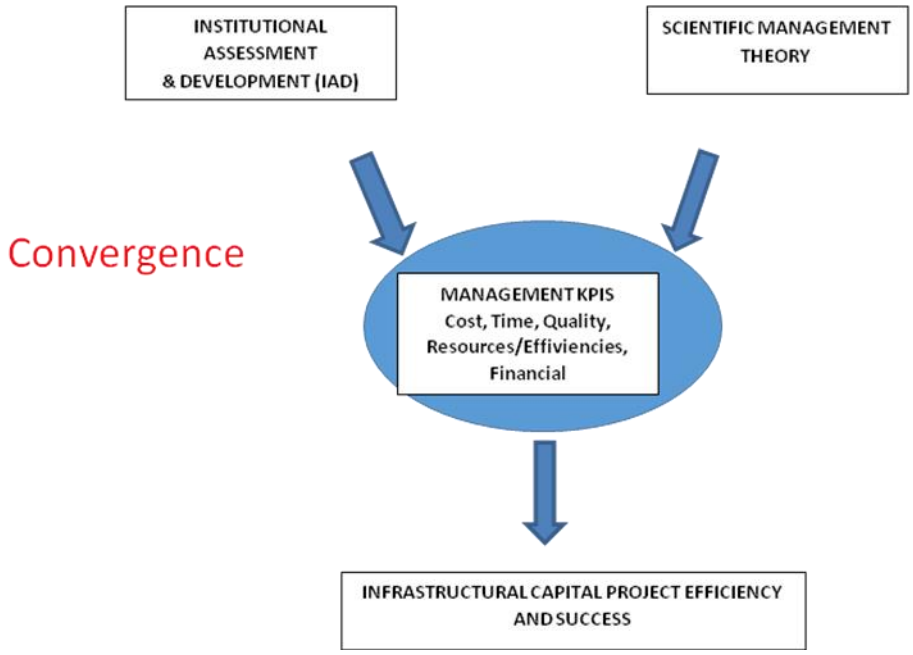
ROI-Return on Investment

KPIs-Key performance indicators

SMART-Specific Measurable Accurate Realistic Timeliness

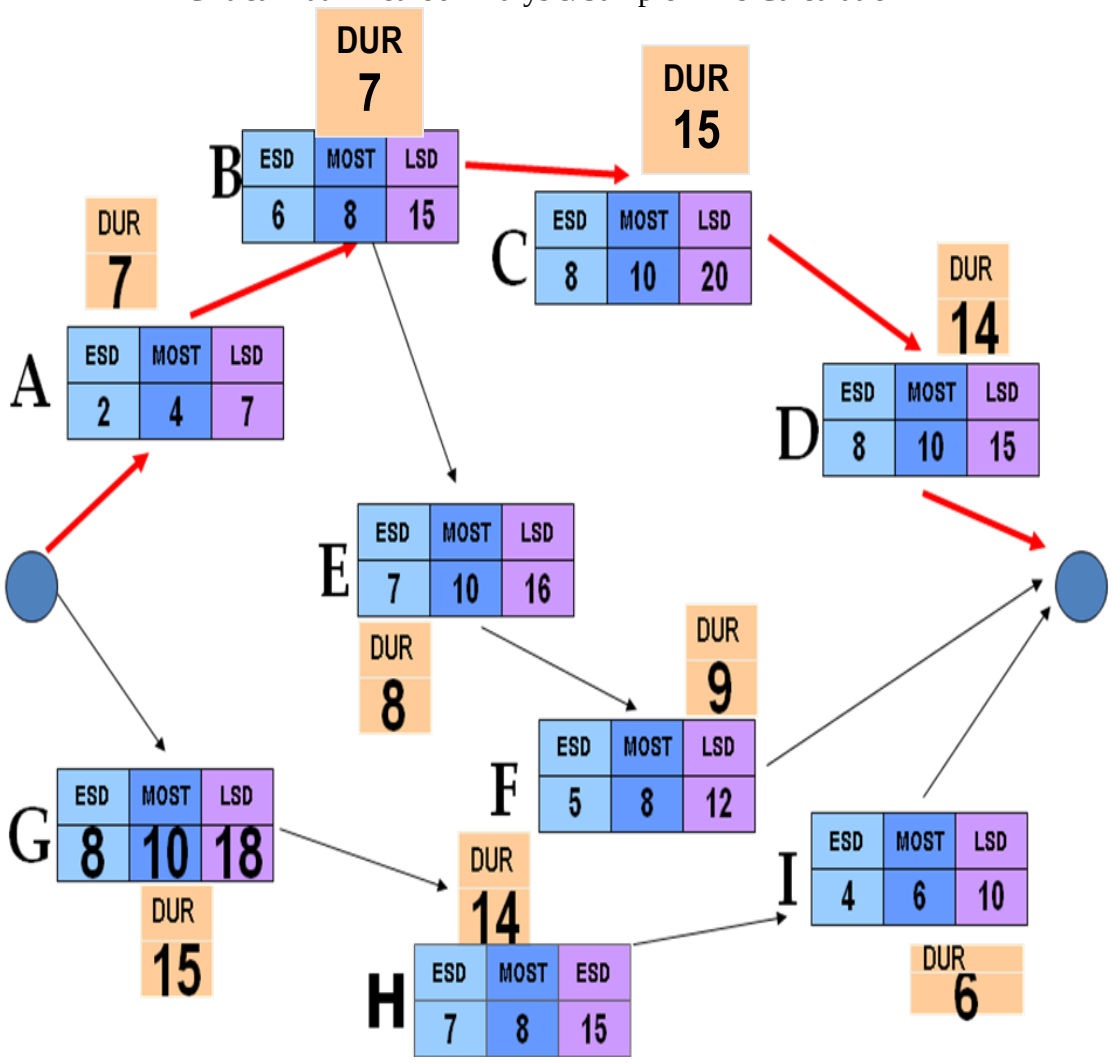
Appendix E

Theoretical framework convergence



Appendix F

Critical Path Method Analysis/Sample KPIs Calculation



Sample KPIs Calculations for each phase

- Schedule Performance Index or Indicator (SPI): SPI=EV/PV

  Schedule Performance Index (SPI) = EV/PV= 90,000/135,000 = 0.67