2015

Enhancing Workplace Productivity and Competitiveness in Trinidad and Tobago Through ICT Adoption

Kennedy Jerome Swaratsingh
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Kennedy Swaratsingh

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Lonny Ness, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Michael Ewald, Committee Member, Doctor of Business Administration Faculty

Dr. Alen Badal, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2015

Abstract

Enhancing Workplace Productivity and Competitiveness in Trinidad and Tobago Through ICT Adoption

by

Kennedy Swaratsingh

MBA, University of the West Indies, 2001

BA, University of the West Indies, 1991

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

July 2015

Abstract

The productivity of Trinidad and Tobago's public sector workplaces is related to their absorptive capacity for technological adoption. Guided by the technology acceptance model, which suggests that individuals' and institutions' use of technology increases in relation to perceived ease of use and apparent value, this case study explored how Trinidad and Tobago used information and communications technology from 2001 – 2010 to improve public sector workplace productivity. Study data were collected from 22 individual interviews with senior executives from the government of Trinidad and Tobago, members of the e-business roundtable, and local industry experts, and from reviewing the archives of the Ministry of Public Administration and Information. The data were analyzed using keyword frequency comparison, coding techniques, and cluster analysis. The resulting themes include e-legislation, e-infrastructure, e-readiness, government e-services, and e-business. The study findings showed that Trinidad and Tobago's technology agenda centered primarily on connecting government ministries and agencies. It also ushered in a period of telecommunication liberalization, which provided sustainable and cost effective options for government, citizens, and businesses to access broadband technology services. The results of the study showed that this access to low-costs broadband technology provides a platform for digital inclusion by improving workplace productivity, providing access to additional opportunities for education via an online platform, and increasing employment opportunities.

Enhancing Workplace Productivity and Competitiveness in Trinidad and Tobago Through ICT Adoption

by

Kennedy Swaratsingh

MBA, University of the West Indies, 2001

BA, University of the West Indies, 1991

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

July 2015

Table of Contents

Section 1: Foundation of the Study

The World Economic Forum (2012) found that Latin American and Caribbean countires have historically trailed behind developing countries in international best practices for leveraging information and communication technology (ICT). This assessment was based on their lack of progress in integrating ICT into service delivery. This lack of progress in ICT integration by countries such as Trinidad and Tobago (T&T), meant that citizens had to visit government offices to access services that ICT could more efficiently and cost effectively deliver. The global competitiveness rating placed T&T 86th out of 142 countries in 2009-2010 (Drzeniek, Mia, & Herrea, 2009; Latham, 2011). In 2001, the newly elected government of Trinidad and Tobago reestablished the Ministry of Public Administration and Information (MPAI). The responsibilities assigned to this ministry included the design, implementation, and adoption of ICT. This ICT mandate constituted an essential element of the country's journey toward national development through public service modernization.

According to the World Bank Group (2011), developing countries experienced a rapid increase in the ICT sector after the World Bank Group's 2000 sector strategy that the global number of subscriptions to mobile phones would increase from 200 million in 2000 to 3.7 billion in 2010 (World Bank Group, 2011). The same strategy predicted that access to fixed or mobile telephones would expand to 70% of global population (World Bank Group, 2011). The World Bank Group (2011) also predicted that the population of Internet users in developing countries would increase to 20% of the population (World Bank Group, 2011). The increase in technological access since 2000 has exceeded the

2000 strategy projection by1.5 billion (World Bank Group, 2011). The World Bank Group (2011) suggested that a deliberate strategy for ICT adoption is a critical element in increasing access to ICT and realizing its potetential to positively impact economic development in small island states, such as T&T.

The World Bank (2011) recognized a defined ICT adoption strategy as a major driving force behind economic growth, increased investment, employment opportunities, and levels of national productivity (World Bank Group, 2011). Researchers at the World Economic Forum (2012) reported Latin American and Caribbean countries posted improvements in network readiness as a result of their investment in ICT infrastructure. Trinidad and Tobago's investment in ICT provided a platform to deliver government services online to citizens. This investment in ICT infrastructure is one out of several pillars that T&T's ICT plan is designed to address between 2001-2010. The issues that confront T&T relate to and include the e-legislation not yet completed and e-services not yet accessible online, which negatively impact public sector productivity and T&T's international business competitiveness.

Background of the Problem

This doctoral explored the process used by the government of T&T to accelerate the pace of national transformation through adopting and implementing ICT between 2001-2010. The journey toward national development and economic sustainability in developing economies such as Trinidad and Tobago, requires an ICT platform to effectively deliver public services to increase productivity and reduce cost (WEF, 2012). The effective delivery of public services would potentially result in increased

productivity, competitiveness, and a new social engagement that reflect the needs and aspirations of modern society. Applying ICT tools creates increased connectivity, efficient multichannel service delivery, and integrated government.

From 2001 to 2010, T&T's government approximately 300M in developing an ICT portal and a fiber-optic communications backbone connecting all government entities, schools, libraries, and statutory offices (Central Bank of Trinidad & Tobago, 2010; WEF, 2012). This upgraded government portal provided a communication interface across all state entities enabling a more efficient flow of government information (Central Bank of Trinidad & Tobago, 2010). Establishing the ICT portal allowed citizens to access government information and some services via the Internet (Central Bank of Trinidad & Tobago, 2010). From 2006 to 2010, the government of T&T developed Phase 2 of its ICT portal focused on creating additional online channels to access information and basic services (Central Bank of Trinidad & Tobago, 2010). The continued development of technology provides a unique opportunity for developing countries such as T&T to accelerate their national development. Leaders across the private and government sectors recognized the potential impact of ICT adoption on national development (Prattipati, 2010). These leaders recognized the need to monitor the impact of ICT on issues such as technological innovation, technological adoption, and sustainability as an enabling platform for national transformation (Prattipati, 2010).

Problem Statement

The general business problem investigated by this study is Trinidad and Tobago's low competitive ranking in government services for enhanced business performance

(WEF, 2013). It specifically investigates the problem of public sector workers reduced productivity in Trinidad and Tobago. This reduced productivity affects the country's national competitiveness ranking in using information and communications technology for public sector efficiency (The World Bank Group, 2012b). The government of Trinidad and Tobago's leveraging information and communication technology is essential to the island's international competitiveness (Mamaghani, 2010), but The World Economic Forum ranked Trinidad and Tobago 99th out of 144 for 2012-2013 in terms of government services for enhanced business performance (WEF, 2013). The lack of end-to-end online technology in Trinidad and Tobago' public services, impacts productivity (Central Bank of Trinidad & Tobago, 2010). This study explores the potential of technology to increase public sector productivity to leaders in the public sector.

Purpose Statement

The purpose of this qualitative, descriptive case study was to explore the role of information and communication technology towards reduced public sector worker productivity in Trinidad and Tobago. The case study present an avenue to explore the effect of adopting service delivery technology, which positively impacts public sector workplace productivity, influencing the country's global business competitiveness rating (WEF, 2013). It analyzed data from Trinidad and Tobago's Ministry of Public Administration's e-business roundtable as a multiple data source using the repository research method highlighted by Patton (2002). The Ministry of Public Administration established this roundtable to create a dialogue between government and other sectors on the use of technology to foster increased public service employees' productivity and more

efficient public service delivery.

The data for this case study was derived from interview data, documentary data, and published opinions of local technology experts. The data gathering process included interviews with 20 participants, including key decision-makers from MPA; archived national technology plans; ministry records; and parliamentary reports. This study promotes positive social change by identifying findings that support using information and communication technology to promote increased productivity in the public sector to reduce access cost to citizens and operating cost to government.

Nature of the Study

A qualitative case study research method was selected for this study because it involved exploring how increased ICT adoption and use of ICT tools assist in developing an efficient public service delivery. A case study approach presented a suitable methodology for this research because the study explored the government of T&T's national ICT plans, policies, and decisions. The increased adoption of ICT products would increase public sector workplace productivity and the business competitiveness of T&T (Central Bank of Trinidad & Tobago, 2010). Case study research had previously been used to explore the adoption of ICT in developing countries, including T&T (World Bank Group, 2011). A similar descriptive case study approach was by The Wrold Bank Group (2011) to investigate T&T's national levels of productivity, efficiency, competitiveness, and growth. The overall goal of this case study was to enable higher levels of efficiency and transparency, and the development of a citizen-centric public sector.

The study collected data from 20 participants who participated in one-on-one semistructured interviews and from the archives of Trinidad and Tobago's Ministry of Public Administration and Information. The interviewees included 10 senior executives who had direct involvement in the design, implementation, and management of the government of T&T's national ICT plan. These 10 senior executives included four senior executives persons from MPAI, four senior executives of the National Information and Communication Technology Center, and two former government ministers. The remaining 10 interviewees consisted of four local ICT industry specialists, three business executives who participated and contributed to the national ICT plan, and two regional ICT experts who assisted in developing T&T's national ICT plan. The sample size selected followed a recommendation by Yin (2009) of indicates 10 to 30 participants as adequate and appropriate participating pool for qualitative research.

This study involved managing the transcripts of the interviews and examining the data using the NVivo 9 computer software program as suggested by Yang (2009). The design of the interview process created an instrument intended to solicit an appreciation of the expected outcomes of the government's national ICT plan, as well as its impact on national productivity and service delivery. This case study research design is best suited for providing and delivering the details of the process when a researcher is seeking to know how and why a situation exists is a qualitative research method (Yin, 2009). According to Yin (2009), data for case study research can come from seven different sources of evidence requiring researchers to use at least two. Interviews and review of archives are the two primary data sources researched for this doctoral study.

A qualitative research was selected because analyzing published statistical data from the government of T&T using a quantitative methodology would not have yielded the descriptive analysis desired. Yin (2011) noted that quantitative method would not help in generating theories focused on empirical data and would not also generate theories on what is, or what has been, and make it difficult for decision makers to infer what future changes and actions should take place. Yin further noted researchers use qualitative data to look at process changes over a specific period, and to understand people's meaning and ability to adjust to the emergence of new issues and ideas such as ICT's impact on productivity. An in-depth, qualitative case study appropriately reflects a methodology that explores ICT as an enabling driver of national transformation and an avenue for increasing productivity, as suggested by Marshall and Rossman, (2011).

A mixed methods methodology for this study was not considered because of the lack of published empirical data specific to T&T about ICT and its effect on productivity. Moreover, mixed methods methodology was not condidered for this study because the data available for the period 2001-2010 explored what ICT initiatives were pursued and how it impacted on productivity, development, and competitiveness of T&T. The design of the in-depth interview process led to extracting, compiling, and exploring resulting themes for use in the study (Yang, 2009). Common themes also emerged from a thorough examination of relevant data that emanated from the MPAI, national ICT plans, and ministry program records and files (Yin, 2011). Additional data sources that led to common themes included parliamentary reports, newspaper clippings, and public

statements (Yin, 2011). Data collection took place in September and October of 2014 following Walden University Institutional Review Board approval.

Research Question

The primary research question used in this study was, "How does information and communications technology influence Trinidad and Tobago's pubic sector workplace productivity?" This question was designed to explored the use of ICT to enhance public sector workplace productivity in Trinidad and Tobago. Studying ICT's effects is important because of the major role of ICT in developing countries as an enabling platform as a potential avenue that drives economic and social development (Mamaghani, 2010). The primary research question was crafted to guide the exploration of the effect of ICT on the delivery of critical government services to citizens, with the ultimate goal of identifying ways of reducing unproductive time spent away from the workplace, as noted by Heeks (2010). The question themes were informed by a review of existing literature and data extracted from reports of international agencies, such as the IDB (Inter-American Development Bank, 2012), and by reviewing the national ICT plan of the government of T&T and the archives of MPAI related to these issues.

Ten interview questions and prompts were also used to guide the inquiry and suplement the primary research question.

1. Describe your role in the development, adoption, and implementation of the national ICT plan for the government of Trinidad and Tobago.
2. How would you describe the impact of a national ICT strategy developed by the e-business roundtable on efficiency in public service delivery?

3. Describe the impact of ICT on public sector workplace productivity?
4. How would you define the barriers that impede against a higher level of adoption of ICT in both the public and the private sectors?
5. How would you describe the impact of ICT adoption on the international business competitive indices of Trinidad and Tobago?
6. How would you describe your expectation of the impact of the national ICT strategy on the economic and social transformation of Trinidad and Tobago?
7. What would you recommend as the possible next steps in the development and adoption of ICT on public sector productivity for Trinidad and Tobago?
8. How would you describe the main accomplishments and setbacks of the national ICT plan based on your role and contribution in its development and implementation?
9. If you had to do it all again, what changes in approach, design, and strategic implementation would you incorporate?
10. What additional information or recommendations would you like to add that can positively influence this study?

Conceptual Framework

Understanding why and how ICT can positively impact the government of T&T's service delivery structure using multiple technological channels required using a conceptual model focused on technology use and behavior, as suggested by Korpelainen, (2011). Technology's potential to increase public sector workplace productivity requires a general understanding of telecommunications sectors as outlined by the World Bank

Group (2012b). Dimelis and Papaioannou (2010) explained that telecommunications liberalization in developing and developed countries introduced competition and created a global trend away from monopoly and government control in telecommunications to private enterprise and competition. Telecommunications liberalization in these countries led to an increase in the speed of transmitting information, a decrease in its cost for consumers, an increase in efficiency of electronic data storage capacity, and ease of data recall (Dimelis & Papaioannou, 2010). Technological development also led to new forms of information capture, process, access, and dissemination that revolutionized and expanded the possibilities of how private sector initiatives have influenced the delivery of public services (Dimelis & Papaioannou, 2010). The positive effects of ICT on public sector workplace productivity, as demonstrated by the national indicators in countries such as Singapore and India, range from increases in output growth, to increase in gross domestic product (Kretschmer, 2012). The Organization for Economic Cooperation and Development lists ICT as a critical tool driving economic growth and public sector productivity increasing its productive output and its contribution to gross domestic product (GDP) (Kretschmer, 2012).

The conceptual framework used in this study focused on explaining how ICT usage behavior caused possible users to accept or reject the use of ICT based on the technology acceptance model (TAM), as noted by Korpelainen, (2011). Korpelainen (2011) explained TAM, founded on the hypothesis of reasoned action, juxtaposed two theoretical constructs, (a) perceived usefulness, and (b) perceived ease of use. Moreover, Korpelainen suggested that TAM predicts users' attitude toward using technology and the

users' willingness to use the technology.

Davis, Bagozzi, and Warshaw (1989) demonstrated how TAM helped to explain why persons felt confident to use a cross section of computer technologies, providing empirical data demonstrating the effect of TAM on ICT behavior. Davis et al. (1989) explained that TAM incorporates users' intention as driven by their attitude, confidence, and trust of the system. Davis et al. further explained the perceived value of TAM and ease of use assist in clarifying the variet of ICT behaviors and emphasizes three aspects that can positively affect users' adoption of technology. The first, attitude, is a mental state of readiness based on experience. The second, perceived usefulness, is an aspect that positively affects users' adoption of technology, including users' acceptance that the technology will enhance their ability to do their job. The third aspect cites perceive ease of use, which refers to the effort and ease in adopting ICT. The process of technology acceptance and adoption varies among users and researchers. Technology acceptance in this study examine three main TAM variables: perceived ease of use, the apparent value, and behavioral intention of the use of technology (Basri & Sulaiman, 2012).

Vidas-Bubanja, Grk, and Cvetković (2010) indicated researchers could use the conceptual framework of a value chain that presents a business process as a complete throughput, from input into production to its output. The conceptual framework of a value chain could also describes ICT as an input into an e-business process, with improved business results as an output (Vidas-Bubanja, Grk, & Cvetković, 2010). Mayo and Wallsten (2011) noted researchers should explore and quantify the impact of introducing new technology on economic activity. Individuals in both private and public

organizations will adapt, adopt, and use ICT if they believe the technology will perform effectively. This process may significantly enhance the options available to business leaders for creating additional opportunities to enhance organizational productivity and efficiency.

Operational Definitions

The special terms and concepts used in this study include:

Caribbean Community Heads of Government (CARICOM): An organization that was established in 1972 by Caribbean leaders attending the Seventh Heads of Government Conference. These heads of government decided to create a common market whose objectives included inter island trade, free movement of labor, and economic development (Caribbean Community Secretariat, 2010).

Developed country: A self-sustaining high-income economy built on a modern infrastructure and technology and having, a high standard of living. According to the World Bank Group (2011), this designation is also applicable to very industrialized middle-income countries.

Developing country: A country with low-income to middle-income economy, as measured on a per capita income basis. Developing countries include several countries with transition economies founded on the per capita income inhabited by 80% of the world's population (World Bank Group, 2011).

Information and communication technology (ICT): An umbrella term for electronic technologies that provide access to information such as the Internet, wireless networks, and cellular phones (WEF, 2012).

Inter-American Development Bank (IDB): A multilateral organization founded in 1959 to provide developmental financing for government and non-governmental organizations in Latin America and the Caribbean (IDB, 2012).

M-government: A term for government information and services delivered to citizens via the use of mobile technology (WEF, 2012).

E-government: A term for governments' investment into technology to deliver access to information and services via an electronic platform (WEF, 2012).

Organisation for Economic Cooperation and Development (OECD): An organization that provides a platform where governments share common experiences and work towards common solutions driving change in developmental sectors which include the economic, social, and environment sectors (Organization for Economic Cooperation and Development, 2012).

Productivity: A term used to measure and calculate inputs to outputs and its effect on a country's economy and its competitiveness (Freeman, 2008).

Small Island Developing States (SIDS): An organization established in 1992 by the United Nations Conference on Environment and Development and comprise of groups of developing countries facing social, economic, and environmental vulnerabilities (United Nations, 2009).

World Bank: A multilateral organization that provide interest free loans to developing countries, low cost development financing to government and private sector in developing countries, and conciliation and arbitration to settle disputes (World Bank, 2012b).

World Economic Forum (WEF): An independent organization that engages leaders is all sectors of society, shaping both global and regional agendas, in the hope of improving the world (WEF, 2012).

Assumptions, Limitations, and Delimitations

Assumptions

The adoption of ICT and implementation of the national ICT strategy of T&T constitute a key components in the success of ICT efforts by the developing countries to enable national development through increased productivity. By focusing on ICT use and access to ICT, governments may drive productivity gains across economic sectors within developing countries such as T&T. During the case study information-gathering process, the information originated after conducting 20 one-on-one interviews with key decision makers of MPAI, members of the E-Business Round Table, and local ICT industry experts. A review of archival government data from 2001 to 2010 constitute a second source of evidence. This assumption fits squarely within three concepts supported by Yin (2009). The first concept states theoretical repetition that involves contrasting case studies will be a more robust form than a single case study and produce results with greater dependability (Yin, 2009). The second concept states participants of the study would be honest and forthcoming in their answers to the interview questions (Yin, 2009). The third concept states responses to the interview questions can result in a snowball effect with the possibilities of expanding the conversation into new directions (Yin, 2009). Consequently, the stated policy of the government of Trinidad and Tobago to use increase ICT adoption for increasing productivity in the public sector workplace

guided the case study as a critical assumption. Another assumption was the selected research process was appropriate to capture and represent the descriptive experiences of the 20 leaders participating in the interview process. Moreover, the assumption was that all participants honestly disclosed all data that described their role, experiences, and perception on the effect of ICT on productivity in the public service.

Limitations

Yin (2009) noted qualitative research validity involves establishing the credibility, reliability, and dependability of data more than analyzing its results. The information provided via the interview process included a documented procedure detailing the steps of the process and protocols followed to record and analyze the data (Yin, 2009). The protocols used to record and analyze the data provided the framework to mitigate against the perceived weaknesses of qualitative research, which ensured reliability, creditability, and validity of the study (Yin, 2009). Another limitation refers to the lack of national data on productivity as well as limited peer reviewed literature and comparative data specific to T&T's ICT journey. Limited data exist on T&T's productivity and national development outside of those from multi-lateral institutions namely the World Bank, IDB, and the World Economic Forum. Yin (2009) recommended structured case study documentation intended to develop a detailed case study protocol. Case study protocols facilitated and ensured that other researchers can duplicate the study and reduce the inherent weaknesses and limitations of the research methodology and lack of specific information (Yin, 2009). This study required interviewing a minimum of 20 participants

whose answers to the questions presented in the interview, provided a sample size and experience specific to the Trinidad and Tobago public service.

Delimitations

The particular emphasis of this study detailed the exploration of the impact of increased adoption of ICT in developing multichannel approaches to service delivery, which may significantly increase the national productivity of T&T. The delimitation of the study focused on answering the research question, which referred to ICT, productivity, and competitiveness of T&T. The study also involved gathering data and analyzing the effect of ICT on public sector workplace productivity, primarily because T&T's public sector modernizing program focuses on creating online access to government information and services. The study involved measuring the process of adoption, the effects of technological acceptance and integration, and the issues of sustainability based on the model of leadership required for ICT adoption. Finally, the study also explored the process of ICT adoption that focused on change management, which may potentially result in higher levels of productivity in public sector workplace of developing countries such as T&T.

Significance of the Study

Advances in ICT from 2005, have resulted in governments delivering its services efficiently, effectively, and economically to its citizens by creating a technologically enabling environment (Al-Huan, 2012). The utilization and adoption of ICT as an integrated platform enhances the competitiveness of countries such as T&T, and may assist in reducing the cost of delivering public services (IDB, 2009). Nonetheless, ICT

adoption emerged as a new challenge in managing public sector modernization (IDB, 2009). The study explored the development of efficient public services leveraged on an integrated ICT portal for developing countries, such as T&T (WEF, 2012). Establishing an ICT portal presented significant consequences for the productivity of the T&T's public and private sectors (WEF, 2012). Incorporating ICT solutions may result in a reduction of productive work time spent accessing essential government services by citizens, and an increase in productive hours of public officers contributing to national GDP.

Reduction of Gaps

This study adds to existing research as a qualitative analysis of how developing countries such as T&T can leverage ICT as an important conduit in fostering both increased productivity and economic development. The research included insight into the use and effect of ICT on national development. Thus, researchers could use this study to explore ICT's impact on national issues affecting developing countries. The national issues include public sector modernization, productivity, economic development, and service delivery by examining the evolving role of ICT as an enabling sector for national transformation. Previous efforts have focused on a single factor or country when assessing the area of ICT adoption. Focusing on a single factor or a singular focus on technology ignore the challenges of adopting ICT in developing countries such as T&T. Examining only institutional factors may result in missing key challenges affecting developing countries, which include inter alia investment, leadership, ICT adoption and use, sustainability, and public–private partnerships (Basri & Sulaiman, 2012).

Contribution to Business Practice

Information and communication technologies have become a focus for governments of developing countries, such as T&T, hoping to accelerate their national development through ICT-driven productivity gains (Masanet & Matthews, 2010). Achieving rapid acceleration in ICT adoption requires a coordinated effort by the government, the private sector, and academia to modernize its systems of service delivery based on a robust and integrated ICT platform (IDB, 2009). Without an integrated ICT agenda, developing countries, such as T&T cannot sustain their national developmental expectations (WEF, 2012). The adoption of ICT may produce increased benefits in areas such as public sector workplace productivity (Masanet & Matthews, 2010). Increase public sector workplace productivity impacts business efficiencies in areas such as cost control mechanisms, energy savings, resource efficiency, enhanced customer interface, and reducing negative environmental effects through using ICT applications (Masanet & Matthews, 2010).

Implications for Social Change

This study provided research which explored the impact of ICT adoption on productivity of T&T through an enhanced system to efficiently deliver public services. Further, the research for this study explored efficiency in public service delivery based on the acceptance and appropiation of technological tools, and its effect on social and economic development of emerging economies, such as T&T. Information and communication technologies present emerging possibilities for T&T if the country desires to compete successfully within the global economy and improve the social,

economic, and environmental conditions of its citizens (Mamaghani, 2010). Mamaghani (2010) suggested the requirement for social change in developing countries such as T&T may improve with the implementation, adoption, and use of ICT. Further, ICT may proform a transformative role in national devopment, promoting sustainable development, reduce the cost of providing government services, and increasing national productivity in developing countries (Mamaghani, 2010).

A Review of the Professional and Academic Literature

This study involved exploring the impact of ICT on T&T's public sector workplace productivity. Exploring ICT adoption and implementation in T&T require an understanding of the national ICT strategies of T&T, which constitute key components used by developing countries to enable national development through increased productivity. By focusing on ICT use, its adoption and access, governments in developing countries such as T&T may drive productivity gains across economic sectors. The literature review contains four sections. The first section outlines a review of ICT and its impact on public sector workplace productivity in developing countries. The second section involves exploring ICT adoption and its impact on national development issues such as social change and competitiveness. The third section includes a discussion on global trends, international agencies, and leadership in the field of ICT. The fourth section includes a description of aspects of the literature that informed the methodology and research design of the study.

Information and communication technology refer to technologies that facilitate the digital recording, processing, retrieving and transmitting information or data for

exchange or knowledge creation (WEF, 2012). Latham (2011) considered ICT as an umbrella tool that describes various technologies used to electronically gather, store, retrieve, or transmit information. Additionally, Gupta and Shah (2012) explored how e-governance has become a citizen-centric approach to providing a transparent, simple, faster, and accountable interface to citizens. Several government agencies used ICT-based solution for integrated administrative and public sector tasks and services (Gupta & Shah, 2012).

The literature reviewed from the following databases including: ABI/Inform Complete, Academic Search Complete, Business Source Complete, Political Source Complete, and Pro Quest Dissertation and Theses. The search for peer-reviewed articles based on keywords and phrases including: *ICT and productivity, ICT and national development, ICT and developing countries, ICT and leadership, ICT and social change, and ICT and technology acceptance model.* Additional phrases used for searches of peer-reviewed articles included: *ICT and adoption strategy, ICT and sustainability, ICT and the public service, ICT and service delivery, ICT and the Caribbean and ICT and the future of modernization.*

ICT and its Impact on Productivity

The volume of literature on the effect of ICT and associated changes on public sector workplace productivity continues to grow. Importantly, ICTs have had a positive effect on both productivity and growth in gross domestic product, wealth generation, and balance of payments cost structures for developing economies (Oliveira & Martins, 2010). Oliveira and Martins (2010) also highlighted the positive outcomes in both

efficiency and effectiveness for businesses' and governments' performance because of ICT adoption and incorporation. Ahmed (2010) noted the preponderance of technology and its availability has led to an increase in adoption rates in developing countries that have effectively led to an increased in the levels of public sector productivity. Additionally, Majumdar, Carare, and Chang (2010) explored the correlation between the use of broadband fiber-optic infrastructure, which provides a wider bandwidth for data transmission, and the productivity of firms. An examination of industry information from telecommunication companies in the United States between 1995-2000, establishes a correlation between ICT and productivity. The new business use of technology provides an efficient form of data transmission as an indication of the impact of technology adoption on a firm's productivity and its bottom line (Majumdar et al., 2010). Venturini (2009) explored the growth and financial value of ICT infrastructure in the United States and the European Union, and its contribution to productivity between 1980 and 2004 using the aggregate impact of ICT. In the research provided, Venturini noted the positive results from sustained use of ICT in the United States and the European Union.

ICT has undergone continuous innovation and development commencing with the advent of the networked computer and the growth of the Internet, Web 2.0, and its associated bandwidth (Ismail & Mamat, 2012). The effects of ICT's adoption on business performance requires ongoing research (Ismail & Mamat, 2012). The focus of much of the research in this area has been on what ICT adoption facilitates, and consequently, ICT adoption decisions have received less attention (Ismail & Mamat, 2012). The proliferation and ubiquitous nature of ICT have made it a necessity and

business imperative for individuals to engage with technological solutions and activity to accomplish the work (Ayyagari, Grover, & Purvis, 2011). Information and communication technology facilitate innovative changes in business and other processes that in turn may generate enhancements in performance and economic value (Ahmed, 2011). The contribution of ICT to revenue generation, cost efficiency, output, and productivity in the public service varies across countries and sectors (Hatum, Pettigrew, & Michelini, 2010). Candace and Williams (2010) examined historical information on ICT adoption from the perspective of the organization by testing theoretical logic to determine which hypothesis best describe and forecast country comparative data on ICT adoption.

The literature reviewed also included the role of management in explaining the link between ICT and public sector workplace productivity. Avgerou (2010) indicated firms operating in the European Union had lower productivity of ICT capital compared to the United States-owned establishments, where estimates suggest a higher productivity than in other firms. Ismail and Mamat (2012); and Adriaanse, Voordijk, and Dewulf (2010) found substantial contribution of ICT to business operations in public and private sectors, and industries across all market segments. Ismail and Mamat (2012); and Cortés and Navarro (2011) found that ICT has had significant and expanding impact on business performance in local and international environments in productivity. According to Rao and Weintraub (2013), the productivity improvement included faster processing of information and products, facilitating changes in business practices, improved management decision-making, and employee participation. The impact of ICT on

business performance in public and private sectors resulted in faster customer engagement, response time, and improved organization strategic management that resulted in improved performance and employee productivity (Rao & Weintraub, 2013).

A growing consensus among scholars and ICT practitioners in the literature indicated that ICT delivers significant and persistent improvements in public sector workplace performance in developing countries (Dimelis & Papaioannou, 2010). Improved performance of organizations and individuals remain evident by incorporating and adopting technology as an enabling mechanism (Dimelis & Papaioannou, 2010). Dimelis and Papaioannou (2010) explored the possible effects of ICT in reducing cost, communication, performance inefficiency, and an increase in productivity. Moreover, Dimelis and Papaioannou (2010) contended the growing documented evidence indicated that an increase in ICT helps to reduce national inefficiencies in governance and public service delivery. Askim, Fimreite, Moseley, and Pedersen (2011) explored how ICT increases the efficiency of the delivery of public services through a seamless vision of modernization, and a one-stop-shop mechanism for effective service delivery. Bannister and Wilson (2011) noted the developments in technology continue to enable an increase in a government's direct interface in, and control of, the lives of its citizens. Some researchers focused on ICT and its impact on manufacturing, education, agriculture, poverty reduction, and business processes. Heeks (2010) presented research that explored the effect of ICT on services. The researched data pointed to a strong contribution from ICT to labor productivity growth and suggested that ICT's impact on public sector modernization and effective service delivery also contributed to increased

productivity (Heeks, 2010).

Adoption of ICT and its Impact on National Development

Information and communication technology have undergone continuous innovation and development that redefined the digital age, which has led to new business practices based on a virtual platform (Ahmed, 2010). The virtual platform creates an enabling environment with dramatic consequences for business processes that generates continuous improvements in performance noted in research presented by Saltari, Wymer, Federici, and Giannetti, (2012), and Simon and Jean (2012). These researchers also indicated that ICT's contribution to output and productivity varies widely across countries and sectors. Ahmed also demonstrated how developing a knowledge-based economy requires a greater appreciation of not just technology but also the wider definition of human capital. This study involved exploring the impact of ICT on public sector workplace productivity and Ahmed provides insight regarding the positive effect on productivity in the public sector by investing in a knowledge-based economy.

Pollitt (2011) explored developments in ICTs such as the growth of the Internet and its pervasive influence on the modernization process of public services. Singh, Pathak, Naz, and Belwal (2010) presented research on how e-governance initiatives focused on citizens participation through end-to-end online services making government more accessible with the support of private sector service providers. Sharma (2011) explained the process by which the Indian government partnered external stakeholders already present in the technology sector to setup most of the government's ICT-based initiatives. Sharma further explained the government developed, implemented, and

operated very few of the initiatives in operation. Sharma further suggested that the government realized benefits derived from information technology (IT) and the Internet require the active participation and collaboration among all sectors in society.

Despite the limitations and challenges of ICT adoption in developing countries, available evidence indicates public sector ICT adoption accelerated between 2007 and 2012 and exerted a positive impact on national development and performance (IDB, 2009). Researchers at the World Bank Group (2012a) reported a correlation between ICT use and specific public sector workplace performance indicators based on actual national data and statistics. These national data and statistics provided documented evidence an inextricable link exists between ICT use and enhanced public sector workplace performance in developing countries (World Bank Group, 2012a). Rojko, Lesjak, and Vehovar (2011) indicated that the economic crisis forced organizations, companies, and countries to reexamine their operations, costs, orientation, and strategy by highlighting the transformative nature of ICT in economic crises. Ramos and Ballell (2009) noted the emergence of technology accelerated economic internationalization allowing emerging economies to cultivate a highly skilled workforce, which used their low labor costs to growth as a comparative advantage.

Research exists supporting the theory that ICT has had an impact and positive contribution to national development, but a body of research also reflects caution and sometimes skepticism. Samah, Shaffril, Hassan, and Jeffrey (2011) argued the opportunity cost of technology resources engaged in bridging the digital divide may lead to neglect of other development priorities. Samah et al. (2011) further argued that even

while being optimistic about the adoption, implementation, and effective use of ICTs, other developmental priorities may still experience lack of access to resources. Heeks (2010) noted that ICT could contribute positively to organizational and national development based on appropriate incorporation and integration. Pipe (2010) expressed concerns regarding the whole scale appropriation of ICT initiatives generated in developed countries by developing econimies. Pipe (2010) suggested that a bottom-up approach that pays greater attention to the local needs and context, may allow for increased relevance and cost-effectiveness.

Saltari et al. (2012) emphasized the role and dynamics of capital accumulation investigating the effect of introducing ICT on capital and production in the Italian economy. Further, Saltari et al. underlined the extent which skills, competencies, and knowledge of the labor force affect the introduction of ICT. The effects of introducing ICT on business practices in the Italian economy apply to developing economies such as T&T, and the lessons learned extrapolated to fit the country's challenges (Saltari et al., 2012). The Global Information Technology Report 2011-2012 (WEF, 2012) provides a framework for developing a study on the competitiveness of global economies using comparative indicators from the data submitted by participating countries.

ICT and Developing Countries

The widespread use of ICTs continues to shape and change the way people, organizations, and national communities develop and work. As ICT adoption increased in developing countries, its application and role as an enabling mechanism driving national and socioeconomic transformation received the attention of researchers and

decision makers (Ahn, Hajela, & Akbar, 2012). Brown and Thompson (2011) presented research into Jamiaca's ICT programs and staregies, and contrasted its approach to those of advanced eonomies in the development of e-government services highlighting the differences in the approach to ICT.

Mamaghani (2010) focused on not only the development of ICT but also on the impact it has through its widespread adoption, particularly in developing countries, in social, economic, and national development. Mamaghani further noted that developing countries should make it a national priority to invest strategically in developing their ICT infrastructure. The return on this investment potentially provide a positive contribution to national development, public sector productivity, and social progress through ICT adoption, especially in areas such as poverty reduction and education (Mamaghani, 2010). Prattipati (2010) presented research that explored the phenomenology of global ICT as an important issue about competitive endurance of emerging economies, and how it affects organizational strategies, culture, training, and management styles.

Bussell (2011) reinforced the theory that ICT provides governments with the opportunity for public sector modernization providing efficient service delivery to citizens through a portal to provide e-government services that may significantly improve service delivery. Romijn and Caniëls (2011) indicated that developing countries should develop a strategic blueprint outlining a planned technological advancement as well as an incremental approach to developing capacity in its national human resources. The increased human resource skills provided capacity to manage the new knowledge-intensive digital society, demonstrating the need for ICT innovation, and for positively

affecting development initiatives of small and large economies (Romijn & Caniëls, 2011). Further, an examination of how ICT impacted the commercial development of countries in the European Union demonstrate the degree of influences on the devlopment of new skills required for knowledge-based economies (Matousková & Czesaná, 2011).

Kelly, Friederici, Minges, and Yamamichi (2012) demonstrated the phenomenon that developing economies have become more mobile than the developed world. Mobile communications through telecommunications liberalization have replaced public telephones operated via land lines and offering an array of innovative solutions, becoming the most pervasive modern technological tool permeating developing societies (Kelly et al., 2012). In certain emerging economies, a larger sector of the population invest and own a mobile phone as a priority before investments such as public housing, creating increased opportunity for m-government services (Kelly et al., 2012).

ICT and Leadership

Hatum et al. (2010) conducted a case study of two companies in Argentina striving to overcome environmental turmoil. Hatum et al. examined whether management in these organizations developed the internal managerial competencies that allowed them to develop the flexibility and agility to adapt in a rapidly changing, uncertain, and unpredictable environment. Hatum et al. noted that organizations should incorporate a strategic change management approach to ICT adoption. A strategic change management approach facilitates exploring ways in which management adapt given the challenges of the digital age, its rate of change, and an unpredictable environment (Hatum et al., 2010). Makins, Nagao, and Bennett (2012) indicated that

enterprise transformation poses inertia and alignment risks at the enterprise, organization, business unit, and team levels. Moreover, Makins, Nagao, and Bennett (2012) makes a distinction that suggests transformation differ from internal change as the risks escalate significantly given the complex interrelationships between stakeholders across businesses, governments, and related organizations.

Weerakkody, El-Haddadeh, and Al-Shafi (2011) proposed a pathway for small developing economies in addressing issues of transformation and the risk therein on enterprise development activities based on effects of technological adoption on small developing states. Weerakkody et al. also highlighted the role that leadership plays in ICT adoption in public sector workplace of small developing economies. Focused national leadership of ICT may positively impact productivity as the challenges of ICT adoption require enlightened leadership to competently address the transformational activities associated with public service modernization resulting in efficient service delivery. Leaders of government can fast track the transformation the public sector workplace of developing economies through technological leapfrogging (Goldemberg, 2011).

Goldemberg (2011) described technological leapfrogging as a process by which leaders of developing countries formulate their development trajectories without having to retrace the paths that industrialized countries made in past decades. Goldemberg opined that leapfrogging in developing countries critically depends on technocrats with capacity to understand modern technologies. Further, Goldemberg explained that leapfrogging required leaders in all sectors including non government organizations who

can incorporate these insights, to accelerate their countries' development with as little environmental impact as possible. Moreover, Goldemberg noted developing countries have been able to forego many of the costs of building information and communication infrastructures after adopting advanced and established technologies from industrialized nations. Yong and Yezheng (2010) explored how management positions an organization to fit the current dynamic environment by stimulating relevant capabilities, forming high-performance systems, and developing organizational capabilities to maintain its sustainable competitive advantage. The leadership and management capacity of both private and public sector organizations directly affect the ICT adoption process for national development in developing countries such as T&T.

ICT, Sustainability, and Social Change

Sakalauskas (2010) indicated achieving sustainable development goals requires new models of collecting, disseminating, and analyzing information among training professionals, policymakers, and the public. Sakalauskas noted that based on the complexity and volume of data available, decision makers need effective support for their decisions. Further, using a knowledge-based approach to decision making can help to reduce complexity for decision makers (Harmon, Demirkan, & Raffo, 2012). Juan (2011) examined the expanding broadband digital divide, which warned developing countries that they would continue to fall behind developed countries if they ignore the requirement to upgrade their telecommunication networks. Vaughan (2011) suggested that notwithstanding the global financial recession and a reduction of available resources for investing in network infrastructure, upgrading the telecommunications networks

reduces the effects of the digital divide.

Newman (2012) examined issues related to sustainability and transformation that indicate organizational conditions can either impede or assist organizational leaders' efforts at transformation based on adapting the principles of sustainability. Newman noted creating an action agenda based on a holistic approach presents a successful methodology to sustainable transformation. Moreover, Newman indicated that creating an action agenda may potentially accelerate growth and shift clients toward a path of sustainable development as an essential requirement for developing countries such as T&T. Simmons (2011) explored the effects of technologies on the relationship between power brokers in society, across its various sectors, and with government. Simmons further noted that based on technologies offering new research data collection methodologies, global transparency requires new financial standards, and citizens possess greater opportunities to participate in the governance process. Simmons further explored how these technologies have also led to innovative research strategies, which further demonstrate the ubiquitous effect of ICT in the global information age on every facet of human endeavor.

A role of the state lies in articulating a development policy driving structural change, developing concrete, credible, and sustainable steps facilitating growth without divesting this responsibility to private enterprise (te Velde et al., 2011). Ojo (2009) indicated that global framing of ICT as a panacea for underdeveloped countries underpins a flawed concept even if evidence suggests the possibility that ICT-based economies thrive. According to Ojo (2009), attempts to solve issues such as poverty, health care,

and illiteracy should occur concurrently with national ICT development. Masanet and Matthews (2010) noted the tangible positive benefits of ICT for developing countries such as T&T, including improved public sector productivity and quality of life. However, Masanet and Matthews (2010) suggested there remains a requirement to explore the negative energy and environmental impact that raises questions and outweighs the advantages that comes with technology and the perceived environmental benefits. One such benefit of ICT appeared in the research presented by van Os (2011), who explored how governments may deliver services through an electronic platform and integrated government for sharing information more efficiently. Emerging research from the WEF (2013) concerning the implications of developing countries such as T&T adopting ICT and its impact on public sector productivity however, suggested that benefits derived supersede the cost of ICT investment.

ICT and Economic Change

Since 2008, the impact of ICT on economic development and productivity has become significantly more important. Boyle, Scherrer-Rathje, and Stuart (2011) noted a need exists for a paradigm shift from the traditional approaches to economic development requiring farsighted and imaginative economic developers and leaders. Ketteni, Mamuneas, and Stengos, (2011) noted nimble and effective decision making will affect the workplace, access to capital, and an expanded education sector, which forms the basis of economic sustainability and growth. The public sector workforce will need to develop additional capacity to adapt to an evolving technological environment, requiring a modern approach to education focused on transforming thought and action (Ketteni,

Mamuneas, & Stengos, 2011). Further, Ketteni et al. (2011) indicated ICT would enable a new theory of education and the development of mobile-networked governance in which concerned citizens can provide inputs that will influence economic decisions.

Ketteni et al. (2011) contended global economic development would increase if leaders in developing countries made innovation maximization their priority. Ketteni et al. (2011) suggested pressing for innovation and business development, including using the best-suited tools such as ICT, would aid global living standards and assist in its improvement. Also for clinical research organizations, ICT development has had an economic impact. Arasaratnam and Humphreys (2013) presented research, which suggested leaders in emerging economies do more to create a focused program for innovation as a strategy for national development, using ICT. Alsumidaie (2012) noted reeducating clinical research staff to take full advantage of the ICT-based technologies has created new economic benefits for these organizations.

Huang (2013) noted the advent of global ICT connections and its potential to increase participation in economic activity. Huang further recommended that ICT help to expand availability and access to education, especially via online programs, which in turn can have a positive effect on developing new skills needed for the emerging knowledge economy. Sanyal and Babu (2012) noted through their research the increase in access to education has led to new possibilities for national development and the advancement of new technological skills. Sanyal and Babu further indicated that ICT presents developing states with a new industry sector to diversify its economy and with technology that could become a catalyst for business innovation. Maier, Suaraşan, and Nicoara (2012) referred

to innovation as an essential component for the survival and success of current and emerging companies. Maier et al. described the ability to nurture creativity and innovative thinking by adding arts to science-based education and noted the increasing need to use this thinking to help adjacent communities cope with emerging developments including economic scenarios. Maier et al. further indicated ICT assist communities to assemble data processes to handle new challenges suitable for business monitoring activity. Gorshkova, Sovik, and Poplavskaya (2013) contended that data processes to handle new challenges suitable for business monitoring activity would aid economic expansion, growth, and productivity.

ICT as an Enabler of Change

The growing power, extent, and adaptability available facilities through ICT media indicates that technology has evolved into a major enabling factor that constantly induces new changes in many fields and areas of activity. Farrington, Crews, and Blenkle (2013) reported that over the next 25 years ICT would have a major impact via the media of distance, virtual, or holographic collaborations and simulations. Farrington et al. further suggested that according to their research, the future ICT would assist in providing advanced bionic abilities to allow people to operate in situations where they otherwise might not have been able. Marketing and advertising tools have adopted, incorporated, and used popular applications from the world of ICT. Nevertheless, even in online sites growing into virtual world communities, Barnes and Pressey (2011) reported using Marketing and advertising tools to study how consumer preferences and Maslow's hierarchy of needs influence the markets.

Multinational expansions into foreign markets do not define a new phenomenon. A major factor that influences the ability of a company to set up a subsidiary production or research and development enterprise abroad lies in availability of skilled labor force. With more enterprises becoming dependent on ICT, available ICT-skilled labor force would positively influence the decision to set up in a particular overseas country (Schmiele, 2012). In a quantitative study of 32 countries in Latin America and SubSaharan Africa, Ifinedo (2012) presented research, indicating that in those regions, availability of ICT infrastructure would present a positive correlation to e-government maturity. Ifinedo found that results from previous studies that involved exploring the same hypothesis supported the positive effects of an available ICT enabled environment and applied the format of increased ICT infrastructure to other regions. The development of a national ICT infrastructure will potentially enable change as it provides for a wider disbursement of services through the growth of e-government services (Ifinedo, 2012).

In some circumstances the advent of ICT may be as a driver of change, in others it may only facilitate change (Narula & Arora, 2010). Helle and Rukanova (2011) deduced in the European Union, although ICT played a minor role in the implementation of decisions, it provided an avenue for enabling the introduction of e-customs. The laws, regulations, and applicable customs policy as human and organizational factors drove new business development and execution. Innovation remained paramount to organizational success and continued development (Street, Weer, & Shipper, 2011). Consequently, successful companies refer to companies with a concentration on achieving innovation (Lacity & Willcocks, 2013). The general and accepted definition of

innovation refers to any activity that improved a customer's services or costs despite its novelty (Lacity & Willcocks, 2013). Kiron, Kruschwitz, Haanaes, Reeves, and Goh (2013) showed how organizations responded to challenges about sustainability such as competing for limited resources or lifestyle changes by consumers demanding healthier products. In Lacity and Willcocks's (2013) survey, participants identified the ways to design innovation into deals. Respondents described a successfully implemented innovation on business process outsourcing and the results pointed to the implementation of new technology tools for improved business processes as the most common types of innovations.

Leaders in government and business recognized innovation as a key element in leveraging ICT as an enabler of organizational success, national growth, sustainability, and understanding of the benefits derived through ICT adoption. The reviewed literature indicated that taking advantage of innovative ICT applications such as mobile phones with Internet access and social media applications provided an avenue for organizations and governments to improve productivity. The reviewed literature further suggested that ICT transformed the use and participation in areas such as e-commerce, e-education, e-government, and mobile governance (m-government).

ICT, TAM, and the Public Service

Borisov and Barbulescu (2012) advocated using the term electronic government refering to ICT tools and systems emerging from continued research into technology used to access and deliver public services to all stakeholders efficiently. Public service use of e-government involves using ICT, in particular online applications, as a tool in creating

alternative avenues to access and deliver government information and services to all stakeholders. As governments recognized the benefits to gain from using ICT in delivering public services, they would need more research, development, and committed resources dedicated to proliferation of ICT tools required for implementation (Bannister & Wilson, 2011). New avenues for governments and citizens to interact have developed since 2008 because of ICT advances such as new web browsers, social media applications and sites, and the increase of mobile technologies (Georgescu, 2012). Additionally, ICT offer tools designed to meet the needs of e-government, which can assist in creating an efficient system to manage public services designed to improve public's confidence in government services (Borisov & Barbulescu, 2012).

The research of the literature undertaken for this study guided the exploration of themes related to the applicability of ICT in its broadest context and as it applies to public sector national development. From 2000 to 2014, ICT's adoption and incorporation have lead to the emergence of a more robust from of electronic government (WEF, 2013). Rana, Williams, Dwivedi, and Williams, (2012) suggested that new research activities and interest exploring themes related to electronic government have emerged using predominantly two main theories. According to Rana et al. (2012) researchers exploring the rise and growing importance of electronic government principally used the diffusion of innovation theory (DOI) and TAM. Rana et al. (2012) argued the emergence of applications linking citizens to government, allowing for seamless, unlimited, and continuous access to information and services required a research methodology that focused on citizens' acceptance of technology.

Rana et al. (2012) suggested that TAM and DOI contain theoretical concepts that overlap, as evidenced by some researchers using TAM for ICT acceptance and adoption in electronic government research. The theory of TAM explores two main variables for researchers focused on electronic government: ease of use, and perceived usefulness (Rana et al., 2012). According to Rana et al. (2012), sufficient research exists to suggest a direct relationship between the belief that a particular technology adds value and the effort to use it, affects technology acceptance towards e-government systems. Rana et al. (2012) also posited that those who used DOI as the theoretical framework explored the use of technology based on compatibility, relative advantage, image, and complexity. Exploring access to electronic government suggested a more tenuous link to compatibility than perceived usefulness (Rana et al., 2012). Sipior, Ward, and Connolly (2010) used TAM to explore the gap between those who have access to ICT in the United States, through the analysis of e-government, and from reviewing the public's use of e-services. The research by Sipior et al. (2010) indicated that the perception of technology as requiring little effort pushes the usage of e-government services, which further emphasized the critical role of ICT in delivering public services. The technology acceptance model provided a contextual reference and relevance to the research of ICT and national development, as a theory used by researchers exploring electronic government.

Khare, Raghav, and Sharma (2012) highlighted the case of the Indian government placing significant investment into e-governance using ICT to make government services useful, simple, and accessible for its citizens. Although citizens had adequate access to

government services in urban areas, access to basic services in rural areas remain extremely difficult because of the absence of ICT infrastructure (Khare et al., 2012). Khare et al. also attributed a degree of additional difficulty in ICT adoption on citizens' technology skills as well as their cognizant about ICT. Khare et al. proposed an e-governance cloud computing structure and service-oriented architecture because they offered an on-demand, self-sufficient service; and ubiquitous network access. Moreover, cloud computing structure and service-oriented architecture also offers location-independent resource; rapid elasticity; and could consequently provide uniform countrywide e-government access to services (Khare et al).

Shareef, Archer, and Dwivedi (2012) noted in the analysis of their study conducted in India that m-government aligns itself for getting e-government services to remote areas in India. Shareef et al. (2012) notes further that similar to developing countries, especially where there has been a major expansion in mobile services rather than wired ICT, m-government provides another avenue to access e-government services. Shareef et al. further contended that m-government makes government services easily accessible for rural communities as well as for the less-computer-savvy members of these communities. Shareef et al. noted e-government opportunities could lead to public sector cost reductions, especially during the period of the financial crisis. These e-government opportunities also result in government using less financial resources to deliver its service to the public resulting in increase levels of public confidence in e-services, and reduction in public expenditure for service delivery. Governments worldwide remain under pressure to reduce spending with a concomitant increase in demand for public services

(Georgescu, 2012). However, ICT adoption by governments in emerging economies and its integration in public service delivery remain less aggressive than required (Georgescu, 2012). Moreover ,public officials have not always been keen to adopt ICT to assist in their public service functions (Georgescu, 2012).

Micheli, Schoeman, Baxter, and Goffin (2012) noted in the United Kingdom, barriers to such public-sector innovation emanated from within the public service, where resistance to change intertwine with risk aversion throughout the public service. The research showed instances where successful technological innovation may not specifically result from ICT services but with increased collaboration, adoption, and integration lead to enhanced public sector efficiency. Micheli et al. (2012) also noted the success of partnerships between private and public sector organizations depended on the capacity of public officers and their willingness to engage with private sector counterparts. Micheli et al. noted further, that successful partnerships depended on the ability of the private-sector to network with other organizations and maintain its focus on output.

In the United Kingdom, private entities established collaborations and commercialization partnerships that understood the needs of the public sector, and had the proprietary technology to enhance the ability of the public sector to fulfill their missions. An example of such an achievement took place in Wales. The government collaborated with a private-sector broadband service provider reducing the cost of mobile transmission service through harmonization and increased availability of broadband connectivity for the use of public-sector agencies (Micheli et al., 2012). Other private

entities who signed on with the same service provider also enjoyed the benefit of getting less expensive ICT services. Micheli et al. (2012) noted that this affordable ICT connectivity offered new ways of providing services and sharing business advantages that provided the cumulative effect of contributing to public sector efficiency and transformation. In another study of the change to e-government in the United Kingdom, Wiredu (2012) noted that public service agent did not always understand how ICT could mesh with their institutional activities to set-up e-governance mechanisms. Wiredu further contended a proper analysis and understanding of operational functionalities of ICT and public bureaucracy would make it easier to accomplish their fusion producing effective and useful public service e-products.

Regardless of the advantages achieved from the use of ICT in the operations and processes of several developing countries' public administration and services, barriers to implementing e-government services remain evident in emerging economies. Al-Huan (2012) revealed that trust, public awareness, access cost, infrastructure constraints, and the absence of enabling legal support remained the primary challenges confronting Jordan in its application of e-services and information. Alomari, Woods, and Sandhu (2012) noted that the Jordanian government could sustain the people's trust through electronic information that provide citizens with instant and accurate information on matters related to services, laws, or regulations. Alomari et al. indicated that trust of the Internet and the benefits of ease of use did not form the basis or major indicators of intention to use e-government websites over traditional paper systems.

Nevertheless, leaders of developing and developed countries recognize the

importance of having national trust in public administration. Ray (2012) noted that accountability of public servants remains a pertinent issue but may be hard to guarantee, thereby leaving issues of transparency and confidence in a poor and noninclusive state. Several countries have adopted anticorruption legislation that have resulted in some governments trying and testing various accountability enforcing systems (Ray, 2012). As an alternative, Ray focused the inquiry on investigating how ICT might facilitate accountability. Ray further suggested a critical path to accountability enforcement demand making information easily available to the public and inferred an important role for ICT in government to achieve higher levels of transparency. Focus on this issue in India led to the installation in the state of Madhya Pradesh of the ICT-enabled Samadhan an online grievance redress system. Ray (2012) noted that via this system, citizens could lodge online complaints against public officials or departments.

Selected complainants received information about the actions taken to redress their grievances via videoconferences between the chief minister of the state, the complainant, and senior government officials responsible for addressing the matter (Ray, 2012). Ray (2012) argued that this capability both improved transparency in the system and reinforced the accountability liaison among the community, service providers, and government. The system does not require a citizen to know the intricacies of government or its departments because the intended users easily accepted this ICT-enabled system. Citizens receive encouragement to take advantage of these ICT-enabled systems, requiring minimal familiarity and ICT competency. Availability of information and services from low-cost mobile providers has created an opportunity for enhanced

connectivity at faster speeds through the introduction of third generation (3G) and now 4G processes. Additionally, ICT may facilitate the introduction of m-governance, which constitutes a subset of e-governance. Since 2007, the expansion of m-government platforms, have included applications to facilitate e-transactions, e-payments, and other e-business services conducted on new smart phones technology (Georgescu, 2012). Services provided on an m-government platform remain expandable for payments of fees and fines (Georgescu, 2012), thereby making m-governance a part of everyday life. Georgescu (2012) also noted e-democracy and e-participation require further expansion using mobile ICT, allowing citizens to participate in the governance process via m-voting and other electronic options for interacting with public service and government agencies.

Al-Huan (2012) described mobile ICT as a positive development that improved interactions between citizens, public service agencies, the private sector, regional Caribbean institutions, and multi-lateral agencies. Al-Huan further noted in instances of unexpected emergencies or natural disasters governments could use mobile ICT to coordinate emergency and disaster management activities. Mobile ICT also provides an avenue to collect, share, and disseminate information to communities spread across a wide area (Al-Huan, 2012). In such situations, mobile applications such as short messaging system (SMS) provide an avenue to send mass information quickly to response agencies and the public.

ICT and the Private Sector

For the period 2000 to 2010, ICT has been an integral element and avenue for transforming the processes and the reengineering of systems business. Ya-Chin, Pin-Yu,

and Hsien-Lee (2011) noted that unlike public sector entities with limited capacity for flexibility, responsiveness, or commercial efficiencies, private sector organizations transform more rapidly to accommodate, incorporate, adopt innovations in technology. The continuous evelotion in technology represent more of an continuous dilemma to public services than the business community in innovation and adoption of technology (Ya-Chin, Pin-Yu, & Hsien-Lee, 2011). Ya-Chin et al. (2011) contended if management of private sector companies fails to innovate as quickly as possible, it would experience an inevitable loss of market share to competitors, potentially leading to their demise. Evolving technologies facilitated information interchange with increasing ease and rapidity so users can engage in operations previously unthinkable a few years ago. Mesch (2010) documented how technological innovations and developments will soon exist at the core of how organizational leaders manage their external and internal business processes, ranging from communication with stakeholders to employees' recruitment and selection. Mesch further noted that a more efficient role for technology would revolve around being contributors to changes in the organization structures and reporting mechanisms.

Private sector leaders have recognized that ICT adoption comprise a fundamental alteration of how people interact and that technology ranks first among influences outside of an organization, affecting its internal operations (Berman & Korsten, 2013). Technology has provided the media with innovative changes in their organizations 2001. Berman and Korsten (2013) also noted that technology has changed how people interrelate with business enterprises as well as with other people. There is no longer the

perception of ICT as being the principal motivator for efficiency but rather most leaders now recognize technology as a facilitator for dialogue and teamwork that helps promote creativity and transformation. Berman and Korsten (2013) further indicated that ICT has allowed innovators to engage in original ways both inside and outside enterprises, modifying their configurations, hierarchies, and spans of control. Berman and Korsten recognized technology has allowed businesses to understanding and interact more intimately with customers, provided new techniques to foster the workers' creativity, transforming the way they work, and how outcomes are determined.

One of the drivers of private sector industrial change and innovation comprise data analysis, and almost all data analysis involves ICT. The availability, accessibilty, and analysis of data accessible by companies, cumulatively result in transformational change to operations and methods of doing business in various industries, changing the way we live and work. Kiron, Ferguson, and Kirk Prentice (2013) noted these ideas find increasing favor with executives, academics, and business analysts. Kiron et al. (2013) explained that company leaders begin to understand customer behavior patterns by analyzing data from a historical perspective previously not possible to see or act on as a competitive advantage. Kiron et al. (2013) also noted companies using new ICT-enabled analytic tools and services to understand their procedures and behaviors in greater detail, allowed and facilitated new questions for consideration by executives. Kiron et al. (2013) observed that companies using analytics to compete and innovate remain at the forefront of this new analytical movement. Twenty-nine academics and senior IT executives at a diverse group of large companies in the United States noted that

approximately 67% used analytics to gain a competitive business advantage and some used analytics to innovate.

Emerging prominence of ICT and the Internet as a cumulative source for data sharing and transmission has also led to organizations such as General Electric initiating and operationalizing a new industrial Internet. Fitzgerald (2013) garnered from interviewing Ruh, General Electric's global software vice president, the idea of using the Internet as a vehicle to connect industrial machines to other machines. Fitzgerald posited that from the interview with Ruh, shared data might help company leaders improve operations efficiently. Consequently, ICT has provided the wherewithal for devices to connect cost-effectively, immediately, and intelligently; establishing new possibilities for data analytics based on emerging opportunities that provided new ways of handling data (Fitzgerald, 2013). Ongoing research in data analytics makes new data available emanating from sensors, surveys, and published peer-reviewed sources. These new data sources continually review the impact of technology and ICT development, and provide an analysis of how executives incorporate new ICT tools into the mainstream of private, public, and business activity.

Interactive communication via ICT speaks to another function that has influenced how some private sector business conducts business online. Elmorshidy (2013) conducted a study on live customer support chat programs based on the proliferation and availability of e-business solutions and websites. Elmorshidy recognized that traditional forms of customer support functions have given way to live chat services based on the demand for real-time information and customer assistance to satisfy the burgeoning

online shopping sites. Recognizing that in the new business era, online customers have higher expectations, demand more and require immediate answers to questions or concerns. Companies respond to this new demand by implementing the CSC. The CSC provides businesses with Internet service to communicate in real-time by using instant messaging built into their company's website. Elmorshidy contended the use of CSC in retail e-commerce provide a cost-effective solution aimed at adding personalization and reducing the risk to consumers through a live chat function during their online shopping experiences. Further, Elmorshidy noted the ability to respond to a customer's questions in real time increases customer satisfaction and helps foster the customer's confidence in the company.

Abbad, Abbad, and Malik (2011) sought to explain the status of e-commerce in Jordan and identify any limitations, problems, or barriers facing its application. Abbad et al. identified six main limitations to e-commerce including issues relating to security, language, access to broadband technology, and e-commerce legislation. Abbad et al. in their research also identified nontechnical issues as additional limitations of e-commerce in Jordan. These nontechnical limitations could have originated from the researchers' unfamiliarity with technical issues emerging out of the burgeoning of e-commerce (Abbad et al., 2011).

Results of the study conducted by Abbad, Abbad, and Malik (2011) indicated students recognized that some benefits from e-commerce and the Internet included a reduction of time, cost of purchase, and convenience. Moreover, Abbad et al. (2011) suggested that e-commerce has emerged as a new avenue to find products and purchase

them anywhere in the world. Abbad et al. noted that to accelerate its readiness for e-commerce and its applications, Jordan remained motivated and committed to upgrading its technological infrastructure environment. Furthermore, having recognized the benefits of e-commerce, the country also extended its applications into e-government. Abbad et al. provided research suggesting the Internet assists in creating additional opportunities for economic development in emerging countries, enhanced by increasingly widespread and growing use of the Worldwide Web. Abbad et al. concluded the greatest prospect for growth in developing countries comprises developing IT industries, and better social applications of ICT, particularly if ICT industries remain compatible with local conditions and conducive to industrialization.

ICT and the Caribbean

Tourism remains an important contributor to the economy of the Caribbean region. The use and application of ICT may result in significant benefits for the tourism industry through media such as electronic marketing (e-marketing). In their study of an alternative to the traditional form of tourism that emphasized the three S's of sea, sun, and sand, Conway and Timms (2010), promoted slow tourism. Slow tourism appealed to the environmentally and socially conscious visitor looking for an authentic indigenous experience (Conway and Timms, 2010). Conway and Timms noted that either form would benefit from ICT advances in e-marketing and e-booking, which emphasized ICT contribution to networking and website development as essential elements for slow tourism's sustainability and identity.

St. John (2012) explained economic development in the Caribbean region could

benefit from the implementation and establishment of a Caribbean and Central American Common Market to counteract trade dependence with the United States. Whether Caribbean governments implement a Caribbean and Central American Common Market within CARICOM or not, economic development will still require the introduction of new and changing technologies. The introduction and use of ICT will have a symbiotical premise regarding available educated workforce able to learn new skills equal to the pace of technological development (St. John, 2012). The infrastructure required for the widespread use of ICT, and developing an education system designed to bring the skills and knowledge necessary for the ICT industry required for the Caribbean is still not in place. This ICT infrastructure will assist the Caribbean keep abreast of worldwide technology developments and the corresponding impact on specific industries such as tourism.

The Caribbean can also benefit from ICT development and innovation in disaster response and mitigation. Pulwarty, Nurse, and Trotz (2010) noted the period between 2001 and 2010 named more tropical storms in the Caribbean than in the previous decade, notwithstanding the devastating earthquake that struck Haiti January 12, 2010. Pulwarty et al. further noted that because of increases in the region's population and wealth, the potential for loss, resulting from natural disasters has increased substantially. The region's disaster management agencies could use ICT to mitigate risks from these phenomena by sharing environmental data and environment-related information (Borisov & Barbulescu 2012). Al-Huan (2012) also suggested that country leaders use mobile technology for responses to unexpected emergencies and natural disasters. Mobile

technology provide governments with a mechanism to coordinate emergency and disaster management activities and to collect, share, and disseminate information to various jurisdictions spread across a wide region (Al-Huan, 2012). In such instances, mobile applications, such as SMS messaging presents a quick and efficient solution for disseminating information to the public and emergency coordinators. As noted by Ifinedo (2012), ICT maturity that reflects citizens' participation and use of online services becomes evident in the Caribbean in times of public emergencies and disasters.

ICT and Service Delivery

With service delivery high on some governments' agendas, in particular those within CARICOM, and therefore, it is not surprising that ICT facilitated development of service delivery channels (Park, Park, Yang, & Lee, 2010). Some aspects of service delivery included providing information on public service websites and receiving information from the public that enabled the government to make informed decisions. Several initiatives employed in India demonstrated the use of Web-based ICT to provide aid to community-related services, and assist the e-participation process by delivering service to the population where and when required (Sharma, 2011). Additionally, Web 2.0 has facilitated the spread of news across T&T and the global community via online independent citizen-generated journalism and blogs.

Improved access to online education, e-health, and other e-government-generated services demonstrate some examples of service delivery in both developed and developing economies that may improve public service delivery (Bontis, Richards, & Serenko, 2011). Bontis et al. (2011) further suggested that informed citizens have

increased roles available for them in social development, and helped to provide additional opportunities for developing employable ICT skills. In a study on India, Sharma (2011) reported on several programs the government started to implement the use of ICT to expand and create innovative solutions to access education in rural India. The Indian government worked with other sectors to execute ICT-based programs that provided facilities to get timely information about market prices and farming methods to India's agricultural community (Sharma, 2011). One of these initiatives that saved farmers both time and money, was a website that gave daily market prices for agricultural products (Sharma, 2011). Some ICT-based schemes also assisted improving public health services via telemedicine, and through e-health programs, which include electronic health records to make the sharing of health information portable and efficient (Sharma, 2011).

Sharma (2011) observed that the Indian government, through collaborations with the private sector, developed, and managed some of these initiatives. The government of India established this collaborative process, and it recognized the benefits ICT and the Internet provided required collaboration between among all sectors in society (Sharma, 2011). Additionally, Sharma recognized establishing ICT-based initiatives had a corresponding reliance on the extent of the country's ICT coverage. These ICT coverage included Internet penetration, wireless or mobile phone adoption, basic IT skills, and the willingness to use technology provided a gauge for a service delivery method (Sharma, 2011). Further, Sharma concluded that attempts to ensure access to cost effective ICT tools, connectivity, and services, given the India's particular circumstances remained a critically evolving exercise.

Campbell, Maglio, and Davis (2011) contended having more knowledge of ICT developments and of how service providers communicate with customers could create a value proposition. Campbell et al. (2011) suggested further that service provider's customer commucication knowledge potentially expand, adapt, and reshaped the customer service process creating new roles for both service provider and customer. Campbell et al. studied a series of service delivery options from self-service to super-service to identify optimal conditions for shifting the provider–customer boundary. Campbell et al. noted some services had a higher customer-service orientation, so the customer did several of the tasks previously done by the provider. An example of these includes self-service airport check-ins, self-service at gas stations, and self-service supermarket checkouts. Additional examples of a shift toward super-service include rental car deliveries to customers, airline passenger pickups, and banks' automatic bill payment services (Campbell et al., 2011).

Campbell et al. (2011) noted these customer delivery modifications have engendered not only increased competition and changing customer attitudes but also the development of new technologies. Increased provider and customer values determined the efficacy of such changes. Self-service meant using a customer's knowledge and abilities to do the activity without being burdensome, whereas super-service removed the customer's burdens using the provider's knowledge and abilities to provide the service (Campbell et al., 2011). Campbell et al. acknowledged new facilities, information, and communications that grew out of ICT advances and the spread of the Internet became a catalyst that brought many of the new service changes. Improvements in electronics and

automation have provided new technologies and business opportunities such as self-service technologies (SSTs) as defined by Campbell et al. (2011), providing fully automated self-services. Self-service technologies found in automated teller machines (ATMs), online banking, self-service gas pumps, and flight check-in and information kiosks provide examples of SSTs. Campbell et al. acknowledged that a major benefit of continuing to spread SST remains the lower costs achieved from its use.

Regardless of their initial slow introduction, use, and advancement, the use of self-service and super-service facilities increased with people's familiarity, use, trust of ICT, and confidence in the reliability of SSTs (Campbell et al., 2011). The use of SST for providing e-government services has also increased significantly, which allow citizens to access information and perform transactions sometimes completely unaided by a government functionary. Proliferation of Web-based ICTs provided a major catalyst that ushered in the shift of the conventional service function between customer and provider to new forms of self-service options (Campbell et al., 2011).

The use of SSTs via ICT also facilitates customers having connectivity across multiple channels with a provider or business. Tate and Johnstone (2010) explored the effect of customer interactions across multiple channels and the increasing levels of access to back-end systems provided by self-service channels providing visibility on quality of the customer experience. According to Tate and Johnstone, customers will form their opinion on the organization's quality of service delivered by employees based on the quality of service encountered through their shopping experiences. Tate and Johnstone acknowledged that providing automated self-service options, such as via a

telephone keypad or speech recognition allowing customers to perform multiple functions, such as accessing specific company information and order tracking. Tate and Johnstone noted that organizational leaders must provide direct or indirect access to customer information stored on their servers, as well as to systems responsible for inventory and the status their customers' orders. Each channel will provide contact with the organization, thereby creating a direct link connecting the customer to the organization (Tate & Johnstone, 2010).

Tate and Johnstone (2010) contended that multichannel service options for consumers using a combination of direct interface and technology provided extensive knowledge into an organization's operations previously hidden from the customer. Tate and Johnstone further purported the interactive disctance between customers and organizations, which they refer to as the line of visibility, changes continually because of increased contact points provided by ICT rather than direct interface. Moreover, Tate and Johnstone also suggested that creating a line of visibility that allows customers to interact with the organizations' back-office processes further increased the interactive opportunities for both the organization and customers. For Tate and Johnstone, this meant that ICT functions above the line in organizations given the increasing interactive capacity developed using ICT tools. The research conducted by Tate and Johnstone documented the experience that mystery shoppers had from their interactions with automated ICT, which includes Internet, telephony, or mobile channels, rather than with people. Participants in the research conducted by Tate and Johnstone also suggested that ICT systems possessed the added functionality to create an emotional response and

convey an emotional connection to the organization. Tate and Johnstone noted the use of ICT-mediated channels such as automated call centers provides an organization with increased visibility to its customers and the increased possibilities of new forms of customer interactions. Therefore, organizations can have continual availability, and customers can interact with an organization's information system via a human–computer interface at their convenience.

Although ICT has become a global phenomenon and a facilitator of e-service delivery, leaders of developing nations should consider the relevant factors that can influence the set-up and use of such a service system. Karunasena, Deng, and Singh (2011) examined the performance and development of the Sri Lanka's e-program by evaluating four vital elements creating value via government's public service delivery. The outcomes of e- Sri Lankan's government public service delivery audit of achieving development of trust and public organizations' effectiveness, concluded that Sri Lanka's e-government public value remains unsatisfactory (Karunasena et al., 2011). Karunasena et al. contended that the threat to Sri Lanka's government information stored in public institutions does not enjoy the required level of protection, which diminishes the value of government's e-system to the public.

Karunasena et al. (2011) provided research highlighting the ICT plan of the Sri Lankan government to invest significant resources in e-government programs using six strategies. These strategies included investing in ICT infrastructure, telecommunications liberalization, and public sector modernization program to create cost effective connectivity to public information and programs, while delivering effective and efficient

public services (Karunasena et al., 2011). Additional strategies pursued by Sri Lanka focused on social programs poverty alleviation that targets the disenfranchise sectors of society and offering access to ICT enabled learning opportunities (Karunasena et al., 2011). Moreover, other strategies adopted by the e-Sri Lanka program included an economic diversification strategy focused on establishing an ICT industry to not only consume ICT services but produce then as well (Karunasena et al., 2011). Another e-Sri Lanka's ICT industry-development strategy included programs designed to strenghthen the legislative and regulatory framework through ICT policy formulation, and to build institutional skills to support ICT development programs (Karunasena et al., 2011).

Karunasena et al. (2011) contended the focus of an administration's ICT platform rests on its ability to deliver public services effectively and efficiently. Karunasena et al. purported to improve the value of e-government to citizens, delayed e-service schemes, and e-administration programs require implementation with some haste. In addition, existing government websites require reconfiguring to allow citizens to access and submit data and information as intended. Karunasena et al. further noted IT security required safeguards needed to protect all information held in government organizations. Karunasena et al. further recognized that severe ICT illiteracy, inadequate facilities to access e-government services, and limited resources further increases the problems of ensuring that all citizens enjoy an equal opporutnity to access government services. According to Karunasena et al., the Sri Lankan government invested in developing its human resources aimed at reducing the obstacles to ICT development and initiatives, and to support its investment in ICT infrastructure. Karunasena et al. concluded the massive

expansion of mobile phone use in Sri Lanka indicated that m-government platform increased accessibility to personalized e-government services and increase public value.

Another aspect of ICT's contribution to service delivery lies in the growth of offshore service centers as noted predominantly in India. Thite (2012) conducted research investigating why Indian multinational corporations (MNCs) providing IT services have become so dominant in the global market. The success of these companies based on their annual economic growth rate of 30% from the early1990s and continuing over the past 2 decades, provides another example of growing importance of ICT (Thite, 2012). Additionally, over 66% of their incomes come from the international market, as they conduct business in all the major IT service markets in both developed, and developing countries (Thite, 2012). Thite (2012) noted the process of becoming an international company starts by onshore interaction and visits with clients, and once satisfied with the client's skills and facilities, which changes to an onshore–offshore operations strategic model. The internationalization process for Indian MNCs increased more quickly when they began establishing facilities in other low-cost global locations, namely South America, Eastern Europe, and Asia. Thite also observed that these companies have steadily increased in value based on the outsourcing of knowledge-intensive services such as analytics and IT services consulting business, which have evolved with varying degrees of success. Additional evidence of their success internationally rests in the fact that they remain the most preferred offshore destination for IT services (Thite, 2012).

Thite (2012) also revealed Indian IT MNCs had several country-specific

advantages that helped them to grow internationally, with the most noteworthy being that India had an immense, low-cost IT labor pool. Indian IT MNCs also benefited from their firm-specific advantages, as Indian IT MNCs benefit from a reputation for superb implementation and strict observance of world-class quality standards (Thite, 2012). Gupta and Shah (2012) conducted a qualitative review of the effect of emerging ICT on e-governance apparatus in India. Gupta and Shah defined e-governance, which they referred to as the use of ICT in governance, as a citizen-centric approach to provide a transparent, simple, faster, and accountable interface to all. E-governance characterizes the way the government provides a service to its citizens, businesses, and even the branches of government using the following delivery modes: government-to-citizen, government-to-business, government-to-government, and government-to-employees (Gupta and Shah, 2012). E-governance goes far beyond computerizing or automating office procedures as a means of fundamentally changing how the government operates, which also means a new set of tasks for the executive, the legislature, and citizens. Gupta and Shah also noted that e-governance could also mean e-administration, e-services, and e-democracy.

Gupta and Shah (2012) noted the Indian government focused on making various government services easily available to any citizen, and leveraged ICT as an enabling mechanism for this strategic initiative. Although costly, emerging technologies such as cloud computing, data mining, and artificial intelligence could help in connecting the nation at all levels. Hardware, networking, and software to reengineer the administrative procedures for examining cases and making decisions represent other expenses incurred

based of the highly complex processes required (Gupta & Shah, 2012).

The design of the e-governance network provided an easy, efficient, and cost effective way to exchange information and access services by connecting to the government portal via emerging technologies and applications (Gupta & Shah, 2012). E-governance also had the advantage of service delivery improvement, standardization of services, accessibility of government information and services, simplifying processes, transparency and accountability, and greater citizen participation in the governance (Gupta & Shah, 2012). Gupta and Shah further noted e-governance would have a positive environmental impact because online government services would reduce the need for hard copy forms, thus savings paper and contribute to a greener planet. Gupta and Shah explained that through e-governance, the government of India provided its citizens easy access to tangible benefits through simple applications. Gupta and Shah list these applications to include completing a form online, sourcing and paying a bill, distance education, and telemedicine.

Having recognized the benefits of ICT involve providing e-services, users need to be cognizant of the online threats they may face. As e-services evolve through innovation and new technologies based on customers' use, it has become critical for businesses and governments to understand the potential of online threats and changing consumer behaviors (Cromer, 2010). Cromer (2010) also suggested that is has become critical for governments and businesses to create an environment where the consumer experience builds trust and increases Internet use. Cromer noted government regulators, consumer advocacy groups, and e-service providers should appreciate the impact of the

Internet and it's irrevocable consequences on consumer behaviour. Cromer contended though users and consumers of the Internet perceived no new ITC threats, the Internet provides opportunities for flexibility and convenience. Cromer further argued if persons perceived the number of online threats to be increasing, they might spend less time online or choose not to visit or interact with websites that lack transparency and security.

Cromer (2010) acknowledged Web innovations provide consumers with potentially much more valuable information and experiences and enable firms more efficiently to receive, respond to, or mitigate any issues that may arise. Through Internet self-efficacy, consumers monitor their time spent on the Internet and engaged in adaptive behaviors as a response to risk threats (Cromer, 2010). Cromer further indicated that Internet self-efficacy provided confidence for consumers to use public sector e-services and new innovative technologies such as Web 2.0. Cromer noted that the continued development and expanding use of the Internet creates a demand for new technological and increased security for all stakeholders. Web 2.0 capabilities provided an atmosphere of trust and transparency that public sector e-services may build upon, allowing the public to engage in a learning environment that provided feedback for future governance (Cromer, 2010). Cromer noted the fragile systems being used in public administration's ICT network requires strengthening using the potential that Web 2.0 technologies have provided.

There may be times when problems that affect one community in a region may not affect communities in another region (Gouvea, Linton, Montoya, & Walsh, 2012). The possibility exists through ICT where a community group can get more directly

involved in assisting to resolve government service issues through providing specific service offering. The government could provide these additional service offerings, and the group could collaborate with the relevant government branch, to facilitate online services. Feller, Finnegan, and Nilsson (2011) acknowledged innovation as essential to transforming the public service whose collaboration with community groups may enable the provision of e-services that will further demonstrate the benefits of ICT investment.

ICT and the Future of Modernization

One of the future roles for ICT will be in the analytics field, which includes the production, collection, storage, and analysis of data. Gobble (2013) noted much of the data would be big data, which refers to data too vast in size, too unstructured, or too fast for normal systems to manage. Gobble further observed the biggest data would result from the arrival of Web 3.0. The proliferation of sensors enabling a new era in data collection automation, transmission, and analysis will likely add to the torrent of data (Gobble, 2013). Innovation and transformation comprise key components to this data production, and they will be pivotal in managing it. Imaginative minds conjure up new ways to use sensors and the data they produce to improve old products and create new ones. Gobble contended that data offer opportunities for innovation, with some new ventures offering new ways to collect, store, and analyze data. Innovators, begin strategically thinking about how to use large information files to expand their knowledge, and to develop the innovation process while emphasizing the role ICT will play in data manipulation.

Winter (2012) noted that Earth's salvation lies in innovation as there represent

serious challenges that will require urgent attention. One of these refers to the wider question of clean energy and availability of fuel. Winter noted with the dependence of populations on fossil fuels, finding new sources of energy remains a major concern, which will become even more so as fossil fuels become scarce and more costly to extract. Winter (2012) contended that innovation and ideas have solved problems once thought insurmountable. An example of this remains the replacement of sperm whale oil by kerosene as a source of fuel for producing light when sperm whales faced the danger of becoming extinct. Winter (2012) explained that innovation will play a pivotal role in solving many of these problems, and ICT will lie at the base of much of this innovation.

Information and communication technology will carry on playing an essential function in purchasing goods and services in the future. Carlyle (2012) acknowledged that ICT and in particular mobile technology have significantly influenced the shopping experience and retail enterprises in developed countries, where some shoppers no longer visit a retailers to make a purchase. Carlyle further suggesting that ICT impacted retailers and retail building spaces as some customers no longer have a store to visit, making purchases via an online transaction with the item delivered to their door. Food selection, as well as other basic retail shopping, accessed online, with some bookstores going out of business due to the advent of online books and music. The reality suggests that these basic and obvious changes in shopping and consumer behavior based on technology present a new shopping platform environment for Caribbean nationals.

Sterman (2013) reported stores such as Apple considered the website an extension of the store, where purchases took place via an online transaction, and returns and second

purchases take place at the physical store. The future of the retail world will continue to modify to use the new ICT driven innovative tools in changing and hitherto yet emerging and unknown shopping patterns (Sterman, 2013). The openness of the current Web 2.0 allows users to produce user-generated content and to interact with other users via other user-generated content applications (Kim, Jin, Kim, & Shin, 2012). Business entities also use ICT tools such as loyalty programs and online customer feedback forms to interact with customers and the public (Kim, Jin, Kim, & Shin, 2012). Petrick and Martinelli (2012) noted that in an uncertain world, businesses would have to pay close attention to emerging trends by predicting the needs of end users. The future role of ICT addresses the emerging needs of end users creating new business opportunities.

Transition

Information and communication technology can significantly enhance the agenda for national development, social transformation, and economic diversification in T&T, which may lead to an increase in national productivity. The definition of ICT in this doctoral study refers to more than computers or the Internet, but to the range of technology used to enhanced systems and processes fostering economic and business development activities. Information and communication technology must encompass the information that businesses create and use, as well as the broad spectrum of increasingly convergent and linked technologies that process that information (Gobble, 2013). Information and communication technologies provide valuable opportunity to affect economic growth of small island states such as T&T in creating a competitive, innovative, and productive society. Recent technological advancements had seen

immense innovation and increased potential in information management and communication in many countries. These technological advancements provide innovative avenues to key decision makers to convey, access, and use information and knowledge to enhance national productivity and service delivery.

Section 1 of the study contains detailed definitions of ICT, as well as various perspectives from the existing literature. This section also included a background for the study, the nature of the study, the methodology, the problem, and purpose statements. Section 2 includes details on the methodologies, analyzes, interview process, questionnaire, and other strategies selected to complete the study. Section 2 details the qualitative case study approach incorporated for the study to explore the implication of ICT adoption on productivity and competitiveness of T&T. The role of the researcher, the research design, method, reliability, and validity are additional areas included in section 2. The semistructured in-depth interviews outlined in section 2 forms part of the data triangulation process with the population size to ensure data saturation.

Section 2: The Project

This section details the methodology used in this study to collect, validate, and analyze the data on ICT's impact on public sector workers' productivity in Trinidad and Tobago. This section further outline the use of Nvivo 9, a computer generated software, to analyze the data collected for this study from the one-on-one interviews and the archive review. Following the purpose statement and the role of the researcher, this section also provide details outlining the criteria used to select the 20 participants for interviewing. The selection criteria for participants makes a further between those who worked directly for the Government of Trinidad and Tobago, and those external to the public service. Additional areas covered in this section include research design and method, research reliability and validity, and transition and summary.

Purpose Statement

This descriptive case study was designed to explore the impact ICT on workplace productivity amongst Trinidad and Tobago's public service workers. The adoption of ICT in-service delivery required further exploration and analysis to consider its effect on increasing public sector workplace productivity by creating online access to basic public services. Adopting ICT accelerates the pace of social change and economic development, providing a productive and creative tool with the potential to enable sustainable development of societies such as T&T (Fonseca, 2010).

The study was designed to identify common themes related to T&T's national ICT agenda, as suggested by Yin (2009), using the work of the MPAI as a repository for multiple data source. The data gathering process included interviews with 20

participants, including key decision-makers from MPA; archived national technology plans; ministry records; and parliamentary reports. These interviews constituted the primary data source. Yusuf and Nabeshima (2012), in a World Bank report, noted that developing economies increased their gross domestic product by an annual average of 4.7% from 1990 to 2008, whereas developed countries growth average of 2.4%. This high rate of growth indicates the strong potential of leaders of developing economies to accelerate their development agenda in areas of social inclusion, poverty reduction, health care, and education via increased ICT adoption (World Bank, 2012a).

Role of the Researcher

In qualitative studies, researchers' responsibilities include data collection, defining data collection methods, collecting and analyzing data, and presenting results and recommendations in an organized, ethical, and objective framework. I conducted a pilot test of the study instrument by interviewing five senior executives from the MPAI. These executives provided feedback on the impact of an ICT-driven service delivery platform on workplace productivity in the public sector. The final research study did not include participants used in the pilot test, but the pilot test provided a basis for the final focus and final questions used in subsequent interviews. These new interviews used for the main study were conducted with 20 participants who comprised of industry experts and executives from MPAI.

The protocols prepared for the exploratory interviews make the methodology repeatable by other researchers who may wish to duplicate the study, as suggested by Turner, (2010). The preparation protocols also included a defined process to obtain the

consent of the participants as well as the steps to take before, during, and after each interview. This protocol was developed to ensure the interview process yielded the required information on the effect of ICT on productivity in T&T. Yin (2009) noted that this protocol constituted a critical aspect in increasing validity of the case study because the study repeatedly used the same structured line of questioning. This structured approach to repeating the same line of questioning assisted in reducing researcher bias and subjectivity that further increased the validity of the research.

The pretest and validation processes ensured that the research instrument was complete and incorporated any changes and modifications resulting from the feedback. Participants were selected using a list of candidates provided by the Prime Minister's office, which ensured transparency of the process, following established protocols. These participants were recruited by sending an initial request for participation to executives and local industry experts who had direct roles in developing and implementing the national ICT plan, and who had roles in measuring its impact on T&T's productivity. The computer generated software program NVivo 9 was used to analyze the data and reveal common themes from the interview process, as suggested by Hoover & Koerber, (2011).

Participants

The case study examined data stored at the Ministry of Public Adninistration and Information, a government ministry the cabinet of the government of T&T reestablished after the national elections of 2001, as the primary data source. One of the primary responsibilities of this ministry has been to design, implement, and managed the national

ICT plan and public service transformation agenda. The group of participants invited to participate in the interviews all held senior positions at MPAI and the e-business roundtable between 2001 and 2010 as key decision makers of the national ICT plan. These positions held in retrospect by the interviewees as the interviews took place in September and October of 2014. The study also examined archival data such as T&T's national ICT plans, ministry records and files, parliamentary reports, newspapers clippings, statements, and statements from ICT experts (Central Bank of Trinidad and Tobago, 2010).

I approached ministry members before initiating the research so as to obtain their consent to obtain direct access to employees, management, and documents (Appendix A). The ministry members were selected through purposeful sampling, which allows recruitment from a specific population to gain the greatest amount of data whose attributes constituted an essential aspect to the study and to select participants who met those criteria (Yin, 2009). Researchers using a case study methodology must establish a credible foundation to substantiate the validity of the study before purposeful sampling (Baxter & Jack, 2008), as in the . ThisMason (2010) opined that too much data does not necessarily mean more credible information as the data can become repetitive thereby strengthening the need for purposeful sampling. The research for this study used purposeful sampling through the criteria developed to invited candidates to participate in the interview process for data collection.

Two key criteria were used to identify the participants for the stuudy's purposeful sampling: Intimate knowledge of the national ICT plan, and performing a key role in

developing, implementing, and managing the national ICT agenda. An additional point of reference included public and private involvement in the national ICT plan through industry experts, academics, and other subject matter experts who provided information into how ICT affect national productivity. These participants had expertise in ICT at a local and regional level, and included members of the e-business round table, academics, and senior public officers who constituted key decision makers at MPAI between 2001 and 2010. The criteria for participating were to have had a senior role at MPAI from 2001 to 2010, knowledge of the national ICT, industry knowledge at national and regional levels, and a role in implementing the national ICT plan.

The 20 potential participants that I contacted with the preliminary summary all indicated their consent to participate in the project in advance (see Appendix A). This sample size of 20 participants constituted an acceptable number of persons for an interview process to allow for saturation of categories and to avoid my inundating the participants, as suggested by Bowen, (2010). Bowen also advised against repeatedly interviewing the same participants to avoid the saturation point, with each participant having one in-depth interview. I conducted face-to-face interviews that each took place at a location convenient for the individual participant.

The resulting information obtained through these interviews assisted and informed the government's plan of action for adopting ICT in and its impact on national productivity of T&T. As part of this project, I approached a senior permanent secretary of government who had responsibility for ICT in July 2014 to provide her with an appreciation of the details of the proposed study to gain her interest and support for this

research project. The permanent secretary indicated that government of T&T will have an interest in the outcome of this case study, which explored the effect that ICT has had on productivity in developing countries such as T&T.

Research Method and Design

Qualitative case study research is often used to explore complex phenomena using multiple data sources. According to Yin (2009), a case study design remains the preferred approach to research the phenomenon when researchers undertake to explore questions of how and why. This led to my selecting a case study approach as the most suitable method available to enable an exploration into how ICT positively affects the national productivity of T&T.

Research Method

A qualitative case study approach facilitated the analysis of each case and strengthened the results of the research strengthening its reliability and robustness (Yin, 2009). Symonds and Gorard (2010) supported the view that, at a simplistic level, qualitative researchers explore textual data reflecting complex phenomena from multiple data sources and quantitative researchers examine numerical hypotheses comparing variables. Symonds and Gorard further suggested that researchers should also consider a mixed methods research, which synthesizes a dual application of a qualitative and quantitative research methodology to the research.

The study involved applying a qualitative case study research approach as the relevant methodology given the nature of the research proposed. Curzi and Rosana (2012) noted that qualitative research focuses on finding meaning, interpreting

phenomena, excluding statistical procedures, and occurring in a natural setting. Gerring (2004) explained that case study research method uses an approach that explores empirical evidence from casual relationships. Gerring also noted that all relationships presumes a conversational aspect naturally, which facilitates an understanding of the integration of individual units, and that researchers can define these conversations through various methods of analysis. Triangulating three distinct reference points derived from data to map out the commonalities among relationships further strengthens the accuracy and robustness of the proposed research methodology. Klaes (2012) explained that quantitatively oriented methodologies dominate management and economic studies, and that other social sciences have evolved by drawing additional methodologies from economic concepts to analyze social phenomena. Klaes further explained that quantitative research tests hypotheses and make predictions whereas qualitative research explores and interprets social phenomenon. Open-ended interview responses, as opposed to precise measurements required for quantitative research, constitute a critical aspect of the proposed data collection process for this doctoral study as noted by Mason (2010). A qualitative case study method was, therefore, the most appropriate data collection and analysis strategy to resolve the research question in this study.

The examination of archival records of MPAI and the government of T&T between 2001 and 2010, presented another source of information explored for this case study based on the six sources of evidence (Yin, 2009). Open-ended interviews and review of the archival records related to the impact of ICT on public sector workplace of

T&T represent two sources of evidence and reference point used for data triangulation. The value of using more than one source of evidence in case study enquiry are complimentary and provided an opportunity to cross-reference lines of converging information exploring ICT's impact on T&T's public service workplace productivity.

Research Design

Yin (2009) described case studies as explanatory, exploratory, or descriptive. Yin (2009) further differentiated between single, holistic, and multiple-case studies, whereas Stake (2010) defined case studies as inherently a contributory instrument used to collect shared information. Stake suggested using an instrumental case study if the intent of the researcher focuses on gaining an understanding of a particular phenomenon. Yin (2009) and Stake (2010) recommended a multiple instrument case study as an appropriate methodology for exploring how and why questions posed at contemporary phenomenon. The study explored how adopting ICT may lead to increasing productivity in T&T and why adopting ICT remains instrumental to public sector modernization and efficient service delivery. Patton (2002) noted that case studies are more credible and accurate with the use of various sources. Patton also suggested that nonexperimental research designs including ethnographic and grounded theory require a researcher to interact extensively with a specific group or substantive topic. Researchers prefer qualitative, descriptive case-study as opposed to a correlational research design methodology when the research focuses on finding answers to questions regarding social, institutional, or organizational effects, promoting change or improving practice (Neuman, 2010). Neuman also suggested those researchers seeking to understand what and not why of the

current phenomenon should employ a descriptive rather than an exploratory methodology.

The objective of this study focused on gaining a better understanding of how ICT can positively affect public sector workplace productivity of T&T. An important element in using descriptive case study research reflects employing multiple data sources to enhance the credibility of the research (Patton, 2002; Yin, 2009). The study incorporated research generated from data that emerge from face-to-face interviews as the primary data collection method (Rowley, 2012). Twenty participants who had a leadership role in developing, implementing, and adopting the national ICT strategy of T&T's government, or senior industry practitioners and local experts in the ICT sector participated in the interviews. The structure of the interviews entailed asking all participants open-ended questions from the research instrument (see Appendix A). The study included a detailed interview protocol (see Appendix B) as recommended by Yin (2009), which involved taking detailed notes, making an audio recording of the interview for ease of recall and accuracy of transcribing data, and asking permission to follow up via a telephone call for clarification if necessary. Before each interview, each participant received a draft of the proposed interview questions (see Appendix B) to apprise him or her of the purpose and details of the study. Each participant received a request to sign a letter of consent (see Appendix A) before starting the interview. Additionally, all participants retained the right to enquire about the use and confidentiality of the information gathered to ensure their comfort with participating in this research process. The 20 interviews followed the same procedure and included the identical questionnaire. Member checking will form

part of the interview protocol requiring all participants to confirm the transcript to ensure validation (Marshall and Rossman, 2011).

Yin (2009) described the value of using more than one source of data as an essential element required for case study research. At the conclusion of the interviews, the responses constituted the information placed into the NVivo 9 data analysis software to develop themes and objectives (Hoover & Koerber, 2011). Review of the archives of MPAI on the impact of technology on public workers productivity constituted another source of evidence used in developing themes. A comprehensive report resulted based on the themes established and analysis of the findings of the research consistent with the pattern-matching technique (Yin, 2009). Pattern-matching technique ensures the robustness of the data in keeping with research for a multiple case study approach and the common themes extracted using NVivo 9 (Yin, 2009). The recommendations for further study indicate areas that require additional exploration and researching the continued application of ICT on issues related to government related workplace productivity in T&T. Yin (2009) outlined that data analysis included examining, categorizing, tabulating, and testing to address the research question appropriately.

Population and Sampling

The population sampling selected for this qualitative descriptive study followed a purposeful sampling strategy with participants deliberately selected for the important information they could provide that remained unavailable through other sources (Patton, 2002). Researchers of multicase studies do not have to follow the random sampling procedures applicable to quantitative research. Purposeful sampling constitutes the most

appropriate method for qualitative research, and allows the researcher the flexibility to choose the participants needed to explore the problem and answer the research questions (Yin, 2009). Documenting the boundaries and details of the study process may increase the credibility and dependability of the qualitative research.

The participants for this study comprised individuals selected based on their involvement in the development, implementation, policy formulation, and execution of the national ICT plan between 2002 and 2010. The participants included business executives who consulted on national ICT policy development and commented on proposed legislation for the period 2002-2010. Also, senior members of regional and international institutions located in T&T whose primary focus constituted ICT development and adoption in the Caribbean for the period 2002-2010 were an essential data source. Industry experts who have written and commented on issues related to national ICT initiatives for the period 2002-2010 constituted a relevant and specific group of participants.

The following categories for the 20 participants invited to participate in the interview process based on these conditions included executives of MPAI 2002-2010 and senior executives of the National Information and Communications Center (NICTC) 2002-2008. Another category of participants selected to participate in this study included local ICT industry experts residing in T&T between 2002 - 2010. An additional category for the selected 20 participants included senior executives of IGov TT, a government owned state company, incorporated in 2008, replaced NICTC. Additional categories of participants included members of the E-Business Round Table 2002-2010 and members

of the Caribbean Telecommunications Union, headquartered in T&T. Participants meeting these criteria and fitting within these categories helped to ensure all subjects had appropriate job experience relevant to the topic and the purpose of the study. These participants provided insight into ICT development in T&T, as well as the insights of subject matter experts on their understanding and application of ICT in the national development of T&T.

Ethical Research

This study required a minimum of 20 participants for robustness and reliability (Yin, 2009). Thirty participants received invitations to participate in the research via a consent letter outlining the proposed research (see Appendix A) to ensure the required number of 20 responded positively. The introductory letter also detailed the ethical considerations, sponsorship of the study, measures set up to ensure confidentiality and anonymity of participants' responses. The introductory letter also lists those authorized to receive and view the completed research paper, and details of what information would appear in the completed study. The study constituted a low-risk study with no risk to the participants. Each participant signed a formal consent form (see Appendix A) that reiterated the procedures adopted to ensure confidentiality and eliminate risk.

Information stipulated that participants would not receive any monetary compensation for participating, and explained the provision for the secure storage of their responses for five years after collecting them. The perspective participants also understood the voluntary nature of participation and the time required for the interview process before undertaking the interview. Any participant could choose to not continue

to participate at any time throughout the study process with no penalty, and with the confidence that this study would not include any previously recorded information. The consent form entailed an invitation to all participants to raise any concerns or questions they had regarding the study. The MPAI's directors and the researcher agreed on a detailed procedure outlining the process to access the data at MPAI and NICTC. Each participant had a code such as TTICT1, TTICT2, TTICT3, and so forth, where TTICT referred to Trinidad and Tobago ICT. The date and time were the only identifying features recorded for data analysis purpose only. Representatives at MPAI will have access to a report summarizing the study when completed.

Data Collection Instruments

The goal for data collection in this study focused on obtaining information related to the effect of the increased adoption of ICT on the national productivity of T&T. An additional goal focused on creating a rich description of the results that provide meaningful data for the government of T&T. The data would assist the government with a clearer understanding of how the implementation of ICT would profoundly affect public sector productivity and key areas for improvement related to service delivery and public sector modernization. Descriptive data in a qualitative case study result from direct interaction with the study sample. The main sources of data collection for this research constitute the interviews and a review of archived documents. Additional sources of data emerged from a review of ICT reports from multileteral agencies with direct relationships and specific to the Caribbean, Latin America, and T&T as noted by Mason (2010).

Instruments

The potential impact of ICT on the national productivity of T&T was the title of the instrument used for interviews in this study. The instrument included 10 open-ended questions, an introduction outlining the background to the research, and a definition of productivity that each participant must read, with a note reinforcing the confidential nature of their participation. Rubin and Rubin (2012) argued that naturalist researchers adopt qualitative design tools focused on observation, questions, and a description. Rubin and Rubin further recommended that semistructured interviews remain the preferable method of interviews for exploring technology's potential effect on productivity and competitiveness of T&T. The design of the instrument established a framework to provide answers to the proposed research question of the study (Marshall & Rossman, 2011).

The goal of the instrument focused on collecting data from the participants regarding their perspective and understanding of the national ICT plan. Additional goals focused on the specific role they played in its development and implementation, the challenges faced in its adoption, its effects on national productivity, and recommendations for the future. Barlow (2010) opined that semistructured interviews include some questions prepared in advance while others evolve as the interview process unfolds to bring into focus the unique perspective of the participant. The cumulative effect of the interview process helped to understand how to adopt ICT that will positively affect national productivity and identified key areas for improvement and further research.

Additional sources of data emerged from the archives of MPAI such as the national ICT plans, the ministry program records and files, parliamentary reports, newspapers clippings, and public statements. These additional sources of descriptive data required for qualitative case study originate from direct interaction with the study sample (Mason, 2010). Primary methods of data collection for this research were one-on-one interviews and archived document review (Mason, 2010). The multiple data-gathering methods of the study helped to gain insight into MPAI's role, policies, and implementation framework, minimizing the potential weaknesses of the interview process, including interviewer bias, response bias, and reflexivity (Yin, 2009). I secured and arranged an appropriate place to conduct the interviews, provided advance communication and invitations to the prospective participants, and obtained and tested recording software and an instrument before conducting the interviews.

Data Collection Technique

For this research, data collection included interviews, a review of MRAI documents, and a review of other pertinent ICT subject matter documentation. The case study research method of the proposed study followed the three principles of data collection to maintain validity (Yin, 2009). The three principles include a detailed chain of evidence, separate storage area for the data in the final analysis from field data, and multiple sources of data (Yin, 2009). This process facilitated a triangulation of all data collected, which Yin identified as six sources for a case study and included those data sources used in the research undertaken for this study. Interviews were the primary method of data collection for the study, with a completion period of four weeks.

The data collection process involved providing each participant with a background of the study and an outline of the interview process (see Appendix A), before the date of the interview. The data collected via an interview process ensured participant responses remain free from any influence from the interviewer. The process involved soliciting and answering any questions on the expected use of the information collected during the study or about any issue of confidentiality raised by the participants. Additionally, each participant received a letter of consent (see Appendix A) to read and sign before the interview, where all 20 interviews followed the same procedure and research instrument. The interview process involved taking detailed notes, making an audio recording, and uploading the interview responses into the NVivo 9 software to determine common themes (Hoover & Koerber, 2011). Furthermore, the interview included conducting follow-up conversations with participants if clarification to responses given in the interview required such action.

Participants received a copy of their interview transcript to confirm the accuracy of each recorded session and any clarification required occurred via email and telephone communication. Marshall and Rossman (2011) highlighted that trustworthiness and ethics require the interviewer engage in member-checks that require the participants to confirm the transcript, and the use of triangulation as a strategy to ensure validation. To reduce subjectivity and researcher bias, and to strengthen the integrity of the results, required data triangulation (Yin, 2009). Data triangulation included reviewing MPAI's documents, conducting interviews, and reviewing other documentary sources as noted by Yin (2009). The additional documentary sources included newspaper articles, the

government's ICT plans and policies, and industry data, which helped to increase the validity of the research (Yin, 2009).

Data Organization Techniques

Data collection took place through detailed interviews of 20 participants, and a spreadsheet contained the codes established to protect the anonymity of the participants. The pattern-matching concept served to condense and organize the data in common themes based on the responses to the research questions (Yin, 2009). Reviewing the audio recordings against the detailed notes taken from the interview helped to ensure the accuracy while transcribing and compiling the data. Common themes emerged, and these served to generate a report outlining the results and suggestions for further research predicated on the increasing awareness of the impact of ICT on issues of national development and productivity.

Backup copies of the responses remained on the laptop, desktop, and back-up hard drive, and sending daily email reports to an email account ensured that, in the event of a compromise of all the storage instruments, the data collected remain available via an automatic cloud backup system. The data will remain stored for five years in NVivo 9 (Turner, 2010) on both the desktop and the back-up hard drive, followed by its disposal. Disposing of the hard and soft data will involve digitally erasing all files from all storage areas, shredding any hard copies of the data, and destroying all audio recordings beyond repair.

Data Analysis

The data collection and analysis for this qualitative research evolve together as an

iterative process ensuring data convergence (Baxter & Jack, 2008). The sources of evidence used for data collection included open-ended interviews and archival review (Yin, 2009). The data collection process included the questions:

1. Describe your role in the development, adoption, and implementation of the national ICT plan for the government of Trinidad and Tobago.
2. How would you describe the impact of a national ICT plan developed by the e-business roundtable on efficiency in public service delivery?
3. Describe the impact of ICT on public sector workplace productivity?
4. How would you define the barriers that impede against a higher level of adoption of ICT in both the public and the private sectors?
5. How would you describe the impact of ICT adoption on the international business competitive indices of Trinidad and Tobago?
6. How would you describe your expectation of the impact of the national ICT strategy on the economic and social transformation of Trinidad and Tobago?
7. What would you recommend as the possible next steps in the development and adoption of ICT on workplace productivity for Trinidad and Tobago?
8. How would you describe the main accomplishments and setbacks of the national ICT plan based on your role and contribution in its development and implementation?
9. If you had to do it all again, what changes in approach, design, and strategic implementation would you incorporate?
10. What additional information or recommendations would you like to add that can

positively influence this study?

The process of data analysis for qualitative studies entailed compiling all the data obtained from the inquiry emanating from the interviews and archival review. The process also requires condensing the data into themes and categories to obtain a deeper appreciation of all the facts. This process ensured the requisite care taken to represent accurately the data collected through transcription and interpretation of the raw data followed academic rigor. The study involved reviewing, analyzing, and placing recorded notes taken in the field into categories in sync with the participants' interview responses to ensure corroboration between the data collected from the document review. I reviewed, coded, and analyzed the interview data to identify themes and patterns (Yin, 2009). The data analysis process continued with entering the data into NVivo 9 (Turner, 2010) based on the themes identified and in line with the research question and the goals of the inquiry (Yin, 2009). Interviewees received coded identification numbers, and each of the 20 participants had consecutive codes such as TTICT1, TTICT2, TTICT3, and so forth. The study involved recording the date and time of the interview for data analysis purposes, and organizing the various responses into selected themes drawn from the differing and similar responses of the participants.

The themes that evolved as a consequence of the data analysis following the input of the information from the interviews and archival review, based on the scope of the research questions (Yin, 2009). Following the compilation and theme categorizing process, descriptive analysis ensued from the data emerging from the 4-week data collection process based on themes and issues arising from responses. The interpretation

of the meaning of the themes and descriptions reflected the following research questions: How does information and communication technology influence T&T's public sector workplace productivity? How can T&T develop programs that simultaneously develop the skills and infusion of technology in the private sector, and accelerate citizens' adoption and acquisition of technology?

Reliability and Validity

The case study method subject the research to the same validity concerns found in all qualitative research, with additional concerns unique to the case study methodology. A multiple case study research method matched the study's requirement and minimized the potential of this limitation (Curzi & Rosana, 2012). It further improves internal and construct validity by assessing rich, descriptive data from multiple subjects (Curzi & Rosana, 2012). The objective of the study served to limit and define the study as stated in the research question, the findings, and the insight into experiences, perceptions, and review of the data collection and analysis process.

Reliability

Yin (2009) noted researchers could ensure reliability by documenting the steps and procedures they followed in conducting the case study as well as by outlining the protocols used for each step of the interview process. Adhering to the protocol designed for this study assured the reliability of the data before, during, and after the interview process that required meticulous and disciplined compliance. The newness of the research instrument suggests that future researchers will need to establish reliability using the same protocols described in the study's methodology, which Yin (2009) defined as

the ability to replicate instrument quality. Case study researchers should incorporate multiple sources of evidence to ensure reliability in pursuit of converging lines of inquiry demonstrating data triangulation (Yin, 2009). The data triangulation process through exploring multiple sources of evidence also ensures that examining the phenomenon from various perspectives serves as a control for the researcher's subjectivity (Yin, 2009).

Marshall and Rossman (2011) opined that when researchers use members check as a central tenet confirming the findings of the researcher, the knowledge claim increases in reliability and robustness of the data. An additional expectation for the research was obtaining relevant and in-depth description of the findings to allow for transferability. Based upon this premise of transferability, researchers design transparent data collection and coding strategies that enhance the reliability, credibility, transferability, and accuracy incorporated in both the interview process and the transcription.

Validity

Yin (2009) noted that content validity for qualitative research focused more on the credibility, trustworthiness, and dependability of data than with the results. Yin further indicated that content validity required the researcher to document the procedures, step up protocols for the study, and develop a database for all recorded and analyzed data. The protocols established by me, as the researcher established content validity and assisted in mitigating against the perceived weaknesses of qualitative research. The design of this process ensured the suitability to test, review, and improve all aspects of the instrument, including questions; and formatting remained paramount. An audio

recording of the interview sessions assisted in providing accurate data transcription because of the verbatim translation, which provided credible and reliable data. Additionally, I reviewed all the data for analysis and met all the participants to recap the interview format for any additional information and changes that were necessary. The transferability of this study lies in the degree that conclusions may apply to situations in other developing countries that are similar to T&T.

Leaders in developing countries may view new information on ICT's impact in the public sector as potential threats to either confirm or build on the existing body of knowledge, preventing the publication of incorrect conclusions. Mason (2010) noted that research validity for qualitative studies focuses on the dependability and credibility originating from findings originating from the research, so validating the data provides an accurate conclusion. Marshall and Rossman (2011) contended that with the inclusion of member- checking and data triangulation, the transactional values of convergence and corroboration ensure an accurate outcome of the data collection process. Marshall and Rossman maintained that the transformational input of multiple perspectives reinforces the validity of the research process. Marshall and Rossman (2011) further opined that member-checking constitutes a method through which participants confirm the accuracy of their contribution, and ensure completeness of the interviewing process. Stake (2010) described data triangulation used a qualitative research as a method to validate the research data by analyzing the research question from several perspectives or by using different sources of information. Data from interviews, archives, government documents,

and the national ICT plans constituted some of the different sources of information for this study, incorporated into the data triangulation process.

Transition and Summary

The goal of this study focused on exploring the impact ICT on public sector workplace productivity in T&T by using a descriptive case study research methodology. The findings facilitated a clearer understanding of the challenges and opportunities that accompany ICT adoption and its potential to accelerate and contribute to both economic growth and social change by incorporating a case study methodology. Section 2 contained a description of the research methodology, sampling, ethical research, data collection, organization, analysis, and interpretation procedures. Section 2 also contained reliability and validity procedures, as a requirement of a new research instrument.

Section 3 contains highlights of the findings of the completed study and an examination of the effects of ICT on government workers workplace productivity of T&T. Section 3 also highlights the potential effect and impact of changes in accessing information and services by citizens, and recommendations for action. Section 3 includes the detailed results and analysis, as well as recommendations for future studies. Moreover, Section 3 includes a reflection of the overall study that highlights the need to develop strategies for adopting ICTs.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this case study was to explore how information and communication technology adoption impacted workplace productivity and competitiveness in Trinidad and Tobago. The research process required used a participant pool of 22 participants to ensure data saturation. Three participants, based on their schedule and nonavailability in the Caribbean region, filled out an interview questionnaire and participated in a telephone interview. Two participants expressed opposing views and suggested that T&T's national ICT plan failed to harness the potential of ICT in any area outside national connectivity. The other 20 participants had mixed views as to the degree of success achieved by T&T's national ICT plan. These opposing views went further to suggest that T&T's national agenda for ICT failed to moved beyond connectivity in impacting the delivery of public services and its workplace productivity during the period 2001-2010.

This doctoral study's central research question was used to explored how information and communications technology influenced T&T's public sector workplace productivity by using a multicase case study research methodology. The study outcomes included highlighting by areas identified by participants as having negatively and positively impacted public sector workplace productivity through ICT adoption. The areas cited as having a positive impact included implementing the government portal; telecommunication liberalization; centralizing enterprise-wide solutions; and establishing a ministerial ICT steering committee, ttserve, ttconnect, e-business roundtable, and

iGovTT. The areas cited as negatively impacting public sector workplace productivity included T&T's failure to fully implement e-legislation and regulations; the slow pace of adding e-services; and a need to boost e-business, cyber security, and trust in e-transactions. Sixteen participants suggested that ICT adoption positively impacted social inclusion, poverty reduction, education, and health care at a cursory level via multichannel access to government and affordable high-speed broadband Internet service.

Presentation of the Findings

The central research question was used to guide the general inquiry into how ICT has influenced T&T's public sector workplace productivity. The results of the research suggested that while all participants agree that ICT adoption is essential to the development aspirations of T&T, the participants suggested that achieved this to varying degrees of success between 2001-2010. Two participants expressed the view that the national ICT plan failed and had little or no positive impact on T&T's national development, productivity, or competitiveness. The emerging themes from the interviews using NVivo9 provided the basis for both the data analysis as well as for the recommendations, which emerged. The technology acceptance model was the conceptual framework used in this doctoral study, which outlined a model for forecasting and describing how ICT usage behavior causes potential adopters to accept or reject ICT (Korpelainen, 2011). Recommendations emerging from this doctoral study suggests that citizens are more inclined to use ICT in they perceived that it would positively impact their interaction with government and their access to efficient government services.

Theme 1: T&T's national ICT plan entitled Fast-forward. The first theme that emerged is Trinidad and Tobago's Fast-forward plan. This national ICT plan focused on connectivity, linking communities, schools, and government network of T&T (TTICT11; TTICT19). Between 2003-2008, the national ICT plan Fast-forward, represented a concerted effort that recognized the importance of ICT as a catalyst in generating greater social and economic benefits, increased workplace productivity, and competitiveness (TTICT10). According to TTICT6 and TTICT13, between 2008-2010, Fast-forward was part of the government's ICT initiatives that were designed to encourage the uptake and usage of ICT in public service, community and private sector (TTICT5; TTICT10). As with any long-term technology plan, adjustments of strategies and programs were used to provide the best opportunity to leverage new technology and ICT trends, and support changes in the economic landscape (TTICT20; TTICT22). Participant TTICT8 suggested that Fast-forward made steady progress and impacted on the state of government's e readiness, which focused primarily on infrastructural development. Participant TTICT13 gave an opposing opinion stating that Fast-forward failed to harness the potential of ICT in other areas such as the application of ICT to transform public service delivery and creating business opportunity for the private sector. Several participants stated that Fast-forward's success in creating an established platform of ICT infrastructure provided an essential pillar for developing new ICT initiatives (TTICT6; TTICT13; TTICT4).

A noted success for Fast-forward lies in education and community access (TTICT4; TTICT19; TTICT10; TTICT13). According to participants TTICT4 and

TTICT19, this area of success for fast-forward provided a platform that built nationwide computer literacy skills for all ages. Participant TTICT13 further suggested that Fast-forward's platform created easy access to information for the population as a whole and school children in particular.

Nonetheless, TTICT21, TTICT13, TTICT5 suggested that despite spending 69% of the total ICT expenditure for the fiscal period 2002 to 2008, 9 of the top 10 ICT projects focused on internal government efficiency. Participants TTICT13 further indicated that projects such as enterprise-wide applications provided the main focus for fast-forward with very little emphasis on customer-centric services. Participant TTICT12 suggested that this led to a perception of fast-forward as ineffective notwithstanding the fact that government placed greater emphasis on leveraging ICT. Participant TTICT13 suggested that fast-forward's primary focus remains that of connectivity as articulated by the national ICT plan of 2003.

Theme 2: Effective government and service delivery. Effective service delivery is a core deliverable for governments. The central objective of public service is providing essential, efficient, and effective services to the public (TTICT2). According to the T&T public sector surveys of 2004 and 2008 that were conducted by MPAI, the public service in T&T has maintained an unsatisfactory rating from the public accessing its services riddled with poor employee satisfaction (TTICT18). The public sector modernization program of MPAI 2004-2008 proposed mechanisms to enhance the channels through which citizens access services made available through ICT adoption, in response to the results of reflected of the MPAI's 2008 public sector survey (TTICT19).

A citizen-centered approach to the delivery of public information and services remains essential for satisfying the public's increasing expectations and demands (TTICT20). The ICT service delivery agenda as defined by MPAI's strategic plan refers to a philosophy of continuous improvement premised on the evolving technologies designed to leapfrog other existing developing countries (TTICT6).

Two participants stated that a pivotal concern for the government of T&T is in enhancing its citizens' access to government information and services (TTICT15; TTICT17). The Cabinet of the government of T&T on August 17th, 2006 approved in principle the TTServe initiative as conceptualized by MPAI and its partner ministries and agencies to improve service delivery efficiency (TTICT15). In practice, TTServe was described as providing convenient channels accessing government information and selected services such as applying for a electronic birth certificate and a government house (TTICT15). Additionally, TTServe was cited as having improved service delivery, customer satisfaction, and keep citizens better informed on all matters related to Government activities (TTICT16). TTServe was also described as having reduced long waiting lines at traditional ministry counters, reduced traffic and parking congestion in urban centers, and improved the image of the public service (TTICT20). The net effect of TTServe was also described as having brought government closer to communities and as having created a model for future cross-ministerial collaboration (TTICT15; TTICT22).

Cabinet documents from the archives of MPAI show that TTServe was expected to provide over-the-counter information and selected services to the public by using

information and forms available online through the e-government portal. These documents further showed that MPAI expected to increase the number of services offered by TTServe, with an ultimate goal of enabling online e-government transactions for the citizens of T&T. TTServe centers provided additional public access options to government information and services at enhanced business hours and improved customer service resulted in improved levels of satisfaction with services provided by the government of T&T (TTICT21).

In 2007, the government rebranded TTServe and relaunched as ttconnect (TTICT21). Positioned as a vehicle for multichannel service delivery, ttconnect, a major ICT initiative of T&T's government, comprise several separate initiatives (TTICT21). According to TTICT13, TTICT15, and TTICT21, the ttconnect Online hosted over 400 public-facing government services and resources, six ttconnect service centers in Trinidad, one in Tobago, and five ttconnect self-serve computer centers provided for public use. The ttconnect online recorded over 2 million visitor hits since the launched of the government portal (TTICT13; TTICT21). The service centers and kiosks operated as one-stop destinations offering convenient access to available government services (TTICT18; TTICT19). Popular services at ttconnect included the application for first birth certificates, home improvement grants/subsidies, beneficiary-owned land subsidy, scholarships, training programs, and government employment (TTICT18; TTICT19).

In 2008, the government of T&T instituted plans to expand the existing network of service centers and kiosks, and increase the number of services and delivery channels (TTICT18; TTICT19). The latter would include the delivery of government services on

ttconnect Express (service centers on buses), the ttconnect mobile, and a ttconnect hot line (TTICT18). The ttconnect online also provided government to citizens (G2C) and government to businesses (G2B) e-services even though most e-services provided mainly information (TTICT1). Additionally, the Ministry of Energy and Energy Industries launched the energy data hub to streamline the interaction between government and the energy sector (TTICT1). The government developed an e-services road map to drive e-services to higher levels of automation that focused on feasibility assessment intended to launch new services (TTICT2).

Theme 3: E-legislation. The key agenda initiative and focus of the strategic plan of MPAI include legislative and policy changes required as part of the evolution toward a knowledge-based economy according to TTICT1. The legal and policy initiatives include deregulation of the telecommunications industry, electronic information handling rules, and citizen privacy and security (TTICT3; TTICT7). The national ICT plan of T&T required significant legislative changes, prioritization, and reformation of specific legal statutes to support an electronic agenda (TTICT14). A clear legislative agenda creates the protection and confidence for businesses, consumers, and employees to benefit from of the new prospects offered by e-commerce (TTICT12). The lack of legal and regulatory frameworks created an impediment against the implementation of ICT initiatives by the government with no guarantee of privacy of information, electronic documents, and digital transaction enjoying legal security (TTICT22).

In November 2007, the government of T&T split the Ministry of Public Administration and Information into two distinct ministries, the Ministry of Information

(MOI) and the Ministry of Public Administration (MPA). The Ministry of Public Administration (MPA) retained oversight for ICT. In 2008, two separate but connected pieces of companion legislation arrived before T&T's parliament, the data protection and electronic transactions Bills by the MOI and MPA respectively (TTICT22). Each piece of legislation required accompanying regulations for compliance such as the data protection bill (TTICT20). For example, the governance mechanism for the data protection bill, which includes establishing a data commissioner's office that monitors data transactions, provide regulatory guidance, and conduct arbitration when disputes arise (TTICT4; TTICT7). The electronic transaction bill also required amendments to the exchequer and audits act require giving effect to electronic transactions for government services (TTICT16). Additional legislative initiatives include amendments to the telecoms act, the passage of a cyber crime act, and giving full effect to the data protection and electronic transaction (TTICT6; TTICT8; TTICT10).

Theme 4: E-infrastructure and e-readiness. For developing economies like T&T, e-infrastructure and e-readiness are important ICT indicators for economic, competitive advantage in the global arena (TTICT12). For citizens of developing economies, such as T&T, ICT provides a major empowering tool base on its capacity to deliver access to information, services, and social interaction multiple devices (TTICT22). A closer review of ICT opportunities of T&T required an understanding of the state of e-readiness (TTICT14). The MPA conducted an e-readiness assessment in 2008 that provided a synopsis of the present state of ICT in T&T and explored the conduciveness of the environment to support on going ICT development (TTICT11;

TTICT19). The indicators used by MPA to access the state of e-readiness of T&T include ICT availability and usage by individuals, businesses, and government (TTICT8; TTICT10). In addition, ICT companies and manpower capabilities, policies and legislation supporting ICT development represent other indicators used by MPA to access the state of T&T's e-readiness environment (TTICT4; TTICT5).

Participant TTICT5 explained that the global ICT report of the World Economic Forum (2013) indicated that T&T has an established and effectively regulated telecommunications infrastructure. Asogwa (2013) presented research, which supports the new paradigm of the effects of ICT on developing economies as the cornerstone of government operations. The World Bank Group (2012b) reported that ICT constitute an integral part of the development strategy for emerging economies in an era of increasing globalization. Participant TTICT4 further suggested that T&T's ICT infrastructure represented an area of success in the national ICT strategy that received positive reviews, and a key indicator of ICT's integration in T&T's development strategy.

Theme 5: Public sector workplace productivity. A central theme related to the results of this doctoral study is the impact of ICT on public sector workplace productivity. The data collected by Market and Opinion Research International Caribbean Limited in February 2010 contracted by MPA, described the public service as: delivering poor service (53%), slow (49%), corrupt (33%), unsatisfactory (31%), impolite (27%), inadequate (18%), unaccountable (14%), and efficient (11%) (TTICT6). The intent of the government backbone resided in its ability to improve the productivity, competency, and usefulness of government services and its officers (TTICT2; TTICT5).

Increased ICT adoption and application to business processes resulted in several ministries and departments automating some of their processes designed to improve service delivery (TTICT17). The government communication backbone govnett.gov.tt provided an intra-government secure network that enabled all connected government agencies to communicate and share information (TTICT20).

The communications backbone provided all public sector agencies with key services, such as Internet access, e-mail services, video conferencing, e-messaging and scheduling, antivirus protection, and access to a dedicated help desk (TTICT6). The backbone also enabled selected government agencies with the ability to automate many traditional work processes using enterprise wide software applications (TTICT13; TTICT19). The effect of automating traditional work practices resulted in increased productivity, reduced customer-waiting time, and increased efficiency for selected government services (TTICT12; TTICT17). The enterprise applications included electronic document management system (EDMS) that assist the organization of cabinet notes at the Prime Minister's and the offices of permanent secretaries across all ministries (TTICT13). Other enterprise applications included integrated human resources information system for delivery of HR services to public officers, Protax for implementing property tax, and government payroll system for management of the government payroll (TTICT13).

The government backbone provided an additional opportunity to increase public sector workplace productivity by offering ministries new services such as Internet protocol telephony and videoconferencing using voice-over IP technology (TTICT1). A

common term that emerged from 60% of participants referred to 'joined up' government. The term 'joined up' government, as defined by TTICT11 refers to a broad public service transformation agenda that uses electronic service delivery. Further, TTICT19 also suggested that joined up government included shared back-office enterprise wide solutions that included human resource management, document management, and payroll administration. Developing public sector transformation agenda premised on an ICT service delivery platform contributed to addressing workplace productivity and service delivery efficiency (TTICT4; TTICT10).

The development of joined up government through ICT adoption resulted in an attempt to increase workplace productivity through shared enterprise services and new access options for citizens to government information and services (TTICT20). New access options to government information and services via ttconnect, allowed government a more effective framework of communication across government and with citizens (TTICT15). Government now finds itself closer to its citizens via ttconnect, which effectively connect government to people through ICT services accessed through a multichannel platform (TTICT1). Information and Communication Technology presents a transformational and enabling tool that facilitated a multichannel delivery of information and citizen centric access to services by government T&T (TTICT15). An enabling ICT environment further provided increase operational efficiency and modernize systems through reengineer business processes, which contributed to new opportunities for increased public sector workplace productivity (TTICT2).

Theme 6: Social and economic development through ICT adoption. This

theme identified the results of this doctoral study on the effects of ICT adoption on the social and economic development of T&T. The government of T&T recognized the capacity of ICT to positively impact all aspects of social and economic life, and provided the public service with the possibility of new responses to social and economic issues (TTICT17). These social and economic issues include poverty alluviation, employment oppotutnities, education, and social justice (TTICT7). To increase the competitive of T&T in today's connected world, the government sort to find innovative ways to convert information into knowledge, which provided a framework to increase T&T's national and economic competitiveness (TTICT22). A framework of the national ICT plan of T&T supports the premised that information and knowledge management are central aspects of productive and commercial activity (TTICT22). Governments of emerging economies such as T&T identified knowledge management and brokered as an increasing important component for sustainable economic development through interconnectedness (TTICT7).

The consequence of the evolving technological agenda and the cost of not participating in it remained high for developing economies such as T&T (TTICT3). The widening gap between connected and less connected economies, coupled with the increasing cost and difficulty of closing the connected gap presents an ongoing challenge to T&T (TTICT7). The integrated use of ICT tools, informatics, and systems support the adoption of technology skills resulting in the potential increase in the rate of national development goals (TTICT16). The national ICT plan of T&T provided the government with a blueprint of how to use knowledge management as a core ingredient of its social agenda promoting sustainable human development (TTICT3). The government of T&T,

as did other CARICOM countries, set poverty reduction through education as one of its main development goals (TTICT20). Further, ICT featured prominently in education with all 360 primary schools connected via high-speed Internet under the schoolnet program (TTICT4). Additionally, the librarynet program equipped all public libraries with computers connected to free high-speed Internet (TTICT8). These interventions provided an outline for both the social and economic growth of T&T's national ICT plan.

Theme 7: Development of ICT governance structures and performance measurement framework. In September 2009, new governance and performance measurement structures designed by MPAI resulted in establishing the National Information & Communication Technology Company Ltd (iGovTT) and delegated responsibility for executing government's ICT strategies and programs (TTICT1). The collaborative development of government enterprise wide ICT programs across all ministries and agencies remain the domain of iGovTT (TTICT9). Establishing iGovTT made it necessary to develop new governance structures to facilitate the successful implementation of the national ICT plan (TTICT2). These new governance structures comprised of ministerial level steering committee as well as tactical collaboration between iGovTT and respective ministries (TTICT8). Implementing ICT projects based on the revised governance structures meant that ministries' owned their projects, but required technical implementation and managerial support from iGovTT (TTICT5). However, enterprise wide projects that covered all government agencies and ministries remained the responsibility of iGovTT for implementation and management (TTICT21). The ministerial steering committee monitored the implementation of the national ICT

plan and enterprise wide government programs, established performance indicators, and facilitated the development government's ICT agenda (TTICT4).

Theme 8: Enabling competitive business. The business community in T&T maintained a consistent aggression towards ICT adoption more so than the public sector where local ICT professionals upgraded their skills based on the increasing demands for competitive business advantage (TTICT6). However, the perception persists that notwithstanding the aggression of T&T's business community in adopting new ICT tools, the use of the Internet not for business-to-business or business-to-consumer transactions remained under developed (TTICT7). The responses of six participants supported the view that businesses could make more resourceful use of technology for business-to-consumer transactions. Four respondents supported the view that the business community could make more effective use of ICT for business-to-business transactions.

However, four respondents suggested that the failure of the business community's desire to widen its use the Internet lies in the lack of legislative support to regulate and protect e-commerce. Participant TTICT13 expressed the view that the failure for the under developed use of the Internet lies with the T&T's government and not the business community based on the lack of legislation and incentives. A possible reason behind the low adoption of the Internet driven interaction by businesses revolved around the lack of access to computers or broadband high-speed Internet services by customers (TTICT7). Additionally, the government's inability to implement new legislation that facilitated electronic transaction, e-payments, data transaction, and security meant that businesses saw little benefit in providing services online (TTICT22). This lack of legislative and

regulatory framework discouraged the proliferation of online business services as well as government's inability to demonstrate greater levels of urgency in encouraging businesses to leverage ICT more effectively (TTICT18).

The e-business roundtable represent a successful private sector driven public, private partnership established to assist with ICT transformation as identified in the national ICT plan of 2003 and established in 2006 (TTICT1). The contribution of the e-business roundtable included developing the national e-business policy and hosting the first national ICT business and innovation symposium in 2008 (TTICT7). The Ministry of Trade and Industry's trade facilitation tool of a single electronic window provides T&T with a trade competitive business advantage over other Caribbean countries (TTICT20). The SEW provides a standardised approach, which increases trade operational efficiency, transparency of government services such as customs and excise, improved revenue, and an expedited trade facilitation process (TTICT18). The establishment of the National Payments Council and developing an e-payments strategy in T&T's Central Bank provided the foundation for T&T's e-commerce framework further boosting the island's business competitiveness environment TTICT1).

The government of T&T recognised that ICT represent a potential tool to not only assist in diversifying the economy through the emergence of a vibrant ICT industry, but enable growth in other industries (TTICT13). A special purpose government owned company eTecK led government's thrust to drive ICT sector development and attract ICT investment (TTICT5). One of eTeck's major projects focused on developing the Tamana In-Tech Park, a science and technology park that includes an ICT cluster (TTICT8). The

government of T&T supported eTecK's effort by offering an incentive program to attract multinational companies with leading edge technologies to locate their offices at the Tamana Park (TTICT2). The government anticipated that additional multinational companies using cutting edge ICTs provides increased opportunities for knowledge brokering and technology transfer to local ICT practitioners (TTICT3).

Theme 9: International benchmarking and competitiveness. International benchmark provided T&T with useful indicators of how its performance progressed compared to other countries (TTICT7). Multinational corporations often use international benchmarks to establish the business case and analyse the investment climate in developing economies such as T&T (TTICT22). The WEF (2013) analysis of the ICT landscape and e-readiness position across developing countires showed that T&T made positive strides in the 2008 survey (TTICT2). However, the WEF (2013) analysis showed that notwithstanding T&T's improment on its e-government readiness index of 0.4768 in 2005 to 0.5307 in 2008, room for improvement still exist (TTICT2). The ranking of T&T by WEF 2009 – 2013 shows that T&T ranked 86th, and lagged behind other Caribbean countries such as Barbados (36th) and Jamaica (53rd) (TTICT5). Notwithstanding the WEF reanking, T&T's networked readiness index improved from 3.55 in 2006-2007 to 3.67 in 2009-2012 (TTICT7).

The World Bank Doing Business Report (2011) covered 10 indicator sets in 183 countries and provided a quantitative measure of regulations that applied to small and medium-size enterprises in T&T (TTICT10). These World Bank (2011) indicators include registering a business, applying for construction permits, recruitment of human

resources, land tax regislation, accessing venture capital, investment protection, tax remittance, and foreign currency exchange control (TTICT18). Data collected by the World Bank resulted from an executive opinion survey (the Survey) administered to over 12,000 business leaders across 134 economies in 2010 (TTICT7). Surveyed data collected included transparency of the legal framework, the quality of education, T&T's government's plan for ICT, and the extent to which government prioritized ICT in its national agenda (TTICT20). Benchmarking T&T's ICT performance with other countries provided necessary indicators and an understanding of ICT progress in T&T comparative to other countries (TTICT5).

Theme 10: Enabling environment for ICT. Developing a vibrant ICT sector for T&T requires an enabling environment, with available and capable resources, and supporting legislation and policies (TTICT13). The growth in the ICT sector remains largely driven by demand from the user sectors and with the government of T&T as the largest consumer where ICT imports far exceeds exports (TTICT21). In ICT manpower capabilities, TTICT10 suggested that it takes from four to eight weeks to hire qualified IT professionals to fill a vacant ICT position in T&T. Participant TTICT8 indicated that sufficient domestic ICT manpower exist to support T&T's current ICT environment but the current levels of domestic ICT resources were insufficient to support overseas companies investing in T&T. The current ICT environment demand that the government perform a primary function in driving demand for ICT goods and services, including the energy sector and financial services (TTICT5). Participant TTICT2 suggests that to

stimulating growth of ICT sector, programs targeted at getting smaller companies to adopt ICT via an enabling environment remains critical.

Ahmed (2010) noted the preponderance of technology and its availability resulted in an increase in adoption rates in developing countries with a corresponding increased in the levels of productivity. The literature review corresponds with the discovery from this research in the application of the national ICT plan of T&T and its ubiquitous deployment across T&T's public sector and its impact on productivity. Pollitt (2011) explored the changes in ICT such as the growth of the Internet and its pervasive influence on the modernization process of public services. The pervasive influence of ICT on public sector modernization are consistent with the findings of this doctoral study through developing an enabling ICT environment for public service delivery as noted by Pollitt (2011). Brown and Thompson (2011) presented the results of their inquiry into e-government procedures and programs that support the e-legislation focus for developing countries such as T&T confirmed by the findings of this study. Ifinedo (2012) presented research, which the findings of this study supports which indicates that for developing economies such as T&T, availability of ICT infrastructure creates a positive correlation to e-government, competitiveness, and e-services. The opportunity to leapfrog developed economies as noted by Goldemberg (2011) position developing countries like T&T to reduce the costs of investment in ICT infrastructures. Goldemberg noted further that developing economies realised reduction in ICT investment cost after adopting advanced and established technologies from industrialized nations, confirmed by the finding of this doctoral study.

Asogwa (2013) presented research supporting the findings of this doctoral study suggesting that Nigeria, consistent with developing economies such as T&T, developed its ICT strategy and infrastructure to enhance public sector productivity and efficiency. Asogwa provided further corroboration to the finding of this study by suggesting that Nigeria's e-government's program would enable higher levels of productivity, service delivery, economic growth, and competiveness. Seymour and Naidoo (2013) presented research suggesting South Africa, like T&T, viewed its broadband rollout as a catalyst for development of its social, economic, knowledge economy, and access to innovative forms of online education. Another theme emanating from the findings of this study focused on ICT as an avenue to increase productivity and empowerment, reduced stress, and opportunities to work from home via Internet access (Seymour & Naidoo, 2013). Further, the results of this doctoral study found synergy in research presented by Seymour and Naidoo (2013) lies in ICT adoption that, in South Africa as in T&T, demand for broadband Internet outstrips ICT adoption.

The findings of the doctoral study support the inclusion of the conceptual framework incorporated into this research. The conceptual framewrok outlined the process of technology acceptance and adoption namely perceived use requiring minimal effort, apparent workstream value, and behavioral intention of technology adoption (Basri & Sulaiman, 2012). Dimelis and Papaioannou (2010) explained that for developing and developed countries, telecommunications liberalization resulted in an increase in the speed of communication, a decrease in its cost for customers, and an increase in efficiency. The use of TAM as the conceptual framework supported the results of this

doctoral study in the areas of technology acceptance and its impact on public sector technology (Asogwa, 2013). The implementation of the national ICT plan of T&T via the enterprise wide public sector programs demonstrates TAM's relevance in the public sector workplace on user acceptance, perceived value, and behavioral intention. The implementation of ttconnect, single electronic window, librarynet, protax, and fast-forward initiatives highlighted the growing acceptance of ICT and it's importance to positively impacting productivity in the public sector workplace through increased perceived value.

Pickernell et al. (2013) provided research that aligned with several themes developed in this study associated with ICT and business development, e-commerce, ICT skills capacity development, and ICT usage and adoption. Pickernell et al. (2013) suggested in their research that while ICT adoption among businesses varied, utilization of ICT carried long-term expectations rather than short-term that determine the investment level. The research presented by Pickernell et al. (2013) supports the findings of this doctoral study as they both concluded the necessity for ICT in several sectors, including the public sector, remains acute and increasing exponentially. Sharma and Baoku (2013) suggested through their research that recent development in ICT provides an increasing avenue for customer interface, interaction, feedback, and access. The research presented by Sharma and Baoku (2013), suggested that in the private and public sectors relationship management and effective customer communication enjoy a new boost through ICT adoption and implementation. However, Samah, Shaffril, Hassan, and Jeffrey (2011) argued the opportunity cost of technology resources engaged in bridging

the digital divide may lead to neglect of other development priorities. Moreover, Pipe (2010) expressed concerns regarding the whole scale appropriation of ICT initiatives generated in developed countries by developing econimies. Pickenell et al. (2013) presented research suggesting ICT adoption remains a catalyst for change in developing economies such as T&T, but a work in progress consistent with the findings of this doctoral study.

Applications to Professional Practice

Developing economies, such as T&T leveraged ICT as a catalyst for transforming their countries towards sustainable socio-economic development (Asogwa, 2013). The 10 themes identified via data analysis suggest that T&T's government envisioned technology as an instrument to enhance government's workplace productivity and service delivery. The information provided in this study highlights the plans, strategies, and implementation framework undertaken by the government of T&T from 2001 – 2010 to connect citizens to government. The data presented further indicates that ICT provides applicable tools to assist in modernizing the public service through a joined up shared service approach to efficiencies in-service delivery that impacts public sector workplace productivity. Public and private sectors leaders in developing economies require example of countries such as T&T to note how governments develops its ICT plans and apply it to national development agendas.

The information provided in this doctoral study creates a context to outline aspects of the national ICT journey of T&T's as it applies to public sector workplace productivity and competitiveness. This information provides useful data to public sector

managers on the structures and strategies on ICT governance, e-legislation, e-readiness, international benchmarking, enabling environment for ICT, and ICT driven business competitiveness. The information presented points to the increasing application and adoption of ICT tools in government and businesses through enhancement of ICT infrastructure. The unique transformation experience of T&T's public service delivery to citizens and businesses through multichannel access and utilization of ICT investments provide learning experiences for future research. The impact of ICT on economic and social sectors based on knowledge management, provide additional learning opportunities for public and private sector leaders.

The utility of the information presented in this doctoral study contributes to the range of information in areas such as public sector workplace productivity and service delivery, competitiveness of developing economies, and ICT adoption. This study adds information that applies specifically to the Caribbean context that expands the body of knowledge on T&T as a developing economy in particular and CARICOM as a whole. The information in this study also assists in providing relevant data that identifies contributing factors that support developing, implementing, and adopting ICT for developing economies states such as T&T. Areas such as e-readiness, e-legislation, and shared ICT services platform provide suggested topics for application.

Implications for Social Change

The national ICT plan of T&T emerged with the national development plan that focused on sustainable economic and social development for all citizens. The information presented in this doctoral study focused technology's impact on

government's workplace productivity and competitiveness of T&T. The national ICT plan concentrated on creating opportunities to improve the quality of lives of the population of T&T. The ICT sector provided new opportunities for poverty reduction, sustainable employment options in a developing ICT sector, and accelerating human development achieved by education and health care services supported by ICT. The emergence of a new economy for T&T built on a platform of knowledge management focused on people centered development, which provided a framework for social change through ICT adoption.

The national ICT plan facilitates access to information and social services, particularly education and health care that contributes to poverty eradication and social justice for financially disadvantaged group. Additionally, ICT facilitates effective participation in government consultation on all key issues affecting the quality of lives of citizens as well as issues relevant to them. The information presented in this doctoral study makes the case for easy and affordable access to broadband high-speed Internet service, and ICT resources and skills needed to participate effectively as a digital citizen. The social change implication of this doctoral study argues for social inclusion of all citizens of T&T, which include rural areas, differently abled persons, low-income households, and socially challenged groups. Online access to government goods and services allows citizens who found it hitherto difficult to connect to government and access its services able to do so effectively. The implication for social change lies in the areas of digital inclusion as a new threat to the existing social order while promoting ICT literacy and online protection based on binding legislative and regulatory framework.

Recommendations for Action

As national ICT plan of T&T moves its focus away from connectivity to usage and uptake, citizens and local organizations need to evolve from being users to knowledge managers. The government would continue to play a leadership role in creating a service delivery platform that drives transformational changes for adoption of ICT by public sector, private sector, and citizens. The new platform requires completing all outstanding T&T national ICT initiatives ranging from infrastructure to legislation and the creation of a viable ICT industry sector. According to Goldemberg (2011), T&T's leaders in government for its ICT agenda, possesses the opportunity to leapfrog other developing or developed economies based on the rapidly evolving ICT tools. However T&T, like other developing economies, must remain committed to leveraging ICT as a competitive advantage in this digital age (Heeks, 2010). The following recommended areas provide the context and steps required for the next phase of the national ICT plan of T&T.

Alignment to the national development policy. The results of the research for this doctoral study indicated that in leveraging ICT, the government of T&T positioned itself to serve citizens and businesses, and increased public sector workplace productivity and international business competitiveness. Moreover, 80% of the respondents supported the outcome of this doctoral study in the effects and use of ICT for T&T's national development, public sector workplace productivity, and international competitiveness. Additionally, ICT offer tools designed to meet the needs of e-government, which could potentially advance the utility of public administration and government's commitment to

the public (Borisov & Barbulescu, 2012). Ojo (2009) indicated that the global framing of ICT as a panacea for underdeveloped countries underpins a flawed concept even if evidence suggests the possibility that ICT-based economies thrive. A total of 20% of respondents share the view that the implementation of T&T's national ICT strategy did not materially effect the delivery of public services, workplace prodcutivity, or T&T's international competitiveness. The recommendations focused on providing affordable and accessible ICT and Internet services to eradicate the digital divide from the T&T national landscape. Affordable Internet access would assist in poverty reduction, social inclusion, and access to new forms of education opportunities.

The national ICT plan requires periodic review to remain relevant, given the pace of ICT evolution and the pace of ICT uptake, usage, and incorporation. Moreover, the national ICT plan demand urgent attention by senior policy makers and consistent implementation by senior public sector technocrats. Further, based on the established ICT infrastructure, public sector leaders may use the available technology to increase service delivery beyond information to end-to-end transactions in keeping with national priorities. Additional opportunities resided in establishing ICT industries, which formed a part of eTech's mandate and remains an outstanding area identified for development in T&T during the next national ICT phase 2015 – 2020. Ultimately, collaboration across all government agencies and ministries, focused leadership, clearly articulated plans, and an apolitical approach to ICT in T&T constituted immediate prerequisites that propelled T&T towards ICT supported development.

Uptake and usage. As a small developing economy, the next stage of ICT

development in T&T's effort to adopt ICT for increased public sector workplace productivity lies in uptake and usage to maximize the use of the e-infrastructure. Therefore, moving beyond connectivity to services, premised on completing the e-legislative agenda, may allow T&T to take advantage of its e-infrastructure as the next phase of ICT development. From 2002 – 2010, the T&T national ICT framework centered on centralizing the governance arrangement for implementing fast-forward initiatives, connectivity agendas, and enterprise wide programs. Further to the results of this doctoral study, the centralization of T&T's ICT initiatives would reduce duplication, streamline priorities, increase investment value, and provide synergies across the public sector by establishing iGovTT. The next phase of ICT development in T&T requires leaders in government to review the governance framework of moving away from centralization and recommit to a recentralization. This move to centralize ICT governance will result in T&T benefiting from economies of scale, and the opportunity to leapfrog developed economies (Goldemberg, 2011). Uptake and usage of ICT by the public and private sectors of T&T demands an articulated, consistent, strategic, committed approach to engendering citizen confidence to ICT acceptance, value, and adoption. The product of uptake and usage supports the government's e-services agenda, and delivers quality e-services by allowing for ease of use, convenience, responsiveness, interactivity, reliability, accuracy, privacy, security, and end to end services.

Bridging the digital divide. The robust connectivity achieved under fast-forward made access to government information and services, provision of computers with Internet access at public libraries, ttconnect, and community access centers, possible and

implemented. Telecomminucation liberalization assisted in providing low-cost, high-speed broadband Internet connectivity for all citizens' island wide and across all demographics. The provision of computers in every home, citizens equipped with the knowledge and skills to effectively harness the full potential of the digital contents, provides an opportunity for social and digital inclusion. This initiative requires urgent emphasis and completion of data privacy, Internet security, computer literacy training, and outreach programs. The ICT literacy training creates an opportunity to empower previously disenfranchised citizens, and encourage participation in the development that facilitates an improvement in the quality of life. The ICT training initiative provides public officers with the knowledge and confidence to showcase the benefits of digital literacy required in embracing ICT to deliver services more confidently and effectively.

E-business road map. Acceleration e-businesses in T&T require the government's continued ICT infrastructure development, its e-Payment systems to include private sector use, and a competitive telecommunications sector. Revision and full implementation of regulations and policies remain a priority for the government of T&T to create a proactive ICT business environment that promotes efficient and secure shopping options, payments, and customer interface. Some of these legislation and regulations include the electronic transactions act, data protection act, establishing a data commissioner and regulations, amendments to the exchequer and audit act for e-payments, and cyber security. Such legislation creates a supportive and enabling e-businesses environment that provides the government with the ability to offer additional services to businesses.

A key prerequisite for effective government to business e-services requires establishing an efficient and effective sharing of business' information amongst government agencies. In the period 2008-2010, the T&T's government began establishing a business hub through a central repository of business' information as a trusted source of essential company and business information with data integrity. Establishing a business hub that creates an opportunity to reduce the timeline, bureaucracy, cost of doing business, and a central data source that provides up-to-date information, which may in turn reduce data duplication and inconsistency.

Recommendations for Further Research

The government of T&T, as a small island developing economy, developed and implemented its national ICT agenda with a stated intention of migrating its operating framework by leveraging ICT tools, programs, and initiatives. The focus of this doctoral study explored ICT's impact on productivity in the public sector workplace of T&T. The findings of this doctoral study revealed other areas for possible research opportunities given the limitations of this research specific to T&T's national ICT plan. An area requiring exploration is in the governance arrangement of the national ICT plan of T&T, and the success or failure of iGovTT. The data specific to T&T's ICT impact on productivity and competiveness proved difficult to obtain and provides an area for future research. This doctoral study provides a context available to future researchers to explore other areas on T&T's national ICT agenda.

The e-service agenda emerged as an important area requiring future research exploration for both the private and public sector. The development of an e-business

service sector, not only in customer service but also in innovative alternatives, remains underdeveloped in the business landscape of T&T. The slow rate of adoption, uptake, and usage of ICT constitute missed opportunities, which may reveal insights through future research into the national context, cultural behaviors, and operating framework for the private and public sectors. An emerging question surrounds the effectiveness of the ttconnect model, and the slow pace of migrating from access to information to that of end-end services. There remain several unexplored areas for future research on T&T's ICT landscape and national agenda emerging from this study that require attention.

Reflections

This qualitative case study exploring ICT's impact on govrenment's workplace productivity and competitiveness of T&T provided an opportunity to explore the government's decision to significantly invest into establishing an ICT platform. Some expressed opinions on national forums created skepticisms, and one article that appeared in a local newspaper entitled *fast-forward to nowhere*. The approach to this study allowed the participants to state their opinion on the questions asked that influenced the outcome and findings of this doctoral study. It became evident the myriad of opinions around the value of the government's investment into ICT and its effect, required focused, unbiased exploration on specific areas to discover the answers to expressed questions. This doctoral study research process also facilitated an opportunity for those involved in developing and implementing the national ICT plan of T&T to reflect on its process, effect, successes, and failures.

Undertaking this doctoral study research came after extensive preparation by faculty, staff, and colleagues throughout this doctoral program that challenged the intent, focus, and preconceived positions held before undertaking the research. The research process further positioned the study in line with existing research that provided another context for reflection. The limited peer-reviewed data on T&T placed further emphasis on the interview process that used 22 participants to ensure data saturation. The research findings create renewed appreciation for the challenges, accomplishments, vision, and learning by those who played a leadership role in developing and implementing the national ICT plan of T&T. The findings also provided new awareness by revealing opportunities that remain available to T&T for future national development in areas of economic diversification, social inclusion, and citizen participation.

The doctoral study process provided me with the tools to undertake this research and to trust the research process as it unfolded. The doctoral process for this study also created an opportunity and a challenge to examine the intention with which I approached the research required for this study, by eliminating predictable outcomes. The additional benefit of colleagues in the discussion room provided useful tips and examples of strategies to adopt, and pitfalls to avoid in undertaking a scholarly journey.

Summary and Study Conclusions

Although T&T made substantial progress in implementing its national ICT plan, and aligned its initiatives to provide an opportunity for increased public sector workplace productivity and national competitiveness, a substantial amount of work remains. The inconsistency in implementation, changes in priorities, lack of alignment, and lack of

focused leadership have reduced the level of success of the national ICT agenda; circumventing its impact, effectiveness, and adoption. However, there is widespread connectivity, established infrastructure, e-legislation that only requires proclamation regulations for full implementation, telecommunication liberalization, multichannel service delivery via the government portal, and a high mobile penetration rate. The new ICT agenda requires alignment to the development of national goals in order to maintain its relevance to citizens, committed and focused leadership, and a one-stop government approach. This ICT agenda provides T&T with an opportunity to reduce government's operating cost, increase service efficiency to citizens, productivity in the public sector, and creates social and digital inclusion through a competitive business environment.

As T&T strives to develop a competitive and vibrant ICT industry with skilled ICT professionals and modern ICT infrastructures, it creates an expectation that this would provide significant support to develop an innovative business economy. The ICT strategies required by T&T include the need for effective communication and process reengineering, transformational leadership and executive commitment, and sustainable social and economic changes to develop the delivery of public services. This development initiative requires T&T to commit to efforts channeled toward developing policies and implementation of programs to alleviate the costs of doing business online, promote healthy competition, support networking, and alliances. Digital inclusion assists not only in creating an environment for increased e-commerce, but also reduces the situation of poverty and social injustice in T&T. All citizens of T&T should have easy

and affordable access to ICT, and resources and skills needed to participate effectively as digital citizens.

References

Abbad, M., Abbad, R., & Malik, S. (2011). Limitations of e-commerce in developing countries: Jordan case. *Education, Business and Society: Contemporary Middle Eastern Issues*, *4*(4), 280-291. doi:10.1108/17537981111190060

Adriaanse, A., Voordijk, H., & Dewulf, G. (2010). Adoption and use of interorganizational ICT in a construction project. *Journal of Construction Engineering & Management*, *136*(9), 1003-1014. doi:10.1061/(ASCE)CO.1943-7862.0000201

Ahmed, E. M. (2010). Human capital and ICT per capital contribution to East Asian productivity growth. *International Social Science Review*, *85*(1), 2. Retrieved from http://www.pigammamu.org/international-social-science-review.html

Ahmed, E. M. (2011). Assessing the impact of ICT and human capital impact on productivity of ASEAN-5 economies. *Journal of Global Management*, *1*(1), 23-36. Retrieved from http://globalmj.eu/

Ahn, M. J., Hajela, A., & Akbar, M. (2012). High technology in emerging markets. *Asia-Pacific Journal of Business Administration*, *4*(1), 23-41. doi:10.1108/17574321211207953

Al-Huan, O. (2012). Toward the utilization of M-government services in developing countries: A qualitative investigation. *International Journal of Business and Social Science*, *3*(5), 155-160. Retrieved from http://www.ijbssnet.com/update/

Alomari, M., Woods, P., & Sandhu, K. (2012). Predictors for e-government adoption in Jordan. *Information Technology & People*, *25*(2), 207-234.

doi:10.1108/09593841211232712

Alsumidaie, M. (2012). Clinical research in the new economy. *Applied Clinical Trials*, *21*(12), 10-11. Retrieved from http://www.appliedclinicaltrialsonline.com/

Arasaratnam, A., & Humphreys, G. (2013, January). Emerging economies drive frugal innovation. *Bulletin of the World Health Organization*, *91*, 6-7. Retrieved from http://www.who.int/bulletin/volumes/91/1/13-020113/en/

Askim, J., Fimreite, A. L., Moseley, A., & Pedersen, L. H. (2011). One-stop shops for social welfare: The adaptation of an organizational form in three countries. *Public Administration*, *89*(4), 1451-1468. doi:10.1111/j.1467-9299.2011.01933.x

Asogwa, B. E. (2013). Electronic government as a paradigm shift for efficient public services. *Library Hi Tech*, *31*(1), 141-159. doi:10.1108/07378831311303985

Avgerou, C. (2010, Fall). Discourses on ICT and development. *Information Technologies & International Development*, *6*(3), 1-18. Retrieved from http://itidjournal.org /index.php/itid

Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. *MIS Quarterly*, *35*(4), 831-858. Retrieved from http://www.misq.org/

Bannister, F., & Wilson, D. (2011). O(ver)-government? Emerging technology, citizen autonomy and the regulatory state. *Information Polity: The International Journal of Government & Democracy in the Information Age*, *16*, 63-79. doi:10.3233/IP20110225

Barlow, C. (2010). Interviews. In A. J. Mills, G. Durepos, & E. Wiebe (Eds.),

Encyclopedia of case study research (pp. 496-500). Thousand Oaks, CA: Sage. doi:10.4135/9781412957397.n182

Barnes, S. J., & Pressey, A. D. (2011). Who needs cyberspace? Examining drivers of needs in second life. *Internet Research*, *21*(3), 236-254. doi:10.1108/10662241111139291

Basri, W. S., & Sulaiman, M. (2012, February). Factors affecting information communication technology acceptance in public organizations in Saudi Arabia. *International Journal of Computer Science and Information Security*, *10*(2), 118-139. Retrieved from http://www.cscjournals.org/journals/IJCSS/description.php

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *Qualitative Report*, *13*(4), 544-559. Retrieved from http://www.nova.edu/ssss/QR

Berman, S., & Korsten, P. (2013). Embracing connectedness: Insights from the IBM 2012 CEO study. *Strategy & Leadership*, *41*(2), 46-57. doi:10.1108/10878571311318240

Bontis, N., Richards, D., & Serenko, A. (2011). Improving service delivery. *The Learning Organization*, *18*(3), 239-250. doi:10.1108/09696471111123289

Borisov, D., & Barbulescu, G. (2012, September). A statistical outlook on the development of E-government and digital divide in Romania. *Management Research and Practice*, *4*(3), 46-56. Retrieved from http://mrp.ase.ro/

Bowen, G. A. (2010). From qualitative dissertation to quality articles: Seven lessons learned. *Qualitative Report*, *15*(4), 864-879. Retrieved from http://

www.nova.edu/ssss/QR

Boyle, T. A., Scherrer-Rathje, M., & Stuart, I. (2011). Learning to be lean: The influence of external information sources in lean improvements. *Journal of Manufacturing Technology Management*, *22*(5), 587-603. doi:10.1108/17410381111134455

Brown, D. H., & Thompson, S. (2011). Priorities, policies and practice of e-government in a developing country context: ICT infrastructure and diffusion in Jamaica. *European Journal of Information Systems*, *20*, 329-342. doi:10.1057/ejis.2011.3

Bussell, J. (2011). Explaining cross-national variation in government adoption of new technologies. *International Studies Quarterly*, *55*(1), 267-280. doi:10.1111/j.1468-2478.2010.00644.x

Campbell, C. S., Maglio, P. P., & Davis, M. M. (2011). From self-service to super-service: A resource mapping framework for co-creating value by shifting the boundary between provider and customer. *Information Systems and eBusiness Management*, *9*(2), 173-191. doi:10.1007/s10257-010-0142-4

Candace, A. M., & Williams, C. (2010). National institutions, entrepreneurship and global ICT adoption: A cross-country test of competing theories. *Journal of Electronic Commerce Research*, *11*(1), 73-91. Retrieved from http://www.csulb.edu/journals/jecr/

Caribbean Community Secretariat. (2010**)**. *Revised Treaty of Chaguaramas establishing the Caribbean Community including the CARICOM single market and economy* [White paper]. Retrieved from http://www.caricom.org/jsp/community/revised_treaty-text.pdf

Carlyle, C. (2012). Retail space in the future: How technology has changed the way we shop. *Real Estate Issues*, *37*(2-3), 38-41. Retrieved from http://www.cre.org/publications/rei.cfm

Central Bank of Trinidad and Tobago. (2010). *Economics statistics of Trinidad and Tobago* [White paper]. Retrieved from http://www.central-bank.org.tt/content/economic-statistics

Conway, D., & Timms, B. F. (2010). Re-branding alternative tourism in the Caribbean: The case for 'slow tourism.' *Tourism and Hospitality Research*, *10*(4), 329-344. doi:10.1057/thr.2010.12

Cortés, E. A., & Navarro, J. A. (2010). Do ICT influence economic growth and human development in European Union countries? *International Advances in Economic Research*, *17*, 28-44. doi:10.1007/s11294-010-9289-5

Cromer, C. (2010, August). Understanding Web 2.0's influences on public e-services: A protection motivation perspective. *Innovation: Management, Policy & Practice*, *12*, 192-205. doi:10.5172/impp.12.2.192

Curzi, Y., & Rosana, S. R. (2012). Bridging rigour and relevance. *International Journal of Organizational Analysis*, *20*(1), 82-94. doi:10.1108/19348831211215678

Davis, F. D., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: Comparison of two theoretical models. *Management Science*, *35*(8), 982-1003. Retrieved from http://mansci.journal.informs.org/journal/mnsc

Dimelis, S. P., & Papaioannou, S. K. (2010). FDI and ICT effects on productivity growth: A comparative analysis of developing and developed countries. *European Journal*

of Development Research, *22*(1), 79-96. doi:10.1057/ejdr.2009.45

Drzeniek, M., Mia, I., & Herrea, E. T. (2009). *Measuring the competitiveness of selected CARICOM countries: The findings of the Global Competitiveness Review 2009-2010* (Discussion Paper No. IDB-DP-166). Retrieved from http://idbdocs.iadb.org/

Elmorshidy, A. (2013, March-April). Applying the technology acceptance and service quality models to live customer support chat for E-commerce websites. *Journal of Applied Business Research*, *29*(2), 589-595. Retrieved from http://www.cluteinstitute.com/journals/journal-of-applied-business-research-jabr/

Farrington, T., Crews, C., & Blenkle, J. (2013, January-February). IRI 2038: Envisioning the future of R&D. *Research Technology Management*, *56*(1), 58-59. Retrieved from http://www.iriweb.org/

Feller, J., Finnegan, P., & Nilsson, O. (2011). Open innovation and public administration: Transformational typologies and business model impacts. *European Journal of Information Systems*, *20*, 358-374. doi:10.1057/ejis.2010.65

Fitzgerald, M. (2013). Sensing the future before it occurs. *MIT Sloan Management Review*, *54*(3), 1-5. Retrieved from http://sloanreview.mit.edu/

Fonseca, C. (2010). The digital divide and the cognitive divide: Reflections on the challenge of human development in the digital age. *Information Technologies & International Development 6*(SE), 25-30. Retrieved from http://itidjournal.org /index.php/itid

Freeman, R. (2008). *Labor productivity indicators comparison of two OECD databases*

productivity differentials & the Balassa-Samuelson effect. [White paper.] Retrieved from http://www.oecd.org/statistics/productivity

Georgescu, M. (2012). Egovernment: New perspectives on the future of government digitisation. *Annales Universitatis Apulensis: Series Oeconomica, 14*(2), 369-384. Retrieved from http://oeconomica.uab.ro/index.php?p=home&l=ro

Gerring, J. (2004). What is a case study and what is it good for? *American Political Science Review*, *98*(2), 341-354. doi:10.1017/s0003055404001182

Gobble, M. M. (2013). Big data: The next big thing in innovation. *Research Technology Management*, *56*, 64–67. doi:10.5437/08956308x5601005

Goldemberg, J. (2011). Technological leapfrogging in the developing world. *Georgetown Journal of International Affairs*, *12*, 135-141. Retrieved from http://journal.georgetown.edu/

Gorshkova, L., Sovik, L., & Poplavskaya, V. (2013, February). Methodology of organizational changes during the implementation of business-activity monitoring. *International Journal of Business and Social Science*, *4*(2), 104-110. Retrieved from http://www.ijbssnet.com/update/

Gouvea, R., Linton, J. D., Montoya, M., & Walsh, S. T. (2012). Emerging technologies and ethics: A race-to-the-bottom or the top? *Journal of Business Ethics*, *109*, 553-567. doi:10.1007/s10551-012-1430-3

Gupta, M., & Shah, S. (2012). ICT and E-governance: A complete overview. *International Journal of Information and Operations Management*, *3*, 178-182. doi:10.4018/978-1-59140-789-8.ch220

Harmon, R. R., Demirkan, H., & Raffo, D. (2012). Roadmapping the next wave of sustainable IT. *Foresight: The Journal of Futures Studies, Strategic Thinking and Policy*, *14*(2), 121-138. doi:10.1108/14636681211222401

Hatum, A., Pettigrew, A., & Michelini, J. (2010, September). Building organizational capabilities to adapt under turmoil. *Journal of Change Management*, *10*(3), 257-274. doi:10.1080/14697017.2010.493292

Heeks, R. (2010, July). Do information and communication technologies (ICTs) contribute to development? *Journal of International Development*, *22*(5), 625-640. doi:10.1002 /jid.1716

Helle, Z. H., & Rukanova, B. (2011). To mind IT or not to mind IT. *Transforming Government: People, Process and Policy*, *5*, 155-166. doi:10.1108 /17506161111131186

Hoover, R. S., & Koerber, A. L. (2011). Using NVivo to answer the challenges of qualitative research in professional communication: Benefits and best practices tutorial. *IEEE Transactions on Professional Communication*, *54*(1) 68-82. Retrieved from http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=47

Huang, G. (2013). In search of system understanding and control. *Business Economics, 48*, 2-7. doi:10.1057/be.2012.37

Ifinedo, P. (2012). Drivers of E-government maturity in two developing regions: Focus on Latin America and sub-Saharan Africa. *Journal of Information Systems and Technology Management*, *9*(1), 5-22. Retrieved from http://www.jistem.fea.usp.br/index.php/jistem

Inter-American Development Bank (IDB). (2012, July). *IDB white paper on so you think you know what drives disbursements at the IDB? Think, think again* [White paper]. Retrieved from the Inter-American Development Bank website: http://idbdocs.iadb.org/

Ismail, A., & Mamat, M. (2012). The relationship between information technology, process innovation and organizational performance. *International Journal of Business and Social Science*, *3*(2), 268-274. Retrieved from http://www.ijbssnet.com /

Juan, A. F. (2011). Economic sustainability of international telecommunication networks. *Info: The Journal of Policy, Regulation and Strategy for Telecommunications, Information and Media*, *13*(1), 6-12. doi:10.1108/14636691111101847

Karunasena, K., Deng, H., & Singh, M. (2011). Measuring the public value of e-government: A case study from Sri Lanka. *Transforming Government: People, Process and Policy*, *5*(1), 81-99. doi:10.1108/17506161111114671

Kelly, T., Friederici, N., Minges, M., & Yamamichi, M. (2012, September). *2012 information and communications for development: Maximizing mobile*. Washington, DC: World Bank. Retrieved from http://siteresources.worldbank.org/

Ketteni, E., Mamuneas, T., & Stengos, T. (2011). The effect of information technology and human capital on economic growth. *Macroeconomic Dynamics*, *15*(5), 595-615. doi:10.1017/s1365100510000210

Khare, A. B., Raghav, V., & Sharma, P. (2012). Cloud computing based rural E-governance model. *International Journal of Information and Operations*

Management Education, *3*(1), 89-91. Retrieved from http://www.inderscience.com/jhome.php?jcode=ijiome

Kim, C., Jin, M., Kim, J., & Shin, N. (2012). User perception of the quality, value, and utility of user-generated content. *Journal of Electronic Commerce Research*, *13*(4), 305-319. Retrieved from http://www.csulb.edu/journals/jecr/

Kiron, D., Ferguson, R. B., & Kirk Prentice, P. (2013). From value to vision: Reimagining the possible with data analytics. *MIT Sloan Management Review*, *54*(3), 1-20. Retrieved from http://sloanreview.mit.edu/

Kiron, D., Kruschwitz, N., Haanaes, K., Reeves, M., & Goh, E. (2013). The innovation bottom line. *MIT Sloan Management Review*, *54*(3), 1-24. Retrieved from http://sloanreview.mit.edu/

Klaes, M. (2012). Paradigm "wars" as methodenstreit. *International Journal of Organizational Analysis*, *20*(1), 13-24. doi:10.1108/19348831211215632

Korpelainen, E. (2011). *Theories of ICT system implementation and adoption: A critical review*. Retrieved from http://lib.tkk.fi/Diss/2011/isbn9789526043869/article1.pdf.

Kretschmer, T. (2012, April 13). *Information and communication technologies and productivity growth: A survey of the literature* (OECD Digital Economy Papers No. 195). Retrieved from http://www.oecd-ilibrary.org/

Lacity, M. C., & Willcocks, L. P. (2013). Outsourcing business processes for innovation. *MIT Sloan Management Review*, *54*(3), 63-69. Retrieved from http://sloanreview.mit.edu/

Latham, A. (2011). An evaluation of the impact of information and communication technologies: Two case study examples. *International Business Research*, *4*(3), 3-9. doi:10.5539/ibr.v4n3p3

Maier, A., Suarasan, M., & Nicoara, F. D. (2012). Innovation: A must for the durable development. *Management & Marketing*, *7*(3), 479-492. Retrieved from http://econpapers.repec.org/article/aiomanmar

Majumdar, S. K., Carare, O. O., & Chang, H. H. (2010). Broadband adoption and firm productivity: Evaluating the benefits of general purpose technology. *Industrial & Corporate Change*, *19*(3)641-674. doi:10.1093/icc/dtp042

Makins, Q., Nagao, D., & Bennett, N. (2012). Enterprise alignment and inertia risks during transformation. *Information, Knowledge, Systems Management*, *11*, 151-168. doi:10.3233/IKS-2012-0178

Mamaghani, F. (2010). The social and economic impact of information and communication technology on developing countries: An analysis. *International Journal of Management*, *27*, 607-615, 777. Retrieved from http://www.theijm.com

Marshall, C., & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks, CA: Sage.

Masanet, E., & Matthews, H. (2010). Exploring environmental applications and benefits of information and communication technology introduction to the special issue. *Journal of Industrial Ecology*, *14*(5), 687-691. doi:10.1111/j.1530-9290.2010.00285.x

Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research*, *11*(3), 1-19. Retrieved from http://www.qualitative-research.net

Matousková, Z., & Czesaná, V. (2011). The role of high technology services in the knowledge economy. *Journal of European Industrial Training*, *35*(7), 702-720. doi:10.1108/03090591111160805

Mayo, J., & Wallsten, S. (2011). From network externalities to broadband growth externalities: A bridge not yet built. *Review of Industrial Organization*, *38*, 173-190. doi:10.1007/s11151-011-9286-8

Mesch, D. J. (2010). Management of human resources in 2020: The outlook for nonprofit organizations. *Public Administration Review*, *70*(s1), s173-174. doi:10.1111/j.1540-6210.2010.02266.x

Micheli, P., Schoeman, M., Baxter, D., & Goffin, K. (2012). New business models for public-sector innovation: Successful technological innovation for government. *Research Technology Management*, *55*(5), 51-57. doi:10.5437/08956308X5505067

Narula, S. A., & Arora, S. (2010). Identifying stakeholders' needs and constraints in adoption of ICT services in rural areas: The case of India. *Social Responsibility Journal*, *6*(2), 222-236. doi:10.1108/17471111011051739

Neuman, W. L. (2010). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Boston, MA: Allyn & Bacon.

Newman, J. (2012, May). An organisational change management framework for

sustainability. *Greener Management International*, (57), 65-75. Retrieved from http://www.greenleaf-publishing.com/default.asp?ContentID=8

Ojo, T. (2009). Global e-litism: Digital technology, social inequality, and transnationality. *Canadian Journal of Communication*, *34*, 759-760. Retrieved from http://www.cjc-online.ca/index.php/journal

Oliveira, T., & Martins, M. F. (2010). Understanding e-business adoption across industries in European countries. *Industrial Management + Data Systems*, *110*(9)1337-1354. doi:10.1108/02635571011087428

Organisation for Economic Cooperation and Development. (2012). *OECD Week 2012: Secretary-General's report to ministers 2012* [White paper]. Retrieved from http://www.oecd.org/

Park, H-Y., Park, J-S., Yang, J-I., & Lee, J-H. (2010). A proposed methodology for U-city service development: Service reusability perspective. *Journal of Service Science*, *2*, 111-126. doi:10.1007/s12927-010-0005-z

Patton, M. Q. (2002). *Qualitative evaluation and research methods.* Thousand Oaks, CA: Sage.

Petrick, I. J., & Martinelli, R. (2012). Driving disruptive innovation: Problem finding and strategy setting in an uncertain world. *Research Technology Management*, *55*(6), 49-57. doi:10.5437/08956308x5506902

Pickernell, D., Jones, P., Packham, G., Brychan, T., White, G., & Willis, R. (2013). E-commerce trading activity and the SME sector: An FSB perspective. *Journal of Small Business and Enterprise Development*, *20*(4), 866-888. doi:10.1108/jsbed-

06-2012-0074

Pipe, R. (2010). Singapore advances intelligent nation master plan. *Journal of E-Governance*, *33*(177), 225-236. doi:10.3233/GOV20100226

Pollitt, C. (2011). Not odious but onerous: Comparative public administration. *Public Administration*, *89*(1), 114-127. doi:10.1111/j.1467-9299.2011.01904.x

Prattipati, S. N. (2010). Sustainability and the role of information and communications technologies. *Business Renaissance Quarterly*, *5*(2), 23-40. doi:10.1080/00139157.2010.522460

Pulwarty, R. S., Nurse, L. A., & Trotz, U. O. (2010). Caribbean islands in a changing climate. *Environment*, *52*(6), 16-27. doi:10.1080/00139157.2010.522460

Ramos, J., & Ballell, P. (2009). Globalisation, new technologies (ICTs) and dual labour markets: The case of Europe. *Journal of Information, Communication & Ethics in Society*, *7*(4), 258-279. doi:10.1108/14779960911004507

Rana, N. P., Williams, M. D., Dwivedi, Y. K., & Williams, J. (2012). Theories and theoretical models for examining the adoption of e-government services. *E - Service Journal*, *8*(2), 26-56,107-108. doi.10.2979/eservicej.8.2.26

Rao, J., & Weintraub, J. (2013). How innovative is your company's culture? *MIT Sloan Management Review*, *54*(3), 29-37. Retrieved from http://sloanreview.mit.edu/

Ray, S. (2012). Reinforcing accountability in public services: An ICT enabled framework. *Transforming Government: People, Process and Policy*, *6*(2), 135-148. doi:10.1108/17506161211246890

Rojko, K., Lesjak, D., & Vehovar, V. (2011). Information communication technology

spending in (2008-) economic crisis. *Industrial Management + Data Systems*, *111*(3), 391-409. doi:10.1108/02635571111118279

Romijn, H. A., & Caniëls, M. J. (2011). Pathways of technological change in developing countries: Review and new agenda. *Development Policy Review*, *29*(3), 359-380. doi:10.1111/j.1467-7679.2011.00537.x

Rowley, J. (2012). Conducting research interviews. *Management Research Review*, *35*(3-4)260-271. doi:10.1108/01409171211210154

Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data* (3rd ed.). Thousand Oaks, CA: Sage.

Sakalauskas, L. (2010). Sustainability models and indicators. *Technological & Economic Development of Economy*, *16*, 567-577. doi:10.3846/tede.2010.35

Saltari, E., Wymer, C. R., Federici, D., & Giannetti, M. (2012). Technological adoption with imperfect markets in the Italian economy. *Studies in Nonlinear Dynamics & Econometrics*, *16*(5), 1-28. doi:10.1515/1558-3708.1934

Samah, B. A., Shaffril, H. A., Hassan, M. A., & Jeffrey, L. D. (2011). Can technology acceptance model be applied on the rural setting: The case of village development and security committee in Malaysia. *Journal of Social Sciences*, *7*(2), 113-119. doi:10.3844/jssp.2011.113.119

Sanyal, P., & Babu, S. C. (2012). Aid effectiveness and capacity development: Implications for economic growth in developing countries. *Modern Economy*, *3*, 567-577. Retrieved from http://www.scirp.org/journal/ME/

Schmiele, A. (2012). Drivers for international innovation activities in developed and

emerging countries. *Journal of Technology Transfer*, *37*(1), 98-123. doi:10.1007/s10961-011-9221-z

Seymour, L. F., & Naidoo, M. (2013). The usage and impact of broadband: A South African household analysis. *Electronic Journal of Information Systems Evaluation*, *16*(2), 134-147. Retrieved from http://www.ejise.com/main.html

Shareef, M. A., Archer, N., & Dwivedi, Y. K. (2012, December). Examining adoption behavior of mobile government. *Journal of Computer Information Systems*, *53*(2), 39-49. Retrieved from http://www.iacis.org/jcis/jcis.php

Sharma, A. (2011). IT in governance in the 21st century. *IT Professional Magazine*, *13*(3), 7-9. doi:10.1109/MITP.2011.48

Sharma, G., & Baoku, L. (2013). Customer satisfaction in web 2.0 and information technology development. *Information Technology & People*, *26*(4), 347-367. doi:10.1108/ITP-12-2012-0157

Simon, E., & Jean, P. N. (2012). Integrating ERP into the organization: Organizational changes and side effects. *International Business Research*, *5*(2), 51-58. doi:10.5539/ibr.v5n2p51

Sipior, J. C., Ward, B. T., & Connolly, R. (2010). The digital divide and t-government in the United States: Using the technology acceptance model to understand usage. *European Journal of Information Systems*, *20*(3), 308-328. doi:10.1057/ejis.2010.64

Simmons, B. A. (2011, September). International studies in the global information age. *International Studies Quarterly*, *55*(3), 589-599. doi:10.1111/j.1468-

2478.2011.00676.x

Singh, G., Pathak, R. D., Naz, R., & Belwal, R. (2010). E-governance for improved public sector service delivery in India, Ethiopia and Fiji. *International Journal of Public Sector Management*, *23*(3), 254-275. doi:10.1108/09513551011032473

Stake, R. E., (2010). *Qualitative research: Studying how things work*. New York, NY: Guilford Press.

Sterman, J. (2013). What the future may bring. *MIT Sloan Management Review*, *54*(2), 13-14. Retrieved from http://sloanreview.mit.edu/

St. John, K. R. (2012). Reinvigorating the Caribbean and Central American common market. *Journal of American Academy of Business, Cambridge*, *18*(1), 83-90. Retrieved from http://www.jaabc.com/journal.htm

Street, V. L., Weer, C., & Shipper, F. (2011). KCI Technologies, Inc.-Engineering the future, one employee at a time. *Journal of Business Case Studies*, *7*(1), 57-68. Retrieved from http://journals.cluteonline.com/index.php/JBCS

Symonds, J. E., & Gorard, S. (2010). Death of mixed methods? Or the rebirth of research as a craft. *Evaluation & Research in Education*, *23*, 121-136. doi:10.1080 /09500790.2010.483514

Tate, M., & Johnstone, D. (2010). ICT, multi-channels and the changing line of visibility: An empirical study. *e-Service Journal*, *7*(2), 66-98, 102. Indiana University Press. Retrieved from http://www.jstor.org/action/showPublication?journalCode=eservicej

te Velde, D., Lin, J., Monga, C., Tendulkar, S. D., Amsden, A., Amoako, K. Y., . . . Lim,

W. (2011). DPR debate: Growth identification and facilitation: The role of the state in the dynamics of structural change. *Development Policy Review*, *29*, 259-310. doi:10.1111/j.1467-7679.2011.00534

Thite, M. (2012). Taking India to the world. *Journal of Indian Business Research*, *4*(2), 116-124. doi:10.1108/17554191211228038

Turner, D. (2010). Qualitative interview design: A practical guide for novice investigators. *Qualitative Report*, *15,* 754-760. Retrieved from http://www.nova.edu/ssss/QR/

United Nations. (2010, June). *The millennium development goals report 2009* [White paper]. Retrieved from www.un.org/millenniumgoals/

van Os, G. (2011). The challenge of coordination: Coordinating integrated electronic service delivery in Denmark and the Netherlands. *Information Polity: The International Journal of Government & Democracy in the Information Age*, *16*, 51-61. doi:10.3233/IP20110224

Vaughan, D. (2011). The importance of capabilities in the sustainability of information and communications technology programs: The case of remote indigenous Australian communities. *Ethics and Information Technology*, *13*, 131-150. doi:10.1007/s10676-011-9269-3

Venturini, F. (2009). The long-run impact of ICT. *Empirical Economics*, *37*, 497-515. doi:10.1007/s00181-008-0243-9

Vidas-Bubanja, M., Grk, S., & Cvetković, N. (2010). Economic aspects of doing e-business in companies. *Megatrend Review*, *7*(2), 21-41. Retrieved from

http://www.megatrendreview.com/

Weerakkody, V., El-Haddadeh, R., & Al-Shafi, S. (2011). Exploring the complexities of e-government implementation and diffusion in a developing country. *Journal of Enterprise Information Management*, *24*(2), 172-196. doi:10.1108/17410391111106293

Winter, S. J. (2012). The rise of cyberinfrastructure and grand challenges for eCommerce. *Information Systems and eBusiness Management*, *10*(3), 279-293. doi:10.1007/s10257-011-0165-5

Wiredu, G. O. (2012). Information systems innovation in public organisations: An institutional perspective. *Information Technology & People*, *25*(2), 188-206. doi:10.1108/09593841211232703

World Bank Group. (2011). *Transformation through infrastructure* [White paper]. Retrieved from http://siteresources.worldbank.org/

World Bank Group. (2012a). *Caribbean—Regional communications infrastructure program project* [White paper]. Retrieved from http://www.worldbank.org/

World Bank Group. (2012b). *ICT for greater development impact: World Bank group strategy for 2012-2015* [White paper). Retrieved from http://siteresources.worldbank.org/

World Economic Forum (WEF). (2012). *The global information technology report 2011-2012* [White paper]. Retrieved from http://www3.weforum.org/

World Economic Forum (WEF). (2013). *The global competitive report 2012-2013* [White paper]. Retrieved from http://reports.weforum.org/

Ya-Ching, L., Pin-Yu, C., & Hsien-Lee, T. (2011). Corporate performance of ICT-enabled business process reengineering. *Industrial Management + Data Systems*, *111*(5), 735-754. doi:10.1108/02635571111137287

Yang, S. (2009). A case study of technology-enhanced historical inquiry. *Innovations in Education and Teaching International*, *46*, 237-248. doi:10.1080/14703290902844040

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage.

Yin, R. K. (2011). *Qualitative research from start to finish.* New York, NY: Guildford Press.

Yong, Z., & Yezheng, L. (2010). How to change an organization to fit the dynamic environment: A case study on a telecom company of China. *International Journal of Business & Management*, *5*(5), 226-234. Retrieved from http://www.ijbssnet.com/

Yusuf, S., & Nabeshima, K. (2012). *Some small countries do it better: Rapid growth and its causes in Singapore, Finland, and Ireland*. Washington, DC: World Bank. Retrieved from http://siteresources.worldbank.org/

Appendix A: Consent Form

09/04/14

Dear Potential Participant,

You are invited to take part in a research study of the role of information and communication technology (ICT), and its effects on the national productivity of Trinidad and Tobago during the period of 2001 and 2010. The researcher is inviting key decision makers of the Government of Trinidad and Tobago (2001 – 2010) who participated in developing and implementing the national ICT plan, industry experts who technical advice to the Government of Trinidad and Tobago in relation to policy development and implementation of the government ICT plan for the period 2001 – 2010, and members of the business community who were members of the government e-business roundtable during the period 2001-2010 to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Kennedy Swaratsingh, who is a doctoral student at Walden University.

Background Information:
The proposed doctoral study explores the process by which the government of Trinidad and Tobago can accelerate the pace of national transformation through the adoption and increase application of information and communication technology (ICT) that creates connectivity, efficient multichannel service delivery, and integrated government. The proposed research examines the potential of ICT to serve as an avenue that has the potential to enhance the delivery of government services to the citizens of Trinidad and Tobago, which can positively impact national productivity.

Procedures:
If you agree to be in this study, you will be asked to:

- Participate in a face to face interview with the researcher responding to questions related to your role in the development and implementation of the national ICT plan of the Government of Trinidad and Tobago during the period 2001 – 2010.
- The interview would last two hours.
- The interview would be taped.
- The interview would be conducted at a location and a time prearranged and agreed to by both the researcher and participant

Here are some sample questions:

- Describe in detail the role you played in the development, adoption, and implementation of the national ICT plan during 2001 to 2010?
- What prompted the development of national ICT policies and how would describe its expectations?

- How would you describe the impact of the national ICT policy on the service delivery of the public sector?
- In your opinion, what is the impact of ICT on national productivity of Trinidad and Tobago?
- How would you define the barriers impede against a greater level of adoption of ICT in both the public and private sectors?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at the Ministry of Public Administration or the Government of Trinidad and Tobago, the Caribbean Telecommunications Union, or the e-business roundtable will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as stress or becoming upset. Being in this study would not pose a risk to your safety or well-being. Any risk of injury or harm during the study interview is virtually nonexistent, and the duration of the interview session will be limited to two hours. The interview will be audiotaped to maintain the accuracy of all data collected.

The continued development of technology provides a unique opportunity for developing countries such as Trinidad and Tobago to accelerate its thrust towards national development. Leaders in both the private and public sectors recognized the impact that the adoption of ICT can have on economic and social development and are paying greater attention to its impact on issues such as the innovation, adoption, and sustainability of technology as an enabling platform for national transformation.

Payment:
Participation in this study is voluntary; there will be no form of payment for participation.

Privacy:
Any information you provide will be kept confidential. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by encryption and password protection on a separate data storage drive that would be kept in a locked safe. Data will be kept for a period of at least 5 years from the completion of the study as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via kswaratsingh@gmail.com/kennedy.swaratsingh@waldenu.edu;

1 246 836 7120 (mobile); or Skype: kennedysingh. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 001-612-312-1210. Walden University's approval number for this study is 09-08-14-0326315 and it expires on September 7, 2015.

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below I understand that I am agreeing to the terms described above.

Printed Name of Participant _____

Date of consent _____

Participant's Signature _____

Researcher's Signature _____

Appendix B: Interview Prompts and Questions

09/15/14

Thank you for participating in this interview on the role of ICT as a catalyst for enhanced competitiveness and increased productivity for T&T. This interview will take approximately 60 minutes to complete, and all details kept confidential by the researcher and will NOT feature in the report of this doctoral study. An audio recording of this interview is for the sole purpose of accurate transcription. The data collected is for analyses only and the final document will have the results of the analysis. Any participant interested in getting a copy of the final report of this study, can request an electronic copy. Thank you for your time participation in this interview.

1. Describe your role in the development, adoption, and implementation of the national ICT plan for the government of Trinidad and Tobago.
2. How would you describe the impact of a national ICT plan developed by the e-business roundtable on efficiency in public service delivery?
3. Describe the impact of ICT on public sector workplace productivity?
4. How would you define the barriers that impede against a higher level of adoption of ICT in both the public and the private sectors?
5. How would you describe the impact of ICT adoption on the international business competitive indices of Trinidad and Tobago?
6. How would you describe your expectation of the impact of the national ICT strategy on the economic and social transformation of Trinidad and Tobago?
7. What would you recommend as the possible next steps in the development and

adoption of ICT on workplace productivity for Trinidad and Tobago?

8. How would you describe the main accomplishments and setbacks of the national ICT plan based on your role and contribution in its development and implementation?
9. If you had to do it all again, what changes in approach, design, and strategic implementation would you incorporate?
10. What additional information or recommendations would you like to add that can positively impact this study?