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Information Technology Infrastructure: Global Economy and National Development in Haiti

Reynolds Alcena
Walden University

Walden University

College of Management and Technology

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Reynolds Alcena

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Review Committee
Dr. Roger Wells, Committee Chairperson, Management Faculty
Dr. Daphne Halkias, Committee Member, Management Faculty
Dr. Anton Camarota, University Reviewer, Management Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

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Abstract

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MS, Tuskegee University, 2005

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Dissertation Submitted in Partial Fulfillment

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Abstract

Political and environmental chaos recently experienced in Haiti has damaged the economic sector and telecommunication infrastructure. Developmental data from Haiti show 3 major trends: inadequate social and economic development, insufficient benefits from the global economy, and poorly planned information technology infrastructure (ITI). The specific problem addressed in this study is a knowledge gap in the views of stakeholders within Haiti's national culture on how the country's ITI can be developed to better engage Haiti in 21st century global and digital economy. The purpose of this qualitative case study was to explore the views of 48 expert participants regarding ITI development within Haiti's national culture to better engage Haiti with the 21st century global and digital economy. To satisfy the goal of this exploratory research a case study research design was used, and data were collected from multiple sources including in-depth interviews of 48 participants, observational field notes, and archival documentation. The analysis of the archival data, online surveys, and semi-structured interviews of expert informants revealed that nationwide broadband internet availability has been achieved, which has resulted in internet usage increasing from 2% in 2002 to 12% in 2009. The study participants noted the lack of reliable access to electricity limits the implementation of ITI in the nation. Legislation and financial investment are needed to improve ITI in Haiti. The academic significance and social change implications of the study include filling the knowledge gap of the status of ITI in Haiti, helping the national development of a modernized ITI well-connected to the global economy, and a better quality of life for Haiti's people.

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Dedication

I am grateful for the support of my parents, siblings, and my children. Their love provides the basis for my quest for knowledge; as well as an embedded desire to engage personally as a positive change agent, working to improve his community by applying positive social change approaches. My parents are positive social change agents. To the people of the Third World, in particular, the Republic of Haiti, hopefully, this study can provide an understanding, and highlight the importance of developing the Information Technology Infrastructure (ITI) of a country. The 7.0 earthquake that occurred in Haiti on January 12, 2010, illustrates the significance of ITI.

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I would like to thank Dr. Roger F. Wells for his mentorship. Special appreciations go to the members of my dissertation committee for their guidance, input and ensuring the scholarship of this study. Dr. Daphne Halkias helped and supervised the methodology of this dissertation. To many, Walden University exists only as a virtual learning environment, for me, it came alive in June 2009 when I suffered a stroke, my colleagues from the research forum reached out and contacted me directly at the hospital. Their support was unexpected, appreciated and instrumental in my ongoing recovery. I remain grateful for their support. I continue to thrive because of the love of my children.

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Chapter 1: Introduction to the Study

Haiti has not technologically linked with the global economy; it is the poorest country in the western hemisphere and one of the least developed economy in the world (Landahl, 2015). Technology, innovation, research, and development are necessary for national economic development. Innovation is crucial for economic growth in development. Science, technology, and innovation have a critical role to play in the developing countries. The countries with favorable environments for using technology to develop new products and processes are more likely to benefit in the global economy than those that are incapable of competing with others (Organization for Economic Co-operation and Development [OECD], 2012). Employing information technology (IT) helps to increase the gross national product (GNP) of a country and reduces its national debt while facilitating local and international trade. IT improves the process of planning, organizing, and enhances public services. Technological improvement is very low in less developed countries (LDC) (Haile, Srour, & Vivarelli, 2013).

Baranyi, Feldman, and Bernier (2015) differentiated the various approaches adapted for economic development in Haiti such as the involvement of Argentina, Brazil, and Chile referred to as the *ABC countries*, along with the Bolivian Alliance for the Americas (ALBA) consisting of 11-member nations: Antigua and Barbuda, Bolivia, Cuba, Dominica, Ecuador, Nicaragua, St Kitts and Nevis, Saint Lucia, Saint Vincent and Grenadines, led by the Venezuelan government. ABC and ALBA together form the South-South Cooperation (SSC), a new method in development cautioning against the self-interest of the North-South Cooperation (NSC). Over the past 10 years, the SSC has

been a major donor to Haitian society. However, the coalition has thus far failed to show any significant improvement over NSC to Haitian society. Fundamental concerns have risen regarding SSC's inability to assess and report outcomes. Overall, the Haitian community is appreciative of ALBA, which is perceived as a caring partner providing help free of conditions. According to Baranyi et al. 2015 the Inter-American Development Bank, which provides supports and finances to reduce poverty, as wells as improve health, education, and infrastructure saw the need in evaluating the impact of their approach to social development.

Globalization propelled a new emergent global middle class, primarily through the citizens of Brazil, China, Indonesia, and India, as well as the top 1% of the world. The people at the lowest of the income ranking and the lower-middle class of the developing nations have not befitted from globalization. According to Basu, Milanovic, Demirguc-Kunt, and Lopez-Claros, 2016, the two primary aims of globalization are to end extreme poverty by 2030 and lift the bottom line of all countries by 40%. Recently, the Information and Communication Technologies for Education (ICTE) program in Haiti has been renamed Project *of Hope*. The goals of ICTE are to offer developing countries with resources and technologies, to enhance computer literacy. In Haiti, ICTE can facilitate the acquisition of technology skills, for poverty reduction and human development. In order for Haiti to succeed in the 21st century, students, young adults, as well as teachers need to develop technological skills accompanied with relevant knowledge (Janjua, Li, & Thomas, 2017).

The Structure of Information Technology Infrastructure in Haiti

According to Dobbins (2017), the state ownership of the landlines services of the country is a monopoly. This regulator is Telecommunications D'Haiti (Teleco); 97% of the stocks are held by the national bank (Banque National de la Republique d' Haiti), which is owned by the government. The Department of Public Works manages Teleco. The telephone service is provided mainly in Port-au-Prince with only 60,000 lines connected, of which only 15% of subscribers are located outside of the capital. The density of service is barely eight lines per 1,000 individuals.

Dobbins (2017) found even after the renovation of the early 1980s, which digitized the structure in 1991, the system had a maximum capacity of 50,000 lines. The quality of service continued to be extremely poor. The waiting list of customers requesting service exceeds 100,000. The organization also maintains control over the regulating agency of the country the National Council of Telecommunications (CONATEL). The chair of Teleco is also the governor of the National Central Bank. The chair and director of Teleco are both appointees of the president of the nation. The board of directors consists of five ministers of various departments of the government also appointed by the president. The workforce of the company is large with 34 workers per 1,000 lines, far in excess of the international standard of seven individuals per thousand.

The introduction of democracy in the country in the 1990s introduced the cellular cell phone industry. Teleco entered into the cellular industry in a partnership with Rectel, with Teleco controlling 60% and Rectel holding the remaining 40% of ownership. This undertaking failed; however, three new cellular companies met the market needs: Digicel,

HaiTel, and Voila. The national telephone company made no improvements to benefit from the growth of the telecommunication industry. Many private companies offer Internet services such as Alpha Communication Network (ACN) Companet, Globelsud, Hintelfocus, Netcom, and Telecom Haiti. Entering the marketplace in 1992, ACN launched the first email service in the country. Their first of the year of service merely 300 individuals, businesses, and organizations enrolled. ACN is the principal provider of service to education, the government, as well as NGOs (Laguerre, 2013).

Telecom Haiti has been providing two-way radio and telecommunications services to a national network for 21 years in the country. It offers HNS' Direcway(R) broadband satellite Internet services to NGOs, businesses, educational institutions, internet cafes and private consumers. Direcway(R) promoted broadband by the Hughes Network Systems (HNS), the leading provider of global broadband satellite services. The primary use of the e-commerce infrastructure of the country was by Citibank, Sogebank, and Unibank. Each bank sustains its own secured satellite Internet services. The infrastructure for e-commerce allowed the opening of many cyber cafes by using the services (Infoasaid, 2012).

According to Dobbins (2017) when Communication Cellulaire D'Haiti (COMCEL) arrived in the market in 1998 with a nationwide TDMA mobile communication system, this constituted a great development in the improvement of ITI in Haiti. The company signed an agreement to build and sustain services such as paging, payphones, and an intercontinental gateway. Trilogy International Partners, LLC the U.S. based private business concern and operated as Viola Comcel in Haiti, owned the

company. Over a 10-year period, the cellular services grew to a service base of more than a million customers. It became one of the largest taxpayers in Haiti, with 35,000 agents nationwide and while it invested, in excess of $200 million USD in its infrastructure.

The leader in the field was HaiTel, which touted that their services allow farmers, entrepreneurs, and small businesses to find new markets for their goods, and while improving the efficiency of their operations. As of 2005, HaiTel in a partnership with the Nortel Corporation, expanded their CDMA network to a CDMA2000 1X, providing Haiti with its first 3G network. With this upgrade, HaiTel offered fast access Internet and multimedia capability. The company expanded this service nationwide. Nortel as partner donated computer systems to public schools with Internet capability (Laguerre, 2013).

Another player in the mobile cellular phone service is Digicel, a major provider in the Caribbean. The company based in Jamaica provides mobile services in 26 Caribbean and Central America countries. Their involvement extends to the South Pacific region of the world where they provide services in Papua New Guinea Samoa, and Tonga with the expansion of their service areas to countries such as Fiji and Vanuatu (Laguerre, 2013).

Blackburn (2012) announced the completion of the merger of Voila with Digicel was, finalized on October 15, 2012. This merger made Digicel the largest cellular provider in Haiti. With their large client base and a partnership with the government, they launched their mobile money service to help the victims of hurricane Irma that occurred on September 7, 2017. The country, fortunately, was spared a direct hit from the hurricane.

Problem Statement

The problem is the political and natural chaos recently experienced by Haiti not only crippled the economic sector but also deeply affected the poorest telecommunication infrastructure in the world (Dobbins, 2017). According to the World Bank (2017) Haiti is the poorest country in the Western Hemisphere and one of the poorest nations in the world with 80 % of the population living under the poverty line and 54% in abject poverty. Many Haitians have no clean running water, about 21% have access to electricity, and almost 50% of the country is illiterate (World Bank, 2017). The intense levels of poverty have resulted in a lack of investment in human capital and the educational infrastructure. Telecommunications must now be a focus of the reconstruction of the country. Most of the initial investment by foreign donors must target the communication services of the government, along with improving the satellite, and wireless broadband capabilities of the country. The future of ITI of Haiti is promising, since the partial privatization of Teleco. The end of 2009, Viettel a Vietnamese Telecom Company won the bid to control 70% ownership of Teleco and developed a new fiber-optic network throughout the country (Infoasaid, 2012).

The years' worth of work and communications, has yet to yield any significant improvements to the creation of a sustainable electrical system in Haiti. The system remains weak in governance and meaningful commercial performance. With World Bank funding after two years and little progress to show, the Rebuilding Energy Infrastructure and Access forced the bank to call for the complete restructuring of the project (World Bank, 2017). The developmental data from Haiti visibly showed three major trends:

Inadequate social and economic development, insufficient benefits from the global economy, and a scantily planned ITI. The literature was silent on how these trends may affect each other (LaGuerre, 2013). The social systems of the country have not kept up with the times. To make matters worse, Haiti has not connected to the 24-hour digital global economy. The country is one of the least developed societies in the world. The specific problem was a knowledge gap existed on the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy (Janjua et al., 2017; LaGuerre, 2013).

Purpose of the Study

The purpose of this qualitative case study was to explore the views of stakeholders within Haiti's national culture, and on how the development of information technology would allow Haiti to engage in the 21st century global, and digital economy**.** To satisfy the goal of this exploratory research, a case study research design was used, and data were collected from multiple sources (Yin, 2014). The unit of analysis was the stakeholder within Haiti's national culture. Qualitative data were based on insights derived from in-depth interviews (Patton, 2015). Since the study concentrated on a specific segment of the Haitian society, instead of an eclectic sampling, data collection was achieved with a purposeful sample using a snowball and chain sampling strategy (Yin, 2014). Data were also collected through the maintenance of field notes (Katz, 2014), and archival documentation (Patton, 2015). Triangulation of data sources was

employed to establish the credibility of the researcher's analysis of the studied phenomena (Yin, 2014).

Research Question

The problem statement and purpose of this study was to answer the following central research question: What are the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy?

Definition of Key Terms

Application architecture: The accessibility of the application software to the users and servers on the network. The application architecture consists of three outlooks the conceptual, logical, and physical aspect.

BRIC: A term coined by Jim O'Neil of Goldman Sachs representing the combined economies of Brazil, Russia, India, and China. They now represent a quarter of the global economy.

General Agreement on Tariffs and Trade (*GATT):* The treaty was created after the end of WWII to increase international trade through the elimination of tariffs, subsidies, and quotas.

Globalization: The unification of national economies, politics, ideas, culture, and people that extends beyond their protective borders.

Hardware: The physical components of a computer system (e.g. communication gear, smartphones, visual aids, and printers).

Information technology infrastructure (ITI): Shared IT resources, including hardware, software, communications technologies, data, and software applications, as well as a human component of skills, expertise, along with knowledge combined to create IT services.

Operating systems (OS): Manage all the application software, user interfaces and hardware in a computer system.

Information system: Consists of people, procedures, data, software, and hardware involved in digital information networks.

Conceptual Framework

The conceptual framework for this study consisted of three main thought currents: Systems theory, modernization, and development. Systems theory developed by Bertalanffy (1968), stressed the significance of incorporating the many of parts of a problem, in an attempt to find necessary solutions. Resolution of problems by segregating the interconnected elements is not achievable. The major benefit of systems theory was the awareness it provided for seeing organizational, and social systems, and their endemic problems, and possible social solutions holistically rather than discretely. Laszlo (1996) indicated that a system could be a subsystem, of a larger system, or structure. The systems approach holds that systems are incorporated wholes of their auxiliary parts, and never as a mechanistic collectivity of components, existing in isolated causal relations. Social and organizational systems could be either open or closed, depending upon the degree of change allowed within them.

According to Otchia (2014), modernization is a process through which countries increase their manufacturing sector, decrease their dependence on agriculture, and advance their collective development through state-sponsored (socialized) systems. The process of modernization involves radical social change, through new technologies, and education. Modernization requires that a country must go through a detailed, progressive development of its industries, urban areas, education system, telecommunication, transportation, political system, and advancement in democratization.

Sen (1999) suggested that development was the progressive expansion of genuine freedoms that people benefit from. Freedom is important to development for two distinctive reasons: (a) evaluative, because social and economic progress cannot be determined without assessing the enhancement of individual freedom; and (b) effectiveness, because economic development is totally dependent on the free will of people.

Nature of the Study

The nature of this study was qualitative, so that the methodology aligned with the purpose of the study, and provided data for the research question. The study's purpose called for a deeper understanding of the views of stakeholders within Haiti's national culture. The focus was also on understanding how the information technology infrastructure can better engage Haiti in the 21st century global and digital economy. An exploratory case study design (Yin, 2014) was utilized to meet the study goals. The goal of qualitative research itself is to explore experiences from the viewpoint of people living within a specific context; this method was associated with the constructivist paradigm

(Cooper & White, 2012). Social constructivists challenge people to be more critical of their understanding of the world and themselves, thus practicing objectivity when interpreting interactions between the individual and the environment (Burr, 2015).

To satisfy the purpose of this exploratory research, a case study research design was used, and data were collected from multiple sources; therefore, research design for this investigation was a multiple-case study. In opting for this method, consideration was given to the type of research question that was developed. According to Yin (2014) case studies, are an appropriate choice for studies with research questions that seek to explore how or why. Additionally, the topic for this investigation was focused on events that were contemporary rather than historical so case study was an appropriate choice for this investigation (Yin, 2014).

According to Lalor et al. (2013), a case study research was useful when investigating an area where little information was available. The investigator gathered data for the research questions of this study from the following sources: A semistructured interview protocol (see Appendix C), retrieval of archival documents in the form of media reports on the IT and economic, and cultural development of Haiti, and researcher field notes. The specific sources of data for the research question, as well are in Table 1.

Significance and Social Change Implications of the Study

Haiti is a developing country with a population of 10 million people with less than 1% of its citizens connected by telephonic landlines. As of 2000, only 20,000 individuals had access to the Internet (Infoasaid, 2012). The investigator in this study attempted to determine the causes and consequences, of the backward IT infrastructure, and how it

could be, used to help Haiti develop better linkages with the global IT system, modernize, and develop its economy, business, education, and healthcare. This study was important for Haiti as data collection and processing is critical in Haiti, where statistics to inform public policies are scarce (World Bank, 2016). Such studies on how the IT infrastructure of the country can be developed, so as for Haiti to engage in the 21st century global, and digital economy, is important to pave the way for developing a land registry, risk management, urban development, agricultural resource management, population census, and sustainable environmental projects (World Bank, 2016).

The application of ICT is revolutionizing healthcare in Haiti through distance learning. The Haiti Medical Education Project in partnership with Haitian medical leaders, faculty, and students formed an e-learning platform for continuing medical education programs. Their mission is to improve the medical education system, using information technology to develop competency-based curricula. Continuing medical education programs are essential in maintaining medical accreditation. This type of training was not previously available in the country. The clinical professors are in the U.S., Canada, and Europe. The focus of the program is the delivery and evaluation of a continuing medical education for physicians in rural Haiti (Battat et al., 2016). This study addressed such infrastructure projects will undoubtedly result in a better quality of life for the people of Haiti.

Assumptions

This study was based on the following assumptions: The first assumption was that information technology is essential for the modernization and development of less

developed societies. The second assumption was that this is being done by using a planned system wise approach. The third assumption was that Haiti's ITI and economy are poorly planned and less developed; and that in the modern digital age, a less developed country cannot fully develop its economy. Society without a national IT innovation plan, and neither can it learn and benefit from the forces of globalization without such innovations. It assumed that the researcher would be able to find adequate and accurate information, through the triangulated sources of data to answer the selected research questions of this study.

Table 1

Data Sources for the Central Research Question

Research question	Variables	Survey Questions	Face to Face Interview	Archival
	Poorly planned ITI	X	X	X
	Insufficient linkage with global economy	X	X	X
	Nature of inputs	X	X	X

Scope and Limitation of the Study

This research study focused on the ITI of Haiti along with its role in national development and linkages to the global economy. The study did not attempt to analyze the history, culture, social structure, or the economy of the nation. Mentioned only in relief, these could be as and when necessary. Only the two largest cities in the country,

Port-au-Prince and Cap-Haitien were covered; and hence any generalization made about the country as the case under study was with caution.

Summary and Transition

In Chapter 1 I described the problem, purpose, conceptual framework, basic research design, significance, and social change implications, assumptions, scope and limitations. I presented a cultural background of the identified problem, that is, the poorly developed state of Haiti's ITI and economy. In addition, I outlined the relationship between globalization, information technology infrastructure, and economic development. Chapter 2 consists of a detailed literature review on the role of information technology in the global economy, and national development with particular references to the developing societies. Chapter 3 contains the methodology and research protocol adopted for the study. The results of the inquiry were summarized in Chapter 4. I presented the conclusion of the study in Chapter 5.

Chapter 2: Literature Review

This chapter presented an understanding of the foundation of globalization, and the importance of information technology infrastructure to development. The discussion illustrated the interdependence of the global economic systems and the role of modernization and system theories. The outlined ways that Haiti could benefit from the global marketplace.

Literature Search Strategy

The researcher in the process of discovering research to support this study explored the significance of information technology infrastructure to development: Walden University library database, Google Scholar, and references from carefully chosen studies. EBSCOhost, ProQuest, and Sage Journals were particularly suitable for this literature review. Journal of MIS, Decision Sciences, and Information Systems Research, MIS Quarterly, as well as International Journal of Technology Management, Journal of Management and Management Science. Google Scholar was used for finding articles that could be located through the databases listed above. Key search terms that were used included: *Haiti, IT infrastructure, information communication technology (ICT), also IT capability.*

Conceptual Framework

There must be understanding of nexus and interplay between different varieties of freedom between (a) political freedoms, (b) economic facilities, (c) social opportunities, (d) transparency, and (e) protective security. Political freedoms exercised in the form of free speech and electoral system foster economic security. Social opportunities like

education and healthcare make it possible for individuals to engage in and benefit from economic activities. Economic facilities offered people the ability to trade and produce personal wealth, developed the social infrastructure of their communities. These freedoms can collectively build on each other (Sen, 1999). The emphasis in the conceptual framework was on systems theories developed by Parson, Bertalanffy, and Laszlo. Development and modernization theories of Sen, Peet, and Hartwick on globalization were also included.

According to Creswell (2013), visualization of conceptual framework theories is in terms of concrete reality. Trochim (2001) indicated that concept mapping is valuable in research to explain intricate thoughts or theories on a subject matter by illustrating them and their operational interconnections pictorially (pp. 27-30). The cause and effect relationships diagram illustrated the essential modernization goals for Haiti in terms of its economy, technology, literacy, and culture (see Figure 1). It also depicted subsystem integration necessary for Haiti to connect with the global economy and undergo total system change. The most important aspect of the conceptual framework diagram was the implied synergic relationship of modernization and systems theories. This illustration defined or operationalized the conceptual framework in the process of generating a useful coding system which analyzed the qualitative contents of this study (Babbie, 2013).

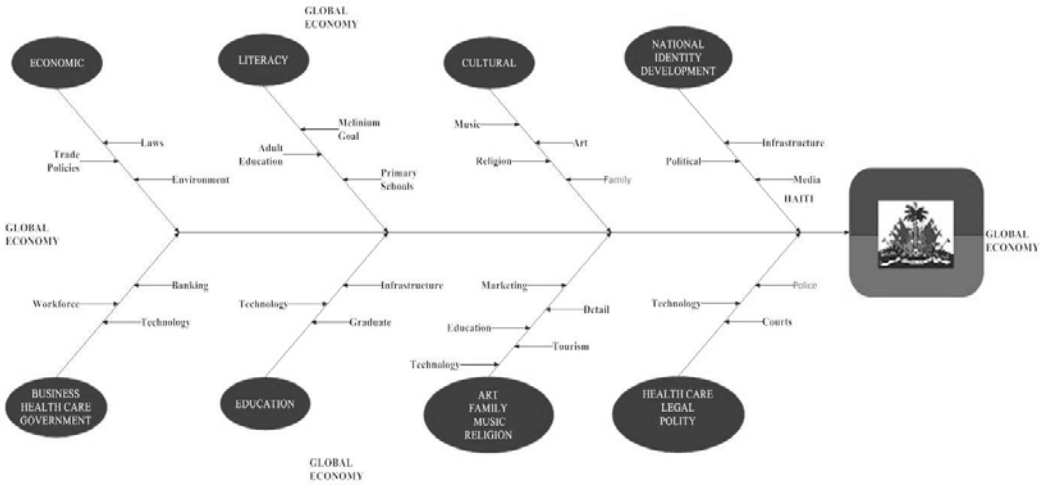

Figure 1. Conceptual framework diagram.

Heek and Stanforth (2015) defined an actor-network theory (ANT) society's relationship to technology, underdeveloped economy as one in which, the technological levels of one or more sectors of the economy fall below the technological level of the most advanced sector, especially if technology exists that will enable those sectors to be more productive. Heek and Stanforth found pertaining to development, there are various ways of grasping technology itself, which consisted of a physical device, or as having components such as human, material, and administrative, working congruently to convert inputs into outputs.

Research on Globalization/Global Economy

Globalization incorporates economies of countries, their politics, ideas, cultures, and people into a whole extended beyond their protective borders, ideological differences, cultures, classes, and races (Globalization101, 2012). Economically, globalization is the extension of production across geographical borders. Globalization

depicts the effortless movement of large amounts of funds in the world. Globalization is a dialectical process, which integrates, and disintegrates communities.

Chandy (2017) concluded the dual dynamism of globalization and technological change with digital renovations were reshaping the world in various and significant ways. The effects are three-fold: (a) disruption of the labor market through relocation, ending of some while creating new ones, (b) diminishing role of labor, (c) decentralize economic activity. New technologies offer the means to link less developed countries with developed economies, which promises to provide access to improve education and vocational training.

Capitalism and technology are the drivers of the expansion of globalization by organizing networks of transnational production, finance, and trade while circumventing some countries in the process. The countries are just conduits of the global free enterprise while reducing the function of their governments. Globalization amplified the amalgamation of global economies, nationally, and locally, while encouraging worldwide trade in goods, and services, borderless exchange of information, technology, human resources, and capital (Globalization101, 2012).

Since the end of the Second World War in 1945, the General Agreement on Tariffs and Trade (GATT) was the foundation of global trade. GATT inhibits export financial assistance on all goods except agricultural products. GATT also drastically reduced tariffs, which led to rapid growth in the trading of manufactured goods, producing a high level of specialized services and trade among nations. Advancement in ocean line shipping has also made possible the latest burst of growth in globalization.

The application of state of the art logistics led to the lower cost of global transactions, allowing firms to benefit from just in time sourcing using the global supply chain system (Berman, 2017).

Deregulation and increased competition caused a reduction in the costs of global shipping and communications. When countries engaged in international trade, they experience growth in their real household purchasing power. Personal incomes stretched further due to a decrease in the cost of goods and services. The benefits nationally led to increases in the gross domestic product (GDP) and capital. When a country removes its border, barriers this led to increased trade, thereby facilitating economic growth. When the wages of the poor increase, it raises their ability to purchase goods, creating better markets for the products that others produce more efficiently. Asia is one such example (Globalization101, 2012).

Since 1980, five trends noticeably emerged in globalization. The rates of growth in underprivileged nations increased much more than the rates of rich countries; this is a first in modern times. Globally the number of very poor individuals existing on less than $1 USD daily drastically decreased by 375 million inhabitants; this is historical, while those with living wages under $2 USD per day rise in their ranks. Global inequality dropped moderately, stopping a two-century trend of upward disparity. Disparity inside the country, in general, is not increasing. Globally, wage inequity is growing. This is not a contradiction with the fourth trend since there is no direct link between wage inequality and household income (Globalization 101.org, 2012).

Collins (2015) suggested the process of globalization is the collapse of borders between countries, improved relations among governments, removal of barriers in merging their economies and communities. Globalization also increases liberalization and access to markets, while eliminating trade barriers in goods and services with the emergence of an integrated international financial market. The effects of globalization on developing nation are many; it increases interdependence and competition among economies of the nations in the global market. This is evident in the trading of goods and services, as well as in the movement of capital, labor, and impact on the environment. The resulting domestic economic developments of developing countries were, not determined solely by domestic policies and market conditions. The global community influences the structure of domestic and global policies.

Hartungi (2006) indicated industrialized nations have been in business longer, therefore, improved their efficiency in production. Their longevity offers advantages over skills, information and knowledge of the production process, market characteristics, and the nature of the labor force. International intervention is necessary for leveling the playing field. The global rule favors the developing nations in maintaining some degrees of protection in selling their products in the world market. In order to profit from globalization, the leaders of developing nations should enlist a limited form of protectionism with regard to trade and industry while allowing their countries to benefit as much as possible. The infant industries in developing countries are not likely to engage head-on as competitors of the successful, experienced industry leaders of the developed nations.

Collins (2015) asserted that assurances to the governments of developing nations should be in the form of space and resources. The pledges from the developed nations should not be made conditionally nor require developing countries to enter into other agreements. Furthermore, developing countries should develop their own policies, protect their fragile economies as necessary, and select the best industrial products to offer for foreign competition. Liberalization is not to be forced on them when it may be detrimental to their self-interests. The leaders of the developing countries need to progress much faster in adopting new technologies, expand their human capital base, and establishing stronger institutions. The industrialized countries could be helpful in assisting developing nations in gearing up to succeed in the global market. The developing nations should promote the encouragement of research and development, as well as improve their marketing skills in specific sectors also an investment in other value-added sectors.

Hartungi (2006) concluded globalization was an ongoing process regardless of the willingness of the developing or developed countries, to engage be it a fair or unfair competition. All nations must, therefore, connect to the global economy. It is difficult for a nation state to be self-sufficient in any sector, and isolate itself from the outside world. Over the past 20 years, citizens of the world observed the manifestation, as well as the consolidation of an economic model that underscores domestic deregulation, along with the elimination of obstacles to global trade and investment. The improvements in health care achieved by many countries could attribute to their increasing ability to gain access to the global markets, investment, savings, and technology.

According to Cornia (2001) when markets are accessible by all, with strong regulatory institutions and safeguards, globalization can expand the performance of the countries with a good human, and physical infrastructure, while tightening the domestic markets. Conversely, for the majority of the countries left behind, most of them are located in Africa, Eastern Europe, and Latin America globalization had not lived up to its promises. The amalgamation of poverty which strikes their domestic environments, along with the inequitable distribution of foreign investments, as well as the introduction of new regulations, further limit the access of their exports to the Organization for Economic Co-Operation and Development (OECD) markets. In the industrialized nations, over the past two decades, there has been deliberate, unstable with a disproportionate pattern of growth and stagnation in health indicators.

Cornia (2001) asserted that early unqualified and unselected globalization is not the answer to this situation. Additionally, unilateral liberalization improbably will not assist in advancing economic performance and health circumstances. A gradual, careful integration into the global economy, coupled with the abstraction of asymmetries in global markets, and to the formation of institutions that are democratic with global management, instead of instantaneous globalization. Globalization is a mean that national and international policymakers, exploit to support domestic deregulation and external liberalization. Globalization has a multifaceted effect on health. Its impacts are interceded by rising income and distribution, economic instability, the accessibility of health, as well as other social services, stress, and other factors. Health status influenced by the existing conditions of each reforming country, its size, and particular global specialty of its

economy, the accessibility and allocation of assets, its human resources, the condition of its infrastructure, and the quality of its domestic policies.

Properly managed, globalization can cause major improvements in health. The global market forces work proficiently with competitive domestic markets, no barriers to trade, and stable regulatory institutions. Other factors necessary for countries to manage globalization successfully are moderate asset concentration, widespread access to public health services, basic social safety services were available and easy to access global markets. Under these conditions, globalization actually reduces the opportunistic behavior, rewards effort, entrepreneurship, captures economies of scale in production, increases employment opportunities, while improving the welfare of individuals by raising earnings and reducing consumer prices (Cornia, 2001).

Baranyi et al. (2015) suggested a growing, symmetrical, non-discriminatory global market could help the developing countries that have good labor forces, physical infrastructures, and small domestic markets to enter the global marketplace. The global market fosters the increase of North to South transfer of capital, healthcare, knowledge, and other technologies. Countries with the domestic conditions to access to the global markets benefit from brisk economic growth, increased wages, and improved health conditions. A few examples derived from the practices of Brazil, China, Costa Rica, India, Vietnam, and Russia (Baranyi et al., (2015).

Laurinavicius and Karlaite (2013) indicated that few countries have met the domestic and international conditions necessary to successful benefit from globalization. The private sector development within the context of the socioeconomic development

paradigm bears a deep moral and ethical value, which should arouse the international consciousness on socioeconomic development by means of privatization. The rising tide of globalization, which is transfixing the corporate culture of competitiveness, and market-driven private sector practices, encouraged by the national governments has left the marginal groups behind. The wealth of nations has grown; however, achieved this was by odious tradeoffs between economic growth, and social well-being.

Privatization itself is a global force that is necessary for economic growth. The significant areas to remedy deprivation and marginalization are the creation of entitlement, opportunity to work, the generation of empowerment by involvement, and village economic development with corresponding associations among the rural and urban sectors. The lack of ethical awareness has produced a coarse exchange concerning economic growth and distributive equity. In China, the gross domestic product growth will decelerate to less than 10% however, global exports and assets will guide this deterioration. Consumers in China will keep on spending based on the ongoing strength of the retail sales of the country (Laurinavicius & Karlaite, 2013).

Role of ITI in Economic and Social Development

An effective national innovation infrastructure integrates general science, the technological framework of a country, existing apparatus that supports fundamental research, the availability of higher education, as well as the general strength of technical knowledge that leads to new ideas, products, and services marketed. The widespread innovation infrastructure incorporates many of several of the components of the national innovation systems point of view, and thoughts provoked growth theory. The innovative

capacity of a country is dependent on the actual innovative conditions that exist in the nation's industrial clusters (Wessner & Wolff, 2012).

Bilbao-Osorio, Dutta, and Lanvin (2013) defined innovation as the action taken by individuals, and businesses while transforming themselves, and their milieu. The promise of the information, and communication technology (ICT), is to ebb the digital divide, as well as hasten economic growth for marginalized people. Allowing them to contribute and profit from the use of ICT in local communities, to gain from sustainable social and economic development. It is difficult to focus the discussion simply on poverty, and various reduction programs. Absent is the lack of targeting of the elimination of poverty, from a wide-ranging of economic development approaches. ICTs by themselves cannot eliminate poverty in a country, and for the majority of its poor people; meeting basic needs must come first. These new technologies are necessary to eliminate poverty, in order to create an environment suitable for economic growth.

Effective application of ICT will allow a country to engage in electronic commerce while accessing market data; improve educational services, accessing health care, empowering women, engaging in social and political discourse, and combining many of the aforementioned into multiple community access assets. Throughout periods of economic downtrends, typically nations do not invest in technological innovation (Bilbao-Osorio et al., 2013).

The adaptation of technology was necessary for Haiti to infuse positive social change to some of its most challenging problems. The solutions to these problems do not exist; their development and application would improve the lives of its population of nine

million people. Haiti is currently experiencing a period of political stability, along with major improvement in the economic, and security condition after the political turmoil of 2004 to 2006. This progress is delicate and not be characterized as a significant growth in the improvement of the social conditions. The President of Haiti offered a development plan outlining the priorities to modernize the nation and develop the private economic sector. This plan, along with the Growth and Poverty Reduction Strategy Paper (GPRSP) of Haiti, forms the framework for the national and international efforts (Katz, 2013).

Katz (2013) found the Government of Haiti, and the IDB outlined four specific sectors to target in addressing these objectives, agriculture, education, economic governance, along with transportation and electricity infrastructure. The strategy of the Bank for the country consists of three objectives. Reinforce the fundamental base for economic growth**,** focus on infrastructure improvement in the transportation, and power generation sectors, provide technical development to improve agriculture, as well as the private sector. Improve services such as water supply and sanitation infrastructure, access to basic education, and vocational schools; and build up the managerial competence and economic control of the Government (Katz, 2013).

Sawada (2015) indicated that economical social overhead capitals (SOC) were expenditures on education, healthcare, public infrastructure, and telecommunication infrastructure. The advancement of these networks made it possible the omnipresent and fast data transmission in the global economy. The broader use of current information and communications systems engender soaring expansion with little inflation. Networked

computers with their capacity to use broad bandwidth systems to facilitate computer-to-computer transmission were the center of the global marketplace.

Bilbao-Osorio et al. (2013) found in 1995 less than 50% of the 214 nations that were members of the International Telecommunications Union (ITU), reached telecom penetration rates above eight. In 1970, France had a telecom penetration rate of eight. From 1970 to 1990, cellular telephones did not play a significant role in the marketplace, communication systems consisted of landlines. The normal fixed line access rate of 102 countries in 1995 was 2.5 phones per 100 people, and because of decades of capital outlay. In 22 of those nations, mobile penetration reached double digits in 2003. In seven nations, more than a .25% of the citizen owned cellular telephones. In the developing world, the growth in communication is occurring primarily in cellular devices rather than landlines. The expenditures for cellular systems are .50% of the cost of land-based. Deployment and repairs are much faster with mobile systems. The low-capital requirements of cellular systems, offer small-scale economies an effective tool for developing their countries access to the global economy.

The IT infrastructure of a country could provide a source of competitive advantage. A superior IT infrastructure consists of assets such as communications quality, hardware, operating systems (OS) quality, data quality, and capabilities such as IT skills, business application integration that is incorporated to work in concert while providing an integral underpinning for enterprise software applications capable of meeting the business demands and growth. A superior IT infrastructure would be a conduit to deliver precise, relevant, dependable, and inclusive information to all

government agencies and the public. A superior IT infrastructure should also have a well informed and experienced IT workforce with excellent technical and operational capabilities responsive to the end users. While IT was, identified in the literature as being an important factor, it was not an active agent of change. People were an active part of the process their role cannot be underestimated (Heek & Stanforth, 2015).

Beck, Sorensen, and Christiansen (2013) indicated that modernization theory developed over three distinctive periods. It features economic, literacy, cultural, and national identity development. The initial period started in the middle of 1950 and lasted until the middle of 1960. This was the wide distribution of the aspiration for the Western standard of living, bringing with it innovative technologies, new advanced innovations, and the introduction of personal achievement plus materialistic success. The 1970's and 80's were a period of rebuked to the Western way of life and exposure of the imperialistic economic policies of the developed world.

Haile et al. (2013) found that this period introduced some critical and media dependency theories, which were unsupportive of the powerful industrial nations. The success of the developed world became dependent on the ability to maintain and manage its mass media. The last period is the unification of markets, the internet, social media, and powerful personal electronic devices, making the 24-hour global market accessible at a cost.

Godardt (2015) reminded us that Japan reached a higher level of literacy than Europe, as early as, the Meiji restoration (1868-1911) which occurred in the middle of the nineteenth century. Japan, as a nation was not industrialized. Meanwhile, Europe

experienced decades of industrialization. Japan invested heavily in human development in the expansion of education and health care even prior to reducing poverty.

Beck, Bonss, and Lau (2003) concluded that modernization leads to the materialization of crime and corruption “Radical change and crisis are a normal part of all modernization (p. 8).” Durkheim (1893) warned that along with the resulting growth in wealth, modernizing nations might experience increasing crime rates and discrimination. In planning for economic and social development, the concerns for safety, as well as security should not ignore.

Hay (2014) indicated that technological innovations derived from intellectual achievement would allow underdeveloped countries to lift themselves beyond the limitations caused by nature. Modernization theory holds that to industrialize, developing countries must implement internal and societal changes. Modernization requires specific elements and processes to achieve the desired societal changes that are essential for the nation’s development. The greatest barrier to modernization was custom. Economic growth was not synonymous with development. Without growth, they cannot be development, which includes social welfare and living standards.

Development was a concept linked to the evolution of capitalism and the end of feudalism. The term development used synonymously with the following expressions: Modernization, westernization, and in particular industrialization. Development economics can categorize into four schools of thoughts that emerged after World War II: (a) structuralism, (b) the linear stages growth model, (c) the neo-Marxist or dependency theory, and (d) the neoclassical revival of the 1980s. These economic analytical views

resulted from the disappointments of the classical, neoclassical, and Marxism in the failures of addressing the fiscal realism that plagues the underdeveloped nations of the world (Peet & Hartwick, 2015).

***Structuralism*.** The modernization process characterized functionally as the first and second phases of modern societies. The first phase of modern societies experienced self-described suppositions as articulated through their deeds, individualized thoughtfulness of people, and obtainment of political objectives with the regular functioning of social institutions. Beck et al. (2013) outlined six essential aspects of first modern societies. The initial three highlight the structural and systemic presumptions of modern society, and the final three involve the self-depiction of social action. Its physical borders describe the Nation state. The countries distinguished themselves by a programmatic individualization significantly bordered on some sides by prototypes of cooperative life greatly suggestive of premodern constitutions; that firmly determined the societal position of a person by lineage. Personal freedom, equality is an influence and shaped by social institutions. The first phase of modern societies referred to as working societies, where all employable individuals are gainfully employed. The first phase of modern societies has a fastidious notion of nature rooted in exploitation. They have confidence in science that it will ultimately maintain proper management of nature. Application of the principle of functional differentiation; breaking down society into social subsystems, and diverse prototypes of social action making development tantamount to the escalation of complexity.

The second phase of modern societies benefited from Globalization, which destabilizes the economic bases of first modern societies and removes the limits of the physical borders of countries. The welfare state developed during the 1960s instituted the expansion of education, health care systems, improvement in housing, as well as laying the foundation to the rise of self-aggrandizement, along with liberalization of women and equal rights. The third is the industrial revolution affecting the essential significance of gainful employment. Finally, leading to the emergence of a political view based on global ecological catastrophes, this brings about the awareness of resources as being limited (Beck et al., 2013).

***Linear Stages Growth Model*.** Peet and Hartwick (2015) referred to the postwar economy as a perfect machine that generated a long period of peace and prosperous environment for the participating Western countries. The British and U.S. drew the blueprint of this machine after the WWII, by combining free multilateralism, or desirable qualities of globalization, and the concerns of the national welfare state. According to their illustrations, globalization was to serve as an enormous engine for economic development, by stimulating innovation while building capital, and a productive labor force.

Rostow (1960) concluded that all developed nations in their economic realm could be within one of five categories or stages of growth model of development. He designated the stages as (a) the traditional or established society, (b) the prerequisite or preconditions to taking off, (c) the actual take-off, (d) the drive or push to maturity, and (e) the final stage or age of soaring mass consumption. The five stages of growth model

of development represent the neo-colonial also referred to as the linear stages growth model or the western European premise of economic development. Three criteria are necessary to reach the take-off stage. The country must first enhance its rate investment, to less than 10% of GDP. A second step must consist of the development of one or additional areas of significant manufacturing with a great rate of growth. The Third, a factor called for the creation of the political, social and institutional structures necessary to expand new modern sectors.

Neo Marxist/Dependency theory. Peet and Hartwick (2015) described Marxism as a philosophy of materialistic social existence, and a dialectical theory of human development. They indicated that Karl Marx and Friedrich Engels as founders of the Marxism school of thought were enlightened modernist believers in social progress and the perfectability of humanity, in the transformative perspective of science, and in the vast materials created by technological advance in westerners. Marx and Engels saw themselves as liberators of modernism and did not sing its praises.

Marxist economics adopted a wider view of development. Classical and neoclassical economists focus on efficiency and cost-effectiveness when allocating scarce resources. Development economics foster sustained economic growth, that increases the standard of living of the poor people of the developing nations. Another goal of development economics is to design public policies conducive to creating rapid economic growth. The neo-Marxist or dependency theory highlighted the exploitation nature of developed nations toward the underdeveloped countries. Neo-Marxist theory was not only provocative; it was flawed, and very formalistic (Peet & Hartwick, 2015)

Neo-Classical revival. Grant and Wilson (2012) indicated in the 1980s with the burgeoning of the debt crisis Neo-classicalism resurged, as an attempt to reduce the mounting economic deficits of the countries. The Neoclassical economists regarded the neo-Marxist theory as unsound and impractical. They also dismissed structuralism, arguing that the problems of the underdeveloped nations were due to structural obstacles in the global economy and that domestic structural failings necessitated major governmental involvement in the economy. To the neoclassical economists, in order to stimulate the expansion of the domestic economy, and generate efficiencies in markets, developing nations must remove market barriers and reduce regulations. The International Monetary Fund (IMF) and World Bank strongly required market-based reforms, and privatization in order to promote development in the Third World. This approach referred to as the Washington Consensus. This framework was used to introduce broad economic changes in Latin America, as well as in the new economies that the descended from the old Soviet Union countries.

According to Welch (2013) after the end of the Cold War, a new form of modernization theory materialized; with comprehensible propositions of global economic development, leading to an innovative notion of modernization that encompasses continuing cultural changes, rising gender equality, new waves of democratization, and the democratic peace theory. Economic development ushers in generally predictable societal, cultural, and political changes. However, modernization is not linear in nature; rather the progression attains points of inflection and can be reversed. Social and cultural changes are path dependent; history was relevant. The value system of a society was

reflective of the interacting driving forces of modernization and the enduring effects of tradition. Modernization itself is not westernization. Though the countries of the West were first to industrialize, more recently the East Asian nations experienced the highest global economic growth rates, with Japan achieving the longest life expectancy in the world, as well as becoming a much-modernized country. The United States is not a global model for cultural change. The process modernization does not inherently lead to democracy. However, social and cultural changes to increase the probability of democratization.

Peet and Hartwick (2015) concluded that modernization could counter with alternatives more considerable, and persuasive, written from the positions of omitted groups, or on the basis blames of the very notion of development. Blaut (1994) vehemently argued against the concept of the European miracle by noting that: (1) Europe prior to 1492 was not superior in development in the world, (2) colonialism is the basis of the wealth of Europe gained from the plundering of the Third World countries, (3) Europe gained special advantages by being close to the Americas.

Dalton and Welzel (2014) questioned the assumption that democracy is a desirable model for developing nations. Leftwich (1993) argued that better politics is the solution to economic growth, not a democracy. He asserted, “If eliminating the continuing offense of poverty and misery is the real target, then unlimited liberal democracy and unrestrained economic liberty may be the last thing the developing world needs (p. 621).”

Shareia (2015) concluded that the primary premise of modernization theory is that developments in the economy and technology would create desirable social, cultural, and political societal changes. Economic development tends to lead to democracy by creating an educated, and free-thinking middle class while transforming the values and motivations of individuals. Modernization brings with it personal economic security and the much sought after universal aspirations of autonomy and freedom.

Touray (2014) offered a dualistic view with the use of social systems theory, which defines modern society as an entity that is centerless, polycentric, uncontrollable, incapable of regulation with each subsystem having its own logic and mode of self-organization. The welfare state cannot solve all the tribulations of society by itself; since polity is only a subsystem of a functionally differentiated society, which is engulfed in solving the problems of the other subsystems. All subsystems of society, such as the economy, education, family, legal system, mass media, polity, religion, and science, were functionally differentiated, each with their particular autonomous, self-referential autopoiesis which is self-reproducing systems to governance which cannot be regulated from any vantage point if not at all ungovernable. Each functionally differentiated subsystem focuses on one specific function and criterion of success or failure; blinded to other interests and values. A subsystem such as a polity cannot guide the others. In a functionally differentiated society, there was no top or a centre representing society.

Laszlo (1996) conceptualized relationships to be a “formal structure built on the basis of interdependence among its parts” (p. 26) the resulting interface surpasses the simple sum of the parts of each party. Previously, independent systems become

subsidiary to management from beyond while maintaining their autonomy. The alignment of systems creates supra systems rather than separating into individual larger systems. The original autonomous systems, become subsystems, that continue to perform their functions in the new supra system (p. 52).

According to Hayek (1988), the market economy was a spontaneous order serving no specific purposes and continually generates new system states. There are few rules those that do exist are only abstract and contextual. In the development of the system, there is very limited predictability. As a fully autonomous system, the economy was capable of steering and organizing itself. The primary thesis of Hayek stated that it is impossible to steer spontaneous orders and harmful to apply outside intervention. While choosing to believe that society guided by Adam Smith's (1776) is an invisible hand, which states that social relationships cannot be actively planned, rather are unconsciously and spontaneously organized.

Bertalanffy (1968) concluded that we are guided by the existing pricing system of the market exchange to produce goods incidentally with unintended results. Systems theory converged on the various parts of the organization, as well as the relationships that manifest amongst them as they emerge into achieving common goals. These common goals lead to the formation of an organization that is a system independent of the concrete substance of each of its subpart.

Parson (1961) defined an organization to be a social system slanting toward the realization of an explicit goal, which becomes a key function of a broader system, such as society (p. 63). Parsons also developed a theoretical concept that every member of

society fulfills four functional imperatives, which are an adaptation, goal attainment, latency, and integration. The social system is part of a wider general system of action, the other elements or subsystems of action are the behavioral system, cultural system, and personality system. He distinguished the four subsystems based on their principal functions. Parsons attributed the A function to be the behavioral organism's primacy of adaptation; the G function to the personality of the individual, its primacy for goal attainment; the I function to the social system is the primacy of integration; and the L function to the cultural system's primacy of latency pattern maintenance. His interest was in understanding how a social scientist can analyze a social system. He referred to his basic categorization of the functional problem of social systems as (AGIL).

Parsons (1969) asserted that society was a form of a social system characterized, by the utmost level of self-competence in relation to its environments, as well as other social systems (p. 38). Society as a social system consists of four primary subsystems with their own particular functional imperative. The latency patterned maintenance subsystem, or the fiduciary, is concerned with the relations between society and the cultural; the goal-realization subsystem, or the polity, to individual personalities; the economy or the adaptive subsystem, to the behavioral being. Parsons, was particularly concerned with the law, as a functional imperative of integration, consisting of the mutual adjustments, the interrelations, of the previously mention subsystems regarding their contributions to the effective functioning of society.

A practical approach to understanding the implication of the complexity introduced by agents adapting to one another must maintain a level of agreement and

certainty in a social system, which determines the general type of approach one uses to manage a system. The degree of agreement between group members, team players, various organizations, or the community about the main principles that make the system and the activities it engaged in is critical to its existence. On the other hand, certainty is a concern with how to predict cause and effect relationships among actions, conditions, and consequences of actions identified. Higher levels of certainty and agreement generate stable, organized, predictable systems that easily be modeled.

Sheffield, Korotayev, and Grini (2013) observed that in the 1970s, new forms of internationalization introduced, from many points of views on ways to increase interdependence between people, communities, and nations driven by private players. Likewise, globalization is seen as being economic in nature (e.g. international movements of goods, financial capital, technology, and trade); as well as some social and political phenomena (e.g., communication, migration, environment, governance, and war). At times, globalization seen as being an old phenomenon and differences analyzed quantitatively rather than qualitative terms, such as trade, human mobility, and foreign investments. While others advocate, it is the resting point of human history. The developed nations hold that that globalization is a necessary stage of capitalistic development as they address the current problems of development ranging from environment, energy concern and governance. This newly found interdependence has given rise to the Triad Nations: Japan, United States, and the European Union; while the majority of the world is attempting to improve their living conditions. This division between the globalizers and non-globalizers varies globally. This is not just a social

movement and Non-Government Organizations (NGO), it consists of governments as well as nations attempting to follow independent while searching for original patterns of emancipation just like China, India, Brazil, Cuba, Venezuela, Iran, etc.

Sheffield et al. (2013) concluded these two major trends generated conflicts between the eventual increase in social conflicts and warfare worldwide. The growing integration of global economies, from the national to the most local levels, fostered international trade in goods and services, as well as the cross-border movement of information, technology, people, and investments. When a country participates in global trade, there is a noticeable increase in household real purchasing power. Globalization offers an environment where export-led economic growth lowers poverty by propping up wages in the low-income nations. By in large, the world has gained a lot from globalization. The Third World, however, has not benefited the least from it. The competitive standings of nations are forever changing; economies are never idle. The populations of some nations grow while others decrease. Since society benefits the most, it should bear the burden of the costs for those who failed due to greater globalization.

Lo, Lin, Chi, and Joseph (2013) however, found over the last 30 years the amount and target of FDI have changed from the less developed to developed countries. In the past, underdeveloped countries have looked at FDI with mistrust and many suspicions of forming a definite threat to their own sovereignty. To counteract this perception, foreign direct investors have adopted a portfolio of incentives consisting of financing, production technology, organizational with managerial expertise, along with access to markets regional and global.

According to Welch (2013), the General Agreement has guided global trade, since the end of World War II, on Tariffs and Trade (GATT) between trading nations, which were a set of rules for global trade. As a result, a banned imposed on all export subsidies except for agricultural products, while the import tariffs were placed on manufactured goods were lower to negligible levels. This has led to an exponential growth in the trade of manufactured goods, realizing an extraordinary level of specialization and exchange between nations. Improvements in ocean shipping have generated larger and faster vessels for containerization of goods also contributes to the latest surge of globalization. With the combination of state of the art logistics, the cost of international transactions dramatically reduced. The multinational companies are employing global supply chains to reduce their costs. The increased competition, as well as deregulation, led to a reduction in the costs of international transportation and telecommunications.

According to the World Bank (2017) Information and Communications Technologies (ICTs), together with the Internet, are transforming the global economy and markets. The changes are broad effecting social and political activity, in the developed and developing the world. All sectors affected including overall development and poverty reduction. Because of ICTs unique networking capabilities, major reduction occurs in the costs of transactions, as well as structural changes in markets and the public sector and institutions. They instantly integrate global and local markets, while immediately increasing the latent values of human capital. They further increase the overall knowledge base and can empower individuals at the community and national levels. Peet and Hartwick (2015) concluded development involves economic, social, cultural

progress, including ethical ideals, as well as higher moral values. Sen (1999) recommended taking a multifaceted approach to development with a proper balance in the role of government, political and social institutions, along with functioning markets.

The review of the literature on the underpinning of the global economy and significance of information technology infrastructure to development discloses that globalization is a growing process, regardless of the willingness of the developing or developed countries to engage. The Third World had not yet benefited from it. To do so, it must connect to the global economy. There was a consensus among the authors that globalization is an economic, social, and political phenomenon which involves communication, migration, environmental, governance and war. Nations that participate in the global economy increased their real household purchasing power. They believe that with Information and Communications Technologies ICT a country can benefit from electronic commerce, market data, educational services, healthcare information, and the empowerment of women. The population also benefits from social and political conversations, as well as improved community access assets. In addition, they gain from increased personal freedom, financial opportunities, and a much-improved quality of life. A developed ITI is now a necessity for the development of all nations.

Description of an Advanced IT Infrastructure

Ashdown et al. (2015) described IT infrastructure as the sharing of IT assets, telecommunications technology, hardware, software, core applications software, as well as the human element of skills, proficiency, and knowledge combined to develop distinctive IT services for organizations. Management information systems (MIS) are

where people use business processes and information technology bridged together to solve problems. Consolidating processor systems lowers capital investment, the cost to install, manage, maintain, and troubleshoot breaches of security and WAN bandwidth. Merging all inter-site interchanges on IP Virtual Private Networks (VPNs) enterprises can condense operations while lowering costs (Ashdown et al., 2015).

Application architectures. Application architecture is where users share network application software and servers. The application consists of four general functions: (1) data storage, (2) the data logic, (3) the business logic, and (4) the presentation logic. Together they form the pillars of any application. In determining which application architecture is best suited for a particular business entity, examine the differences between two-tier client servers, web-based, and host-based server. Two-tier client-server consists of a user system interface located on an office desktop and database server that is a more powerful machine, which serves many clients. Processing management divides the user system interface and the database server. The database management is a system server that controls stored processes and triggers (Ashdown et al., 2015).

The following figures were illustrations of the various network architectures on designs previously rendered by Bradley Morgan (2007). Two-tier architectures (browser, web server and database server combined) should use only for small, simple applications that use one DBMS (Database Management System), do not require forward recovery so that transactions are not lost with a moderate volume workload and have little or no inter-application communication. Figure 2: Two-Tier Client-Server Architecture.

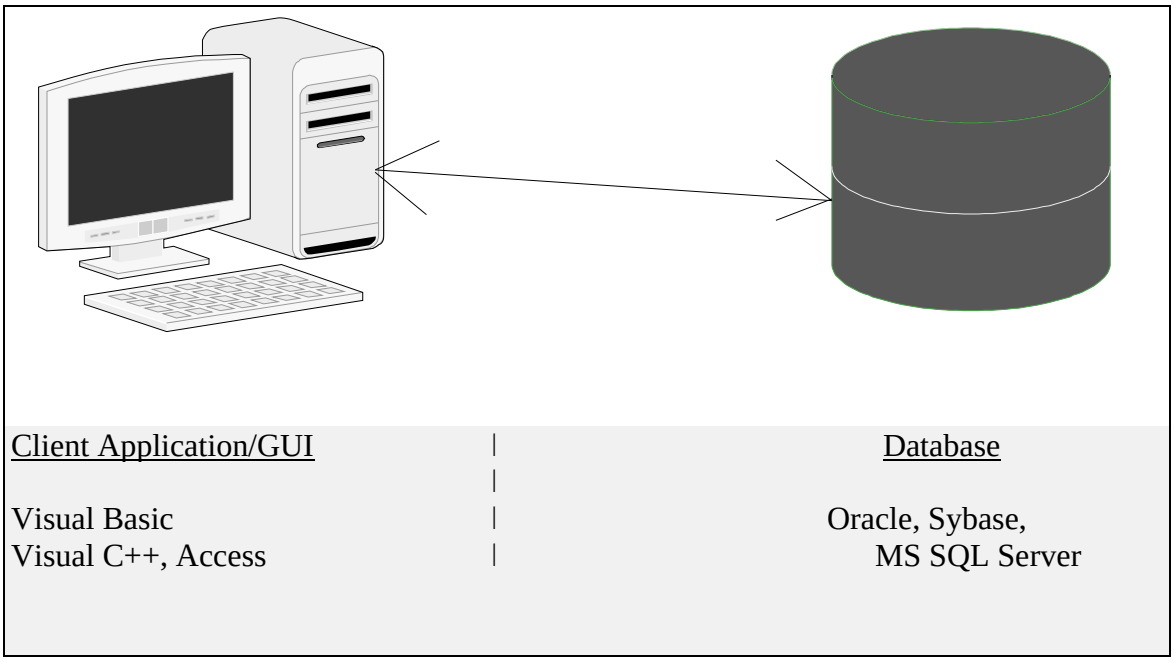

Figure 2. Basic network: Two-Tier client-server architecture.

In two-tier architectures, there are two types of designs, a thin client (fat server) system where the majority of the processing takes place on the server tier and a fat client (thin server) where most of the processing happens on the machine user. One of the limitations of the two-tier architectures is that performance began to deteriorate when the number of users is greater than 100. This was a result of the server keeping open connections via live messages with each user, even when no one is working. A second limitation of the two-tier design is the use of proprietary database management software (DBMS) which limits flexibility and choice of DBMS. Finally, existing performance of the two-tier architecture provides limited flexibility in transferring data between servers without writing new procedural codes. Figure 3**:** Web-Based, Two-tier client-server architecture.

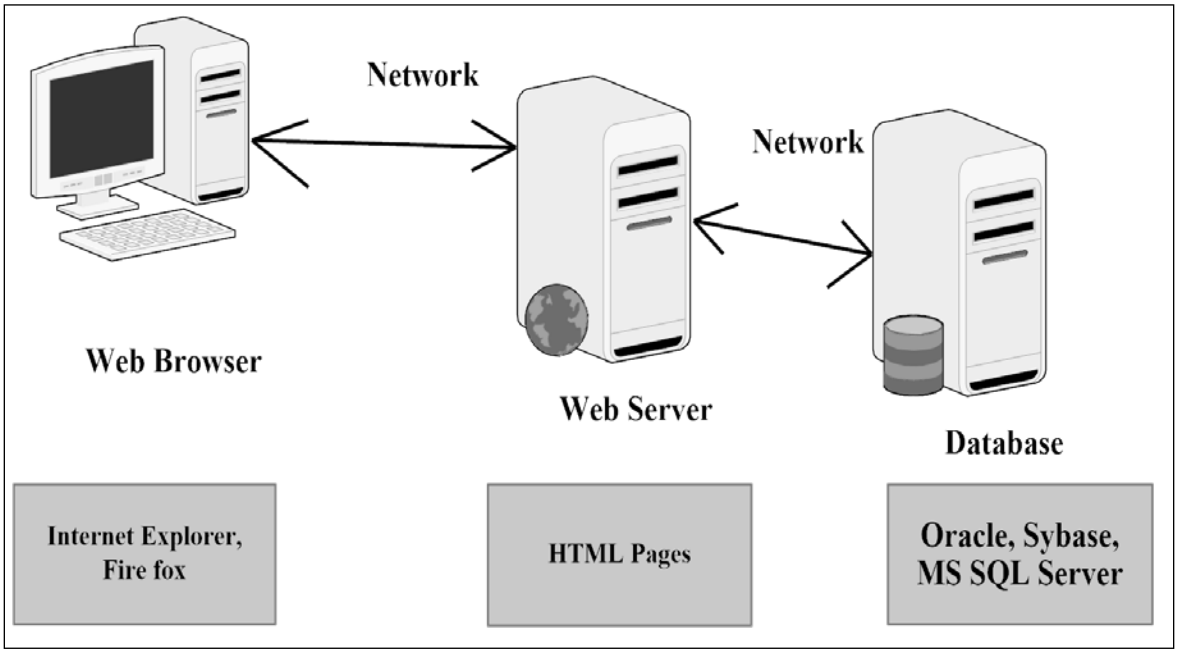

Figure 3. Web-based two-tier client-server architecture

Ashdown et al. (2015) concluded that the host-based email architectures are the wrong choice since it involves sending all the keystrokes of the user to the server for processing. This, in turn, returns all characters back to the user's terminal for display. While all the software housed on the server, Web-Based Client Server (WBCS) computing uses a web browser to access and manipulate dynamic information from a web-based DBMS. Figure 3**:** Web-Based two-tier client-server architecture.

Three-Tier Client-Server Architecture is another choice to the current client/server model, by employing a specially designed graphical user interface (GUI) portal capable of manipulating the data stored in a DBMS using proprietary communication tools. Figure 4, illustrates the Three-Tier Client-Server Architecture. WBCS generates hypertext markup language (HTML) pages upon request to access the

latest data by the use of the World Wide Web.

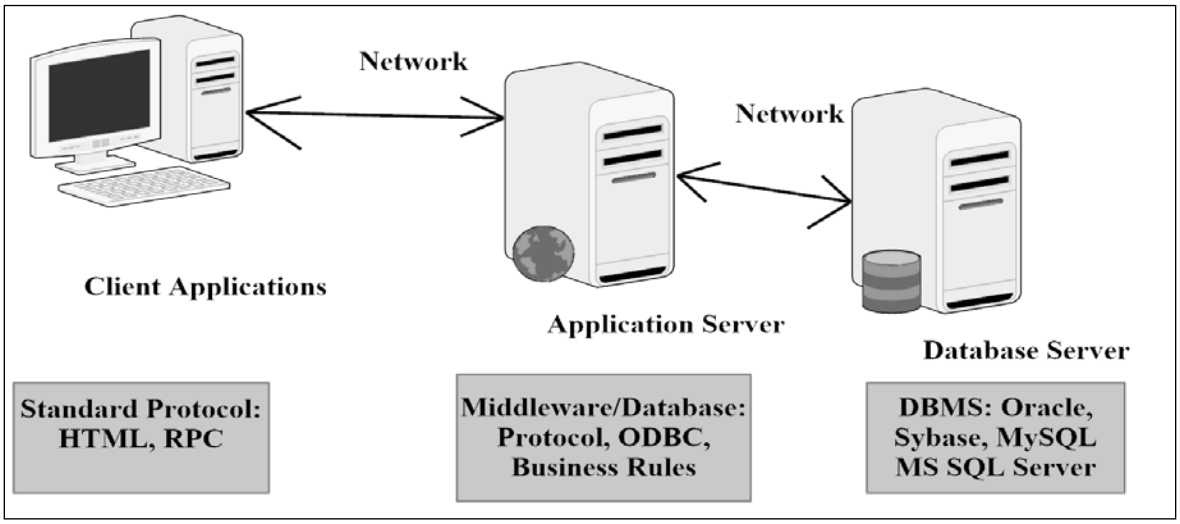

Figure 4. Three-Tier Client-Server Architecture

The majority of n-tier database designed consists of a three-tier configuration. Here, the client-server representation consists of a middle tier, also known as, a business tier that is an application server housing the business logic. The middle-tier frees the user software and DBMS by converting client requests into database searches and turning information from the database into requested client data. Hence, the client and server by no means communicate openly with each other. Since the middle-tier in three-tier architecture houses the business logic, there is improved scalability and segregation of the business software. Multi-tier architecture is the preferred, logical topology in the Internet Application Architecture, which consists of a browser, web-server, optional application component server, and database server (Microsoft.com, 2017). Figure 5 displays a Web-Based Three-Tier Client-Server Architecture.

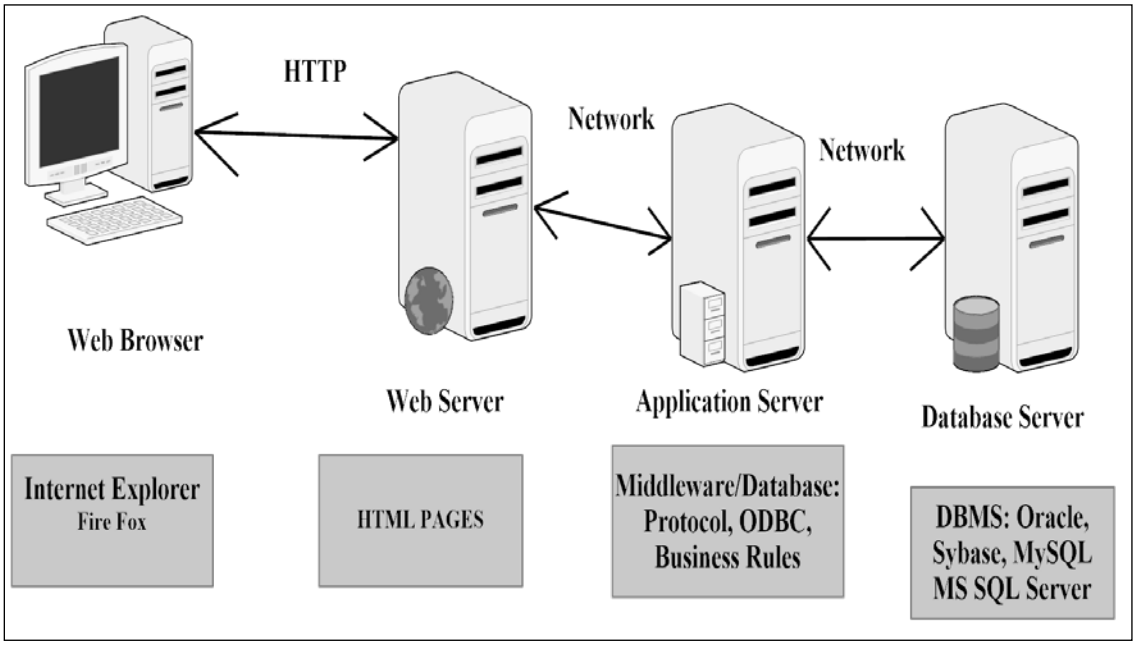

Figure 5. Web-Based Three-Tier Client-Server Architecture.

***Physical Layer*:** According to Ashdown et al. (2015) the physical layer includes servers, clients, and circuits. The circuits are a combination of the physical media and special purpose devices that facilitate the transmission to travel through the media. Two different types of data can flow through the circuit: digital and analog. Many different types of transmission media data are in use such as copper, glass or plastics (fiber optic cable), or air in the form of radio, infrared, microwave, or satellite.

***Data link layer*.** The data link layer is in charge of transferring data from one computer system to another devoid of errors. There are two categories of network errors: corrupted and lost data. The total elimination of network errors on any network does not exist. The properly designed system can prevent, detect, and correct most errors. Errors may occur every few hours, minutes, or seconds due to noises on the lines. Data communication errors may result from line noise and distortion. Twisted pair wire and

coaxial cable are more likely to suffer from noise than fiber optic cable. Impulse noise, crosstalk, and intermodulation noise caused by electrical interference Web-Based (Ashdown et al., 2015).

Agrell et al. (2016) suggested that numerous advantages exist when using optical communications systems for creating applications for the expansion of data handling capability, electrical noise protection, electrical isolation, plus improved safety, and data protection. The fiber bandwidth is a reference as MHz km. A result of frequency and distance, bandwidth ranges with distance: Half of the distance, doubles the frequency. When the distance is double, this, in turn, results in the reduction of frequency, by 50%. Designed for a distance of 100 meters using twisted pair cabling, the resulting bandwidth using 62.5/125 micrometer fiber will be 1600 MHz at 850 nm and 5000 MHz at 1300 nm. To design a 2-km run which is typical of most fiber networks, the resulting bandwidth will be 80 MHz at 850 nm and 250 MHz at 1300 nm. In single mode fibers, for a 100-meter span, the bandwidth would be approximately of 888 GHz. The single mode fiber's bandwidth capability is infinite; it is beyond the capability of the current hardware.

Taylor and Metzler (2007) found that copper is intrinsically unreliable; the pair can fail if the insulation has faults. A lot of the copper wiring has significant age on them. A new fiber network is more reliable and ultimately less expensive to maintain, service providers are placing copper wiring when homes upgrade to fiber optic services. In residential settings, copper is being retired, and future residents of the home may not have the option of going back to copper wiring. This is primarily a consumer issue but with significant implications for businesses. Monitoring a system can be the key to manage the

source of system interferences. Network monitoring can offer critical cost-saving performance while enhancing the IT functions can affect the productivity of staff and reduce cost overruns in maintaining the system infrastructure. A network monitoring system examines internal network systems for conflicts. It is capable of finding and assisting to download snail-paced web pages, lost in transit email, questionable user request and overloaded file delivery, crashing servers, unpredictable network communication connections or other hardware devices.

Ashdown et al. (2015) suggested achieving the monitoring by using software or a combination of hardware and software solutions. Network monitoring solutions can be free or purchased. The Accedian EtherNID allows constant in-service monitoring of service level agreement, Its constraints consist of packet loss, latency, delay variation, and availability.

Network and transport layer. The network and transport layers are accountable for stirring messages from one end to another. They are dire parts of the network. The transport layer executes three tasks: establishing end-to-end connections, addressing, and packetizing (Ashdown et al., 2015).

Addressing and routing. Ashdown et al. (2015) indicated that on TCP/IP networks; each workstation is identifiable by a distinctive IP address, which consists of 32-bits. The design systems are into small groups of interconnecting networks. This allows the communication between the users of the small networks to remain localized. The computers attached to the small network become a subnet of the larger network. Connecting to the small network computers through a router filters the traffic of the

networks. Using the 32-bits of IP addresses to assign to the networks and subnets forming a hierarchy, where the routers can communicate with a machine regardless of its location in the world.

Network technologies. The two primary benefits of building a local area network (LAN) are accessing information and sharing resources. When sharing information users can access the same data files, communicate by email, while accessing the Internet. When sharing resource one machine can share other devices, as well as software with others connected to the network (Ashdown et al., 2015).

Management has two choices: Alternative 1: Traditional Shared Ethernet 10Base-T network, Hub based 10Base-T LANs can run effectively only to about 50% of their capacity while providing a total network capacity of only 5Mbps. With 10 computers connected to a10Base-T hub, on average each machine could only use 500 Kbps. This performance renders alternative 1 as a poor choice since 50 users may have to be on the LAN at times. Alternative 2: Switched Ethernet 10Base-T Network; in the mid-1990s, the concept of switched Ethernet evolved and began to displace the shared Ethernet that had been in place (Ashdown et al., 2015).

Switched Ethernet is identical to traditional Ethernet; instead of a hub, there is a switch. The system prevents two computers to transmit data simultaneously. This type of switching system is a workgroup switch designed to support a small set of computers (often 16 to 24) in one LAN. A switch is an intelligent device with a small computer built in designed to manage a set of separate point-to-point circuits (Fitzgerald & Dennis,

2007, pp. 212-213). At present, we lack the all-encompassing experience with Ethernet switches, to use the full capacity of switched Ethernet.

Enterprise networks. Without an enterprise-wide network or Internet connection, moving information between department LANs or two users is difficult. A backbone network (BN) is a high-speed network that connects many networks. A BN referred to as an enterprise network when it connects to all networks within a company regardless of physical location (Ashdown et al., 2015). To develop the enterprise network the Microsoft Internet Security and Acceleration (ISA) Server 2006 enterprise system is an appropriate tool.

To join the much-desired dignified global community the introduction, as well as acceptance of modernization and systems theories is critical for Haiti. Systems theory consists of the economy, environment, and political system of the country. Including the culture, scientific and technological programs along with the relationship that exists between them as they develop into a totality, as well as its role in this global economy Parsons (1969) saw society as a kind of social system exemplified by the utmost stage of self-competence in regard to its environments and other social systems.

The Case of Haiti and Technology Development: Brief History of Haiti

In 1492, lost in search of India, Christopher Columbus landed on the island were credited to have discovered the new world, which he named Hispaniola (Little Spain) in honor of Queen Isabella of Spain. He encountered the welcoming inhabitants who were Tainos, a name, which means good people, Tai (good), nos (people) in their language; Columbus was the first person to call them Indians. They called their country Quiskeya,

which means mother of the earth in their native language; later the first leader of the new republic Jean-Jacques Dessalines renamed it Ayiti, Hayti, which means mountainous or higher ground to honor the Taino people. The Tainos are descendants of the Arawak people of Latin America. They inhabited most of the Caribbean, the Bahamas, Cuba, Dominica, Guadeloupe, Hispaniola, Jamaica, Puerto Rico, Martinique, Montserrat, Virgin Islands, and most the West Indies. Today we use many words derived from the language of the Tainos, such as barbecue (barbacoa), canoe (Kanoa), tobacco (tabaco), hurricane (juracán), and cassava or (yucca). The use of these words used is in English, French, Spanish, and other languages. Hispaniola became the first country that Europeans colonized. The settlers used three trade ships for the voyage: La Nina (Santa Clara), La Pinta, and La Santa Maria, which sunk on December 24, 1492, on the coast Cap-Haitien, Haiti, where its relics lie (Stone, 2013).

The Spanish settlers annihilated all of the natives within 50 years of securing their newly acquired settlement, which lasted for over 200 years. Most of the Tainos worked to death in the pursuit of gold. The genocide of the Tainos documented as being one of the most brutal in human history. Many died of the introduction of smallpox, syphilis, and other venereal diseases; most were brutally murdered. Eighteen years after settling on the island the Spaniards resorted to importing African slaves to maintain the economy of Hispaniola. The initial influx of slaves of African descent came directly from Spain, not from the continent of Africa. Thereafter, all slaves came from Africa (Stone, 2013). Though the Spanish failed to stabilize the island, it remained a prize for many. Even Sir

Francis Drake of the English empire attempted to invade the country in 1586. Though he failed, his attempt destabilized the Spanish hold on Hispaniola.

In the early 17th century, the French established their presence on the L'Île de La Tortue (Isle of Tortuga) located 6 miles off the northern coast of Hispaniola. After Spain ceded to them the western third of the island in 1697 through the Treaty of Ryswick, which they called St. Domingue and later became Haiti, the French developed the wealthiest colony in the Caribbean, with an economy founded primarily on forestry highlighted by mahogany wood, as well as fruits, legumes, rhum, spices, and sugar-based industries. The overall trade of Haiti was valued to be more than the sum all of the 13 North American colonies which England controlled. The French called it La Perle des Antilles (Fuller, 2015).

The slaves never accepted their condition of bondage at all. The year1752 began a 6-year spree known as the marronage, led by a voudou priest born in Guinea named François Mackandal. The revolting slaves took refuge in the hills and forests of the country where they conducted strategic raids on their masters. Over 6,000 whites killed while their plantations destroyed with fire. In 1758, the French caught and executed him on the square of Cap-Français, now Cap-Haitien, for all to see. However, the unrest never completely ceased. It continued to percolate (Fuller, 2015).

Durandis (2017) noted, August 14, 1791, marked the start of the first major slave revolt of St Domingue led by Dutty Boukman a houngan or voudou priest, a slave of Jamaican heritage. The rebellion was bloodied many plantations were set in flames, and Boukman lost his life yet gained a legacy in Haitian history by proclaiming to live free or

die. His efforts lead to the beginning of many other attempts to rid the country of the scorn of slavery. Led by Toussaint Louverture in the late 18th century, an estimated half million slaves of Haiti revolted.

The First Black Republic in the World

After a protracted struggle, Haiti became the first independent black republic in the world on January 1, 1804. The poorest country in the Western Hemisphere experienced alienation from Europe and the United States, as well as political violence for most of its history. The independence of Haiti did not bring with it the leadership necessary to govern a newly formed Black nation in a world divided by color. Internally, the country split by race among blacks and the ruling mulatto. Slavery by Europeans in the Americas was simply barbaric. The revolutionaries seek legality, equality, and self-determination. While the observers of the revolution celebrate its occurrence on January 1 each year, the people of Haiti are still paying a price for it today. The independence of Haiti cannot be reversed. The Haitian people struggle daily to sustain and safeguard it (Durandis, 2017).

According to McPherson (2016) the first century of its existence, only two presidents served their full term of office. Six short-term presidents led Haiti during the period 1911-1915. Prior to that, President Saget Nissage served from 1870 to1874 and the term of Tiresias Simon Sam span from1896 to1902. During the course of the 19th century, Haiti never successfully instituted a constitutional government and lost control over its economy. In 1915, the assassination and mutilation of the sitting president made it convenient for the U.S. to occupy the country for its own strategic concerns.

Allegedly, the occupation reinstituted law and order, as well as the restructuring of public finances. The Haitian people never accepted the occupation. During the revolt of 1918, about 2,000 people died (McPherson, 2016).

Ulysse (2015) posited most individuals are unaware of the American occupation, its inception, justification, effect, and impact. Students are not learning about the Haitian revolution in school. It is incumbent on the people to highlight their creativeness, diligence, sincerity and strong work ethics, in spite of circumstances. McPherson (2016) summarized throughout this period of occupation in Haiti, the world experienced the first global war (1914-1918), the great depression of the U.S. (1929-1939), the 1929 crash of the American stock exchange, the 1927 flood of the Mississippi, the greatest river flood in American history and the global influenza epidemic of 1918, which killed over 50,000,000 people. By 1934, President Franklin D. Roosevelt ordered the withdrawal of U.S. troops from Haitian soil, which left the country in a desperate predicament. The United States itself was experiencing its own internal turmoil but kept control of the finances of the country until 1947.

In 1957, François Duvalier, M.D. (Papa Doc) secured the presidency and unlike his predecessors, he held on to power successfully. In 1964, he declared himself President for Life. During his tenure, killed thousands of Haitians and much more fled the country. This situation brought Haiti's first major exodus of the educated citizens of the country, which happened again in the 70s (Joseph, 2014). Upon the passing away of Duvalier in 1971 his 19-year-old son, Jean-Claude Duvalier (Baby Doc) assumed the title of President for Life. He attempted to lessen repression, but he could not address the

mounting opposition to his administration, ultimately forced to leave the country with the assistance of the United States in February 1986. What followed were four years of military dictatorship that fostered the country into a burgeoning narcotic state in the late 1980s (Joseph, 2014).

McPherson (2016) noted in 1991, Haiti held the first free election in its history and elected Jean-Bertrand Aristide a well-liked Catholic priest with 67% of the popular vote. Immediately, after assuming office President Aristide launched an investigation into the conduct of his predecessor Madame Etha Pascal-Trouillot (1990-1991) and various other public officials. A series of governmental inquiries provoked six generals to resign. In an attempt to address civil order, President Aristide proposed to separate the military and police. He took these actions to foster foreign aid. However, the elite and private business sector did not receive his policies well. Many of his supporters maintained a militant stance and propagated the same misdeeds he was attempting to eradicate. Their behaviors and the policies of President Aristide lead to a coup d'état by the army on September 30, 1991. The removal of Aristide motivated approximately 38,000 Haitians by 1992 to enter the U.S. illegally using flotillas of makeshift boats overflowed with people. Regardless of their political status, they returned to Haiti. The United States along with the Organization of American States (OAS) imposed an embargo on Haiti (McPherson, 2016).

The European Union and other nations were not supportive of the embargo, yet froze foreign aid and assets of the government of Haiti in a foreign holding. Three years of negotiations with the United Nations and leaders of Haiti led only to stricter sanctions

on the economy. On October 15, 1994, the U.S. intervened in Haiti to secure the restoration of President Aristide to power. Over 20, 000 American troops invaded Haiti to restore the democratically elected leader to power. The army was decommissioned and armed forces trained some newly formed national police. The inexperienced police force was unable to contain a growth in mob violence and political retribution from former military members. Yet, the presidential elections held and René Préval a former close aide to Aristide won 87% of the popular votes, a clear landslide. The election consisted of a low turnout with only 25% of registered voters participating. All but four of the 27 registered political parties refuted the outcome of the election due to questionable issues witnessed by international observers. Street violence and political killings affected the turnout; it seemed like the old days (McPherson, 2016).

Lo et al., (2013) cautioned, the impact of the embargo cannot be underestimated. Notably, during the period of 1980 to 1986, the end of the Duvalier regime, which fostered an environment of political instability, the inflow foreign direct investment, decreased dramatically from .84% to .19% because of the blockade. Over the following 4 years, foreign direct investment (FDI) increased slightly from .36 % to .81%. In contrast, FDI increased marginally in 1995 the year following the end of the embargo. In 1999, the country privatized some operations and deregulated the telecommunication sector. Investors welcomed this decision, 2006 FDI reached 3.36% in growth, which was the highest for the period ending in 2010, which was 2.28%.

McNulty (2017) concluded, “There will be no foreign direct investment in Haiti until there is adequate security, and until the rule of law as maintained the Haitians

prevails" (p.16). From 2000 to 2008 FDI extended from $13 to $72 million USD per year. To transform the Haitian education system to a modern institution of learning, FDI is critical. In spite of the international community donating more than $5 billion USD to Haiti, the small nation continues to function in a desperately impoverished fragile condition. Numerous factors are to blame for this, the Haitian elites, U.S. domestic policies, the donor community, Non-governmental organizations (NGOs), as well as many of the private contractors. The Haitian people continued to be victims of a rampant culture of corruption, illegality, and political violence. This environment generated an insidious lack of trust and collaboration among the people thus destroying all the public development projects (Heritage Foundation, 2017).

The aftermath of the 7.0 earthquake of 2010 ruined much of the capital has left Haiti more dependent on foreign aid more than ever before. The overall impact of the disaster stated as $7.8 billion USD in destruction rendering the contraction of the GDP of Haiti. Corruption continues to be rampant; no discernible reduction in the level of poverty is noted, the population continues to be venerable to natural calamities, together with the inadequate level of education of the population form the basis that severely impedes growth in the economy (Theodora.com, 2017).

According to Apaza (2014), Haiti has inadequate administration; there is an urgent need to improve the management of the public sector, its financial administration, and for increasing competency. There is also a need for performance-based assessments of institution s to eliminate fraud. The NGOs need to develop a comprehensive plan for

them to better manage and arrive at a holistic national consensus to finance the sustainable projects with the most impact.

The problems facing Haiti are not all self-induced. During the year of 2008, the world experienced turbulent spiraling prices, droughts, flooding, and food scarcity. These events that made global headlines, cumulated into food riots and protests in Bangladesh, Burkina Faso, Cameroon, Egypt, as well as Haiti. In the country of Haiti, 78% of the population lives on less than two dollars a day. The country imports over 50% of its food and the citizens use 75% of their incomes to buy food. The riots resulted in the doubling of rice prices last spring caused the death of five individuals. The government officials reduced prices with a 15% subsidy. In the fall of 2008, because of four tropical storms, in addition to hurricanes Gustav, Hanna, and Ike, many people lost their lives. The storm damages make it extremely hard to provide food aid to millions of Haitians, creating a greater risk of malnutrition and starvation. To aggravate matters on October 4, 2016, hurricane Mathew, the strongest storm to hit the country in 50 years with a category four storm made landfall. Leaving 80% of the town of Jeremie destroyed (Political Risk Services, 2016).

The storms killed 800 and left close to 1 million people homeless, the value of lost crops estimated to $1 billion USD. These conditions have been hardest on children; leading many eat to mud cookies, a concoction of dirt, salt, and vegetable shortening. Haiti has the highest mortality rate of infants and children less than 5-years old and mothers in the Western Hemisphere. The country’s drinking water is not clean, and the sanitation system is very poor (World Bank, 2017). Because of the earthquake of January

12, 2010, Haiti has the opportunity to reinvent itself, and foster enduring change. The goal for Haiti builds a country with a modern infrastructure. This calls for long-term investment. It will take years, to address the needs of reforestation, and strengthen the agriculture sector (Miller et al., 2012).

Hughes, Palen, and Peterson (2014) in studying the role of social media, and emergency management found numerous areas of concern: Technical hitches in the verification of social media data, untold liability risks, data overload, and a lack of assets to manage the complexity of social media communications and data. It is necessary to apply performance metrics, standardization, best-operating practices, digital helpers, training, and exercise drills. Social media exist as Internet-based applications that support high social interface, and user-generated content often at a defined group, or to a wide-web scale. The most popular social media sites are WhatsApp, Facebook, Twitter, YouTube, and Flickr. O'Connor (2012) focused on the need for correspondents to improve the accuracy of reporting the number of casualties in disaster zones. The accuracy of the official number of victims from the earthquake of Haiti in 2010 has risen into questions. Many journalists included in their writing the number of victims published by others, without ever verifying its authenticity. With the help of social media, this unverified information went viral**.**

The reporting of the earthquake of 2010 went viral. The whole world was witnessing what Katz (2013) an Associated Press journalist living in Haiti at the time described as an eruption "with twenty-five times the force of the atomic blast that wiped out Hiroshima" (p. 112). With billions of dollars pledged for the reconstruction of Haiti

Katz explained the misconception that foreign aid goes directly to the government of the country in need. The funds given were as an alternative, to domestic NGOs and contractors under the precept of circumventing incompetency and fraud. The benefactor of this funding was Chemonics International, which reported the completion of 314 small grants, procurement services, as well as technically assisting with over 600 short-term activities totaling $39,845,182 USD. Chemonics is a for-profit development organization, created by a former rice exporter to Haiti. The Securities and Exchange Commission censured the company in 2013 for bribing Haitian officials (Katz, 2013).

According to Kushner (2012) of the 1,537 contracts awarded by the US Agency for International Development (USAID) of the post-earthquake era, only 23 went to locally owned businesses since September 2011. Forty percent of the contracts awarded to contractors from Washington D.C., Virginia, and Maryland. Notably, of the $1.1 billion USD spent in Haiti in 2010, neither a contract nor money were awarded to a Haitian business entity. Analysis by the World Bank on the current economic condition of the country indicates festering difficulties in fostering a vibrant and rapid growth economy in order to reduce poverty. As the poorest country in the Western Hemisphere, Haiti continues to be one of the weakest economies in the world, 59% of the people live on $2.41 USD, while another 24% struggle to survive on $1.23 USD in 2014, the per-capita or GDP was only $824 USD. The economic forecast for 2017 thus far shows a dire slow growth of one percent (World Bank, 2017).

The International Monetary Fund (2012) presented the Haitian Poverty Reduction paper and the three-year investment program 2014 to 2016 focused on the Strategic Plan

for the development of Haiti. The plan targeted four specific areas: Territorial rebuilding, economic rebuilding, social rebuilding, and institutional rebuilding. The IMF concluded Haiti lacks in analytical competency, as well as the ability to monitor the sustainable gains and the poverty reduction policy (International Monetary Fund, 2016). Hurricane Mathew heavily damaged the country in 2016 followed by a devastating drought affecting detrimentally the agricultural sector the first six months. Irma did not directly hit Haiti however; it brought major floods, destroyed homes, farms, shattered water and sanitation infrastructures. It is unlikely that the northern part of the country, one of its poorest communities can recover promptly and adequately (FocusEconomics, 2017)

Results Related Gap to the Literature Review

Collis and Hussey (2014) described exploratory research as being necessary since it involved conducting a study into an area "when there are very few or no earlier studies to which we can refer for information about the issue or problem" (p.4). The overall goal of this inquiry was to identify patterns and ideas in developing a hypothesis rather than testing one. The purpose of the investigator choosing an exploratory research was to examine relationships by searching for answers to the hypothesis or other problems (Patton, 2015). The investigator found a lack of prior studies into the ITL or ICT of Haiti. Laguere (2013) in his study of information technology for development: The internet and mobile phone in Haiti found a similar lack of studies when he explored the cellular mobile sector of Haiti. The problem statement and purpose of this exploratory study were used to answer the following central research question: What are the views of stakeholders within Haiti's national culture on how the information technology

infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy?

Finding 1. The government of Haiti must adopt and implement a national innovation plan which would facilitate its connection to the global economy. Analysis by the World Bank on the current economic condition of the country indicates festering difficulties in fostering a vibrant and rapid growth economy in order to reduce poverty. As the poorest country in the Western Hemisphere, Haiti continues to be one of the weakest economies in the world, 59% of the people live on $2.41 USD. while another 24% struggle to survive on $1.23 USD. In 2014, the per-capita or GDP was only $824 USD. The economic forecast for 2017 thus far, shows a dire slow growth of one percent (World Bank, 2017).

To help address the lack of a national strategic plan, the Haitian government with the assistance of the International Monetary Fund, formulated the Haitian Poverty Reduction paper a three-year investment program 2014 to 2016 outlined a strategic plan for the development of Haiti. The plan consisted of four specific areas: Territorial rebuilding, economic rebuilding, social rebuilding, and institutional rebuilding. The IMF found Haiti lacks in analytical competency and the ability to monitor the sustainable gains (International Monetary Fund, 2016). Apaza (2014) concluded Haiti has inadequate administration; there is an urgent need to improve the management of the public sector, its financial administration, and for increasing competency. The development and implementation of performance-based assessments of all its institutions to eliminate fraud and create a culture to prevent its existence.

Finding 2. Haiti is lacking in the availability of computer systems and internet access nationwide, in the schools, governmental offices, and businesses. The government needs to prioritize university-level education since it is the foundation for national development. Overall, there are 50,000 students studying at the university level nationwide with no access to digital libraries which would allow the learner's access to the libraries of universities throughout the world (McNulty, 2017).

Finding 3. All schools in Haiti should have computer labs and internet access for all students to improve the education system of the country. According to McNulty (2017), FDI is critical for the transform the Haitian education system to a modern institution of learning, the small nation continues to function in a desperately impoverished fragile condition. More schools are needed that has IT ability. Also, teachers are needed to teach IT courses. All students should have access to computer labs and internet access. One participant indicated new schools should be built equipped with computers and internet service. Another participant suggested all the schools be, computerized with access to the internet.

Finding 4. The hospitals in Haiti should all be computerized with internet access to benefit from global telemedicine programs to treat patients, train nurses, doctors and other medical staff members as a means of improving healthcare in the nation. Another of respondent supported this idea believing that private industry should make sure that all schools primary and secondary have computer labs. A survey respondent suggested that all the offices of the doctors should be, computerized. All medical records should digitize. Another respondent also thought medical records at hospitals should be,

computerized. In addition, the birth of all children should be, computerized. One participant concluded that all medical clinics and hospitals should be, computerized. A participant indicated that IT could help improve health care in Haiti by allowing research in different illnesses to come up with treatments.

Finding 5. The internet should be employed to offer sports events, concerts, Mardi Gras and other venues, including pay-per-view to promote the cultural characteristic of Haiti. Cultural events should be promoted using the internet. Promoting the products of the artisans and selling them on the internet should be made available. Books and CDs could also be sold over the internet. All the sports events are promoted and made available on the internet. Haiti should have a website for cultural events and historical sites.

Finding 6. The government of Haiti should explore ways that technology can improve tourism in the nation. When asked How is information technology (IT) being used to promote tourism for Haiti, 39% of the respondents indicated that websites be developed to promote art shows, museums, folkloric concerts and web-stores should be created to sell event tickets online. Thirty-three percent of the participants suggested that IT usage promote the national parks.

Finding 7. The government of Haiti should offer the online availability of obtaining a copy of birth certificate, renewal of driver's licenses, obtaining a passport, filing of taxes and other governmental services. When asked what governmental service can you access online, 71% of the respondent said they look up the results of national exams, 50% verify election information, and 53% searched for general information.

Forty-seven of the participants stated they paid their taxes online and 44% indicated applying for business licenses, birth certificates, and vehicle registration. According to 67% of the respondents, the government should employ the use of social media, such as Facebook and Tweeter.

Summary

A systematic approach has been adopted to confront the lack of progress in reducing poverty, improving literacy, health care in Haiti by using triangulation as a model, in addressing the structures, processes, problems, as well as the prospects that globalization offers. Focusing on a single approach would not have any meaningful impact in dealing with the problems facing Haiti. A multifaceted adaptive system is made of a great and varied number of agents that network in nonlinear and adaptive ways. The implemented national poverty reduction strategy was making a tangible difference in. In education, more children enrolled in school, than prior to the earthquake of 2010, many schools building repaired and built news. Security was improved and built police stations in all the communes. Economic activity increased and improved health care (International Monetary Fund, 2016).

Economic theory holds that as trade liberalization comes about, the gains made by the gainers surpass the losses realized by the losers, while the overall nation ends up better off. The economic principles do not promise that they would not be any losers, rather it since the gains of the gainers far exceed the losses of the losers, it would be just to offset the losses of the losers while society would still reap a net gain. Chandy (2017) offered the dual dynamism view of globalization and technological change. With the new

developmental digital renovations and introductions in Haiti, technology is reshaping the country's linkage to the global economy world in various and substantial ways.

In applying the actor-network theory of Heek and Stanforth (2015) the people of Haiti are using technology to now communicate locally or globally affordable. They can transfer and receive money. The technology was in more schools and government offices. The healthcare sector was using more technology. Businesses were beginning to use more technology to access goods and services. With these developments, the economy was growing in a more sustainable and productive way. The adversaries of globalization assert that globalization will lower the standard of life to that of the developing countries. Their views were exactly backward. The goal for Haiti was to speed up its broad-based economic development; in the process, offering the citizen of the country the purchasing power to create better markets for products they produce; in turn, creating more jobs in areas where they can acquire a comparative advantage.

Chapter 2 presented a detailed summary of the current academic literature outlining the factors involved in information technology infrastructure and an exploration of the global economy. Next, the third chapter outlined the choice of methodologies. The manner the study was conducted was explained, as well as the approaches adopted along with the research procedures and proposed analytical tools that were employed to study the information technology infrastructure of Haiti. In chapter the results of the study were presented and discussed. The conclusions of the study were offered in chapter five.

Chapter 3: Research Method

The purpose of this qualitative case study was to explore the views of stakeholders within Haiti's national culture, on how the information technology infrastructure of the country can be developed, so as for Haiti to engage in the 21st century global, and digital economy. To satisfy the goal of this exploratory research, a case study research design was used and data was collected from multiple sources (Yin, 2014). This chapter provided details of the design of this study, the sampling procedure, the population studied, and instrumentation tool. It also outlined the data collection process, as well as the analysis procedures. The justification for choosing the case study approach with a mixed methodology, as well as its advantages along with any of disadvantages it possesses. The data collection tools for this study consisted of two survey instruments, informal interviews with expert informants, and background research to assess the information technology infrastructure of Haiti. Triangulation is the appliance of a number of research methods in studying an event (Bishop-Clarke & Dietz-Uhler, 2012). At the end of this chapter, is a discussion of the participant's rights and ethical considerations.

Research Design and Rationale

Lalor et al. (2013) asserted that a case for embracing the case study approach based on three arguments. First, on methodological grounds case studies offer a holistic yet rigorous approach to achieving explanation and understanding. Case studies could complement current professional prediction strength. Second, the professional presumption of a lack of research protocols for case studies is incorrect. Finally, we can

view this evolution as a threat or as a challenge. Case studies can consist of single or multiple case designs. The use of single cases is to substantiate or test a theory or characterize a distinctive or intense case. Single-case studies are idyllic for studying a rare and unique phenomenon. The investigator should take care not to distort the event. The multiple designs pursued to replicate instead of applying sampling logic. Where other cases are not available to replicate, the investigator is restricted to the use of a single-case design.

According to Lalor et al. (2013), the collective case study is when each case; either forecast comparable outcomes or generates divergent conclusions for anticipated explanations. This methodical framework is required to support a specific theory in designing of a case study. In the application of multiple case frameworks, it is critical to outline both theories and contending theories when conducting a study.

Eliminating biographical, ethnography, and grounded theory as options was not difficult since a biography is the study of the life of a person, while ethnography involves the description of a culture. The grounded theory could be applicable but dismissed since the goal of this study is to evaluate not to develop any new theories. A grounded theory study is an attempt to generate or discover a theory. A critical characteristic of the grounded theory is that it has specific components one central phenomenon, causal conditions, conditions, and context, as well as consequences. Another significant characteristic requires the researcher not to have any preconceive theoretical ideas or notions, therefore, allowing the emergence of a substantive theory (Creswell, 2013).

Phenomenological studies center on the depiction of the experiences of a cluster of people stated from a first-person viewpoint. This is a philosophical approach with no assumptions and requires the suspension of all judgments in reference the ordinary position under examination. The suspension regarded as an epoche. The critical attribute is the intentionality of consciousness where the authenticity of an object linked to the consciousness of someone. A cross-sectional study, on the other hand, is the examination of a phenomenon exactly through subjects who are at a different point in the timeline in the occurrence. The phenomenon studied at a specific point in time (Creswell, 2013).

A longitudinal survey is a study of one group of subjects over a specific period. In longitudinal surveys, avoided are some of the limitations of cross-sectional studies. These types of surveys demand more resources than cross-sectional study (e.g. time and capital)**.** They are several potential problems, such as superseding occurrences outside of the investigator's control and tend to reduce the sample size since many respondents drop out as time progresses. Panel study consist of identifying individuals to determine those who are changing over a period. While, in a trend, the study calls for, different groups of subjects at special points in time to be a sample. The variables that are changing over time are exposed (Creswell, 2013).

There were three principles of data collection applied in this case study research. The first involved the use of multiple sources of evidence. Obtaining evidence and data from multiple sources allowed the researcher to converge lines of inquiry. A number of triangulation protocols were applied to confirm each interpretation. A case study database was created to apply the second principal. This database consisted of notes, documents,

tabular material, narratives, and answers to questions. The third principle required maintaining a chain of evidence. This chain amplified the reliability of data in this case study. An assessment of the protocol was conducted to search for the linkages connecting procedure and the primary questions studied as advised by (Yin, 2014).

Starman (2013) noted criticism of case studies are at a number of levels, in particular for the absence of representativeness of cases used as a means of observation for the social event or issue constituting the object of the study. They are disparaging due to the lack of rigor in the process of collecting, constructing, and analyzing empirical materials that form case studies. The call for rigor is associated with bias, frequently initiated by the prejudice of the researcher and field of informers, on whom; the investigator depends to study a case comprehensively.

According to Lalor et al. (2013), there are two types of case studies. The first factual case studies depict real organizations, people, and situations and the second fictional ones, even though generally based on real individuals and events, do not use the real names of organizations or people. Factual cases can offer a great deal of information, provide credence to conditions and difficulties, and most of all, draw actual conclusions. Factual cases do possess some shortcomings. Typically, case debaters get fixated on the elements of the case as they recall them. When analyzing factual cases, researchers tend to highlight the precision of the details rather than on the correctness of the results. The second: fictional cases are theoretical and do not offer the reliability offered by the factual types. The fictional case essayists are not inhibited by the details. The writers have the liberty to elaborate on dilemmas, questions, conditions, and groups of

individuals to study. A case study may deal with many predicaments and demonstrate the appropriate steps taken to resolve them (Yin, 2014).

The Role of the Researcher

The researcher reviewed many research methodology approaches in the process of selecting an appropriate design for this study. This review of the ITI of Haiti was exploratory in nature and employed a triangulated qualitative approach. Creswell (2013) summarized five traditions of research approaches: Biographical, case study, ethnography, grounded theory, and phenomenology, all were considered in determining the appropriate method for this study. Also, considered were background research and field research. The study could have also been a hybrid of two or more approaches; however, the researcher chose to focus on the outcome and what the method to use. In choosing among the aforementioned approaches, there were four factors considered, the audience question, background question, scholarly literature question, and personal approach question (Creswell, 2013).

According to Creswell (2013), the research question calls for the investigator to outline the desired outcomes and purpose of the study. The personal approach question in the structure of a qualitative research methodology may determine the success or failure of its implementation. The investigator chose an approach that went well with his personal approach. Many people favor working in different arrangements. The scholarly literature informed the answering of the following questions: Is there a lack research and publication on the topic being study? Would there be an economic development in pursuing the research? Is this a duplicate study to validate prior data? Will this study

expand and contribute to the knowledge base? Any of the above questions constitute a good reason to pursue a study. The audience question addressed the method of choice. It is best to employ the method most chosen by the gatekeepers of the field. When the method is unusual, the procedure may become difficult to validate, as well as the conclusions. The personal approach question is where theory has an effect on practice. The desired outcome of a qualitative approach is the best approach to realizing its success (Creswell, 2013).

Methodology

Yin (2014) proposed that research design is a plan action for moving from here to there. He described here as the initial set of research questions; and there, as the conclusions or answers to the research question. Yin (2014) also suggested that the design should be looked at as a blueprint of research that focuses on four problems: (1) What are the important questions for the study? (2) What are the relevant data for this study? (3) What type of data to collect? (4) How results should it analyze? For this study, the following research questions were to assess the ITI of Haiti:

What are the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy?

This exploratory study on the ITI of Haiti employed a case study design. This approach allowed the inclusion of many entities in the case study such as Haitian policymakers, businesspersons, opinion makers, organizational leaders and religious

leaders. According to Patton (2015), the purpose of exploratory research is to examine relationships by searching for answers to the hypothesis or other problems.

Exploratory research is used to conduct an examination of a topic or subject where relatively little known. The guidelines for this type of research do not outline all the required necessary steps to conduct interviews. Yin (2014) concluded that a case study is an exploration of a delimited system or a case over a period through a detailed in-depth data collection process. A case is also an event, a program, an activity, or individuals of interest. Two critical characteristics employed in this study, a bounded system, and a detailed in-depth case over time. The bounded system restrained by time and the location of the case studied. Detailed in-depth case over time is the collection process of gathering information from multiple sources.

This research method consisted of data collection for the research questions from the following sources: A semi-structured interview protocol (see Appendix C), retrieval of archival documents in the form of media reports on the IT and economic, and cultural development of Haiti, and researcher field notes of an online questionnaire, interviews or both, which provided direct access to people who work in areas with knowledge, and access to the information technology system. These approaches provided in-depth, information-rich data on the ITI of Haiti. This process permitted the researcher to allow the participants to articulate their views, facilitating the researcher to listen, while manually recording, as well as via an audio digital recorder, with the written consent of the interviewees (Patton, 2015). The course “used to achieve any or all of the following

goals: Find facts, verify facts, clarify facts, generate enthusiasm, get end user involved, identify requirements, and solicit ideas and opinions" (Whitten & Bentley, 2007, p. 222).

Archival documents were used by the investigator to collect the generated large bodies of data. The method for retrieving data from archival records focused on providing data to answer the research question. The amount of data collected could not be forecasted, all relevant data, were collected. The data were coded to accommodate the needs of this study as necessary since the information was previously stored for purposes other than this inquiry. The details of the design of this research study are outlined in the following sections (Yin, 2014). The design built on the problem statement, the purpose of the research, and the research question was discussed in the first chapter of this study.

Participant Selection Logic

Being that Haiti has two main cities Port-au-Prince, the capital of the nation, and Cap-Haitien, the target population consisted of all their residents. The unit of analysis was the Haitian people. The investigator used an expert purposive, non-probability sampling to select participants who are aware of the ITI of Haiti; since they positioned to provide detail perspectives on the phenomenon studied. An expert purposive non-probability sampling was the best method to employ in selecting the sample, since it exemplified attributes of specific subgroups of concern, and made possible analysis involving the various groups. The benefit of using this sampling design was, it ensured that the key participants had knowledge of the workings of the ITI of the country being assessed (Patton, 2015).

According to Singleton and Straits (2017) when only a small number of cases are available; nonrandom selection be chosen since it relies on the expertise of the investigator. Probability sampling maybe pointless if the goal is to develop more of an understanding of the problem studied. In the instance where the population consists of only 100 people, each individual case is examined on its own merit in contrast with all others. Purposeful sampling calls on the investigator to rely on its own expertise in selecting the representative sample.

The use of a semi-structured interview protocol (see Appendix C) with expert informants provided access to the quantitative and qualitative data necessary to conduct an in-depth analysis of the ITI of Haiti. The sample for the semi-structured interview protocol with a subsample of 48 expert informants was purposeful in nature, which allowed the researcher to select participants with the knowledge to contribute to answering the research questions studied. The expert informants came from a cross-section of the Haitian society.

Gaining access to participants. The significance and purpose of this study were explained to all the participants. Also explained was the importance of their participation to them. The investigator communicated with the chosen prospective participants by telephone, email, and instant messenger. In building rapport, the investigator always presented himself as a graduate doctoral student with an approved university study, interested in understanding the development of ITI of Haiti. The participants were informed their involvement was completely anonymous and confidential during, as well as after the study.

The investigator outlined to all the participants the benefits of conducting the research. Anticipated, though no probable risks to those who participated in the study. Participants were reassured that they may terminate their participation in the study, as well as all interviews anytime they desire. The investigator was able to gain direct individual contact and the tenable commitment of all the participants by employing the above approaches. Prior to conducting any interviews, the investigator obtained written consent (Creswell, 2013).

Instrumentation

A semistructured interview protocol was utilized with a purposefully selected sample of Haitian policymakers, business owners, opinion makers, and organizational leaders (see Appendix C). Semistructured interview protocol is lists of questions pertinent to a particular research topic given to selected individuals of a population studied. They administered by standard mail, email, telephone and on the Internet or a combination of two or more methods. The most cost-effective way to conduct the surveys was by email or online. Many companies offer development software to administer and evaluate surveys entirely online (Dillman, Smyth, & Christian, 2014).

Pilot Study

The goals of the pilot study were as follows: (1) identifying issues and barriers related to recruiting potential participants, (2) engaging the researcher in a culturally appropriate way and from a social constructivist perspective, (3) reflecting the importance of the trustworthiness of data collected in qualitative inquiry, and (4) modifying interview questions (Kim, 2011). The web-based instrument employed in this

examination was developed, and administered by using the online survey tool Instant Survey; the tool used to analyze the responses of the participants. Using the instant survey online tool made the data available immediately to me and assisted in the analysis of the quantitative, as well as, the qualitative data. The semi-structured interview protocol was translated into French and Creole to accommodate the languages spoken by the expert informants and was piloted pretested at a university in a southeastern state of the United States with four graduate students. After they completed and reviewed the questionnaire, their views on its substance and presentation noted. Changes to questions and format addressed based on their comments. The researcher did not intend to solicit sensitive information from the participants (Singleton & Straits, 2017).

If sensitive information were to become necessary, it would be asked without seeming to pry into the personal lives of the participants. The most sensitive questions would proceed with a direct explanation of its importance to the study. The order that the sensitive questions asked is paramount, first less sensitive questions would be introduced. The respondent would be asked to answer a few iniquitous questions that would have built up to the sensitive topics showing a logical need for such questions. The sensitive questions would not have been at the beginning or at the end of the questionnaire (Singleton & Straits, 2017).

Summary of Subtopics Used in Survey

The following subtopics grounded in the extant literature were used in the semi-structured interview protocol (see Appendix C): The use of IT in business, education, health, and government services in Haiti; the role of IT in the promotion of tourism and

cultural events; application of IT in improving literacy in Haiti. Also covered is the availability of IT services in Haiti; as well as the use of IT to connect with the global economy. The responses came from open-ended questions, a selection from a list of choices nominally scaled.

According to Edwards and Holland (2013) informal interviews with expert informants, as in the case of this study, these participants are identified as “stakeholders” consist of one-on-one dialogue to collect specific information and opinions to study the subjects. During the interview, the participants were encouraged to do most of the talking and the investigator documented the conversation by recording it or taking notes. All expert informants provided consent prior to recording.

All one-time observations are not inherently inferior validity wise. Prolonged engagement and persistent observations are important in order to draw valid conclusions in a research study. Conducting debriefing sessions with study subjects offered insights into subject’s views, and motivation about the sensitive topics if any were included in the study. The debriefing sessions did not reveal question and answer problems in the research study. Debriefing allowed the researcher to verify the external validity of the testing results (Singleton & Straits, 2017). The following interview questions were asked of the expert informants:

1. Why do you think Haiti is, not fully connected to the Global Economy?
2. What information technology (IT) resources are lacking in Haiti?
3. How could IT, be used to improve the education system of Haiti?
4. How could IT, be used to develop the health care system of Haiti?

5. How could IT, be used to promote the cultural characteristics of Haiti?
6. How is information technology (IT), being used to promote tourism for Haiti?
7. What Haitian governmental service can you access online?
8. Please discuss freely any issues relating to IT that you feel are important that were not asked by any of the previous questions.

Procedures for Recruitment, Participation, and Data Collection

This case study protocol included semi-structured qualitative interview procedures and general guidelines necessary for the appropriate use of the instrument. Its development preceded the data collection process. The protocol was crucial, and a key factor in affirming reliability in this case study research. This representative protocol consisted of an overview of the case study outlining the objectives, issues, and topics studied. The detail of the field procedures included credentials, permission to access to sites, and sources of information. In this case study, the research question acted as a key component of the protocol that the researcher remained mindful of during the data collection. Lastly, the case study report included an outline, and format for the narrative. An Introductory Letter (Appendix A) and Informed Consent Form (Appendix B) were provided to the participants for review, and signature before the start of the actual interview process (Yin, 2014).

The overview consisted of an outline of the ITI of Haiti and reason for conducting the case study. The field procedures largely entailed data collection concerns and appropriately designed. I was not in control of the environment where the data collection took take place (Yin, 2014). Consequently, the procedures were extremely important.

The plan consisted of the outline necessary to secure permission to access archival data, a draft of the invitation letter to solicit the participation of expert informants, as well as the procedures to collect data, and contingency plan to deal with unforeseen incidences. In the data collection process, the investigator was sensitive to the rights of the participants and did not introduce any preconceived ideas into the study, in so doing that would have biased the findings. The data collection process commenced upon the receipt of approval to conduct this study from the Walden University Internal Review Board. Saturation is the point when new data collection does not shed any new insights toward answering research questions (O'Reilly & Parker, 2013). According to researchers, at least six participants are needed to reach thematic saturation in a qualitative study. Furthermore, continuing interviews after saturation did not provide additional insights (Mason, 2010).

Data Analysis Plan

Data coding. The investigator read the data thoroughly and continued to read the data again to mark significant points. Afterward, the data sorted, categorized, and significant points coded in relations to the research questions. This procedure repeated until the data was coded. Afterwards, entered the data into a data coding grid form. The appropriate variables were identified and selected for analysis. The results for the selected themes were summarized in a report. The data analysis encompassed three concurrent flows of action: (1) data reduction, (2) data display and conclusion, (3) verification (Adler & Clark, 2015). The data management was, linked to data analysis with no rigid limitations connecting them. The system was made of secured high-quality accessible information and documentation of the assessment conducted. All information

collected and used to conduct analysis are maintained in a safe, secure environment long past the end of the study.

Data reduction. The qualitative data collected was reduced by the researcher and transferred into a manageable format easy to access, understand, and code. The tapes of each interview were transcribed promptly into a word document. The survey instrument was coded into common analytical themes facilitating the examination of the data collected. This process remained active throughout this research study.

Data display. The data was presented in an organized, compressed format that facilitates the summary of the large quantity of information into meaningful conclusions and results. The information was presented in various tables as rankings, proportions, groupings and summary statements. The data display was a critical part of the analytical process.

Thematic analysis: Thematic analysis was, employed as a method to identify, analyze, and report common patterns in the qualitative dataset. Boyatzis (1998) stated one could take a variety of approaches to using thematic analysis and essentially get the same rigor. He contrasted theory-driven codes, derived from the researcher's or other existing theories; inductive codes derived bottom-up from the researcher's reading of the data; and prior-research driven codes. He argued that all approaches have something to offer qualitative data analysis; “thematic analysis is flexible and what researchers do with the themes once they uncover them differs based on the intentions of the research and the process of analysis” (Boyatzis, p. 152). The researcher must be quite thorough in his/her data analysis/thematic analysis and this is a section that needs to be concise, focused on

the voice of the participants (raw data) without having to restate it in another form what the participants stated or expanding narratives unnecessarily (Boyatzis, 1998).

Identifying themes within the text, among other components of the data analysis process, is a highly interpretive process, and methodologist state the need to always refer back to the raw data, and refrain from relying on summarized forms of data (Guest, MacQueen & Namey, 2011: p. 15). The data collected from the semi-structured interviews were analyzed qualitatively, and then the qualitative thematic analysis results were converged with the trends apparent in the summary descriptive statistics. The researcher used direct observation, and field notes to triangulate with the interview results, and archival data for purposes of data analysis.

Detailed action plan to obtain archival data. Figure 6 shows a detailed action plan, outlining the process used to obtain data from the archives and various governmental ministries. The action plan also summarized the follow-up procedures after the initial mailing of the request for information, and the feedback mechanism to the participating departments. Also included are the steps necessary to obtain the expert participants. The steps leading to the actual travel to Haiti for data collection are outlined.

Verification. Upon completing the data collection, reduction, and display, the conclusions came from patterns in the data. They were verified to ensure their accuracy and all the procedures employed documented. This allowed for the modification of analytical techniques, methods procedures, and self-reflection. This process was also important for future possible replication of the study.

Issues of Trustworthiness

Trustworthiness of data is a critical concept in qualitative investigations, as well to ensure reliable, transferable, and verifiable outcomes to establish the rigor of the research results (Golafshani, 2003; Morse et al., 2002). This case study's research design contained multiple sources of evidence including a database of information and an audit trail to organize and track information to the sources and the sharing of information with research participants (Yin, 2014). Using a variety of methods is crucial for the trustworthiness of qualitative studies (Golafshani, 2003) thus, apart from the semi-structured interviews other types of qualitative data were collected to enrich and support the findings of this case study. The semi-structured interview protocol was pilot-tested such pilot-testing established trustworthiness and credibility in the study findings (Lincoln & Guba, 1985).

Another strategy used to support the study's trustworthiness was the use of observational field notes throughout the process to preserve personal reflections of the data collected from the interviewees (Katz, 2014). Checks were performed during the research by sharing this researcher's notes, and information with the participants, which permitted clarification or additional data, which corroborated the findings. Additional information collected minimized identified gaps were unified to obtain a better understanding of interview responses (Baxter & Jack, 2008). Encouraging participants to review the information obtained during the interview provided dependability by confirming the researcher's perspective of the case (Yin, 2014). When the operational measures support the concepts developed from the case study questions, construct

validity is increased (Yin, 2014).

The researcher conducted member checks during and after the research. Peer scrutiny was sought to recognize researcher bias. Examination of data collected underwent subject matter expert examination, and reflection to ensure content and confirmability of the findings. Through this process, the researcher reached an understanding of underlying meanings and through multimethod triangulation of research developed conclusions (Guion, Diehl, & McDonald, 2011; Patton, 2015). The study's trustworthiness of the data was ensured through the thematic analysis that was conducted through data gathering, content analysis, trustworthiness discussions with a proper debriefer, and an SME who conducted quality audits on the results of the data analysis (Golafshani, 2003). The trustworthiness of data collection was verified by providing precise details of the sampling method and participants' descriptions (Elo et al., 2014).

Ethical Procedures

Participation in this survey was voluntary. The participant had the choice, to or not, answer the questionnaire, or answer only some of the questions. If the questionnaire was not responded to, the researcher attempted to seek their participation again. They could choose to participate or not to take part or contacted. They could have discontinued their involvement in the study at any time without providing an explanation. All responses are, kept confidential. I adhered to all the ethical standards established by the Internal Review Board of Walden University. I consulted the international compilation of regulations provided by the US Federal Office of Human Research Protections. The survey instrument was, translated into French, and the interviews conducted in French.

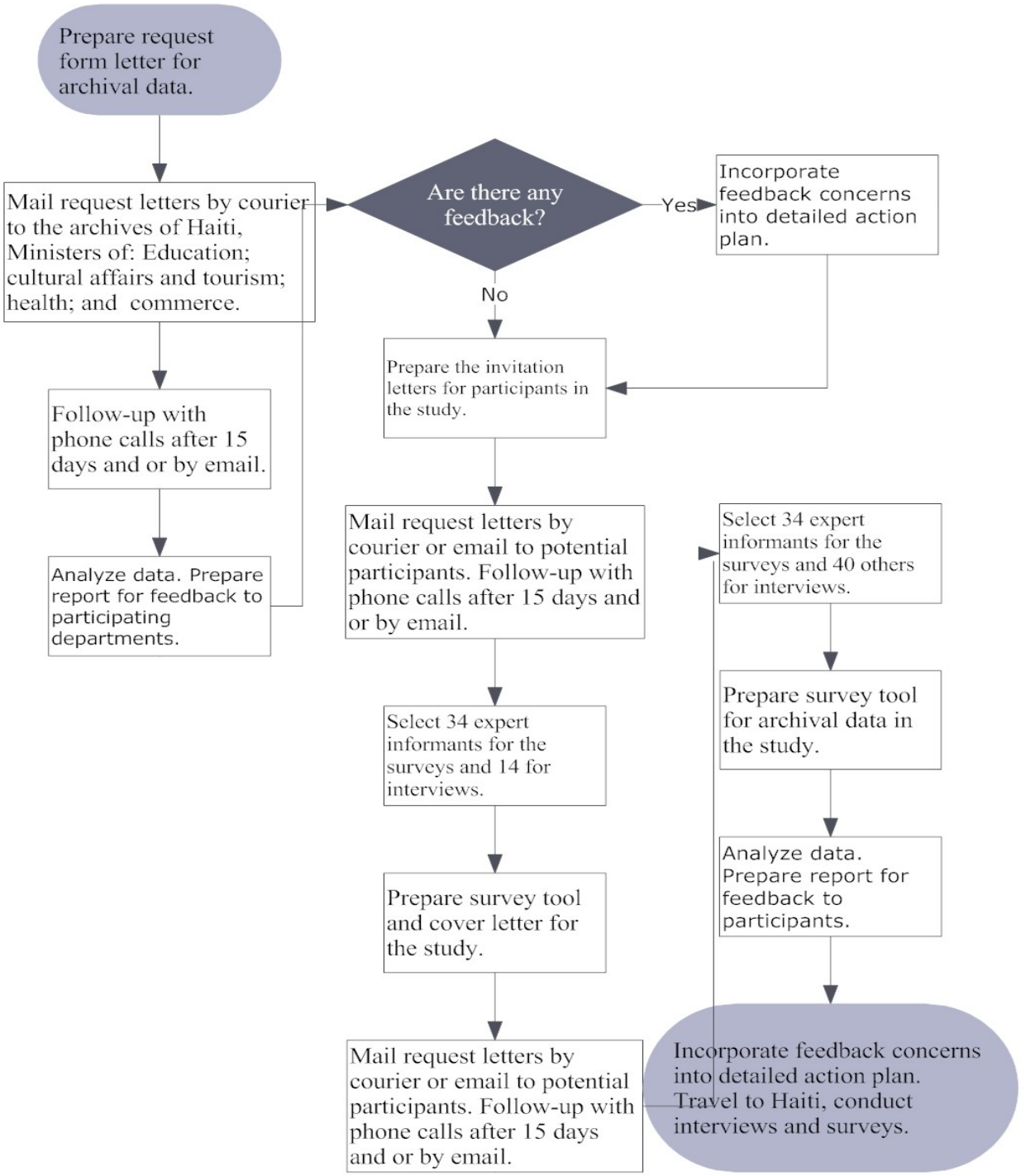

Figure 6. Detailed action plan.

Summary

In Chapter 3, the research methodology design was, outlined. The rights of informants are clearly stated. The procedures, data collection methods are, outlined; issues related to the trustworthiness of the data collected, as well as a conclusion along with verification discussion. The proposed approaches adopted in interviewing expert participants are also outlined. The rationale for the choice of the chosen methodology, the sample, and setting are substantiated. The analytical approaches to study the data are detailed. In chapter 4, the results of the study were presented and a thorough analysis of all the data collected. Chapter 5, the investigator interpreted the findings and presented the implications, limitations, and recommendations from the study. The author offered a summative narrative as the conclusion of the study.

Chapter 4: Results

The purpose of this qualitative case study was to explore the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy. To satisfy the goal of this exploratory research, a case study research design was used, and data were collected from multiple sources (Yin, 2014). The unit of analysis is the stakeholder within Haiti's national culture. Qualitative data were based on insights derived from in-depth interviews (Patton, 2015). The data collected for this study was, derived from a non-probability sampling of 49 individuals who voluntarily participated in the inquiry. Thirty-four participants were surveyed and 14 others interviewed. All the participants consented in writing to their involvement in the research. The sample for the semi-structured interview protocol with a subsample of 48 expert informants was purposeful in nature, which allowed the researcher to select participants with the knowledge to contribute to answering the research questions studied. The expert informants came from a cross-section of the Haitian society.

In the following subsections of Chapter 4, The author discussed the research setting, the demographic characteristics of the participants, their answers to the interview questions, the researcher's direct observation, examination of the field notes, and journal entries. Furthermore, the author presented the primary evolving themes; the conclusions derived; and the liaison of the research results to the conceptual framework, research question, as well as the body of literature. Consequently, the exhibition of the findings necessitated that the detailed responses of the participants be included. The evidence

made from the data analysis and offered in this study represents the principle and implications crucial for the comprehension of the case being studied, as well as answering the overarching research question. In protecting the privacy of the research participants, the investigator ensured not to include any confidential or any identifiable information that could not be revealed to participants anywhere in this study. I made sure to exclude immaterial or redundant information in this study.

The problem statement and purpose of this study, were used to answer the following central research question: What are the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy?

Pilot Study

As described in Chapter 3, the web-based instrument employed in this examination was developed, and administered by using the online survey tool Instant Survey; the tool used to analyze the responses of the participants. The semistructured interview protocol was translated into French and Creole to accommodate the languages spoken by the expert informants and was piloted pre-tested at a university in a southeastern state of the United States with four graduate students. After they completed and reviewed the questionnaire, their views on its substance and presentation noted. Changes to questions and format addressed based on their comments. The instrument did not incorporate a talking down to tonality; it showed awareness of language usage by regional and other group differences in the meaning of words. During the pretest phase of the design of the study, the investigator was cautious when asking personal and sensitive

questions. The researcher did not intend to solicit sensitive information from the participants (Singleton & Straits, 2017).

Research Setting

Throughout the data collection process of the study, many of the participants indicated the lack of electricity as a major hindrance to economic development. Inconsistent availability of electrical power made it difficult at times to conduct the archival research. The period of the data collection process was unstable due to the political turmoil which occurred at the data collection time in the country. Elections were to occur, however, they continued to be postponed. The government was at a standstill since the Senate could not form a quorum. The future was very uncertain due to the earthquake of 2010. The participants were not deterred from partaking in the study.

Demographics

Thirty-four participants were, purposively selected to participate in the online survey. Seventy-nine percent of the participants of the study were 30 years old or below that age range. The remainder of the participants, which totaled 21%, was between the ages of 31 to 50 years old. In terms of gender, 29 males and five females took part in the study (see figure 8). Forty-one percent of the respondents resided in the city of Cap-Haitian. While 59% of the participants lived in Port-au-Prince, the capital of Haiti as reflected in figure 7. An additional 14 individuals took part in the one on one interview aspect of the study. Five of the participants interviewed were females and nine were males. Eight of the respondents lived in the city of Port-au-Prince and six resided in Cap-Haitian (Figure7).

Response	Total	% of Total Respondents	%
Cap-Haitian	14		41%
Port-au-Prince	20		59%
Total Responses: 34		**0% 20% 40% 60% 80%**	

Figure 7. Which city do you live in?
Note: Bar Chart generated from the Instant Survey online database tool.

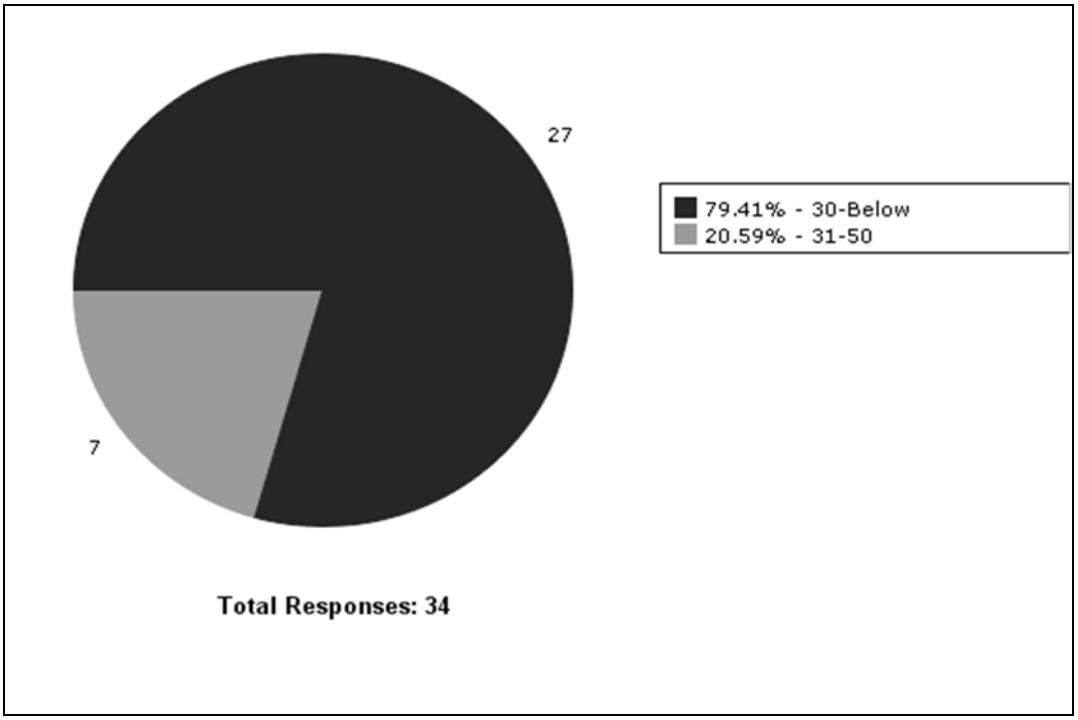

Figure 8. Age of survey participants.

The gender distribution of the participants consisted of 85% male and 15% females. Male and female participants had an equal chance of participating in the study. Twenty-nine males and five females participated in the research (see figure 9).

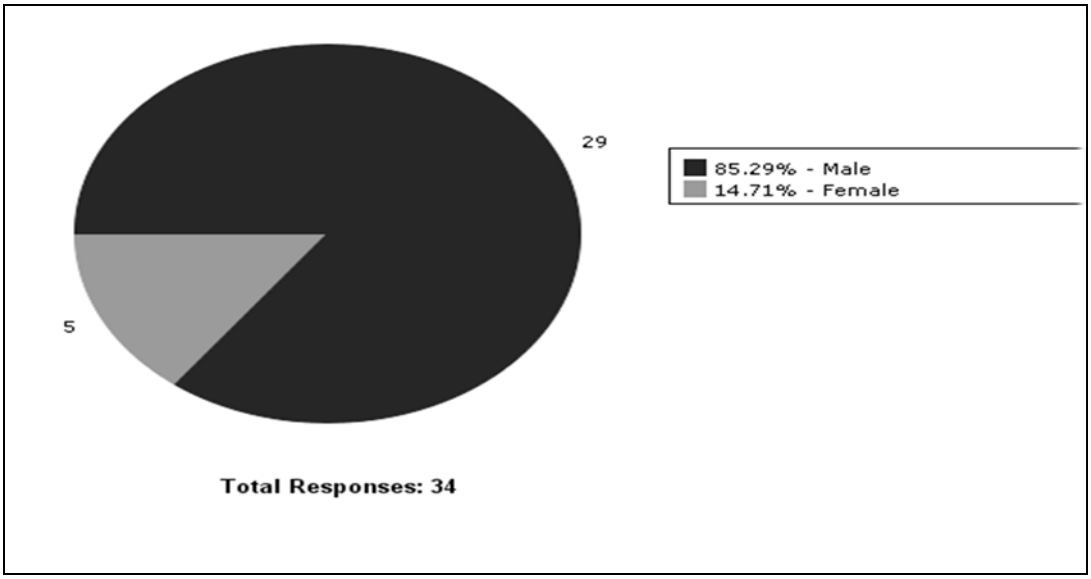

Figure 9. Gender of Survey Participants

The educational background of the study participants is, summarized in Figure 10. The rhetoric year is equivalent to the last of high school and philosophy is considered a year of practicum designed to transition the student in choosing the appropriate subject to major in college in preparation for graduate, and or professional studies. The analysis showed that 39% of the respondents completed high school, while nearly 6% finished their philosophy year. Half of the study participants enrolled in college or completed some or all of their university education. Each Respondent could choose only one of the following options: Rhetoric, Philosophy, University level, law school medical school and none of the above (see figure 10).

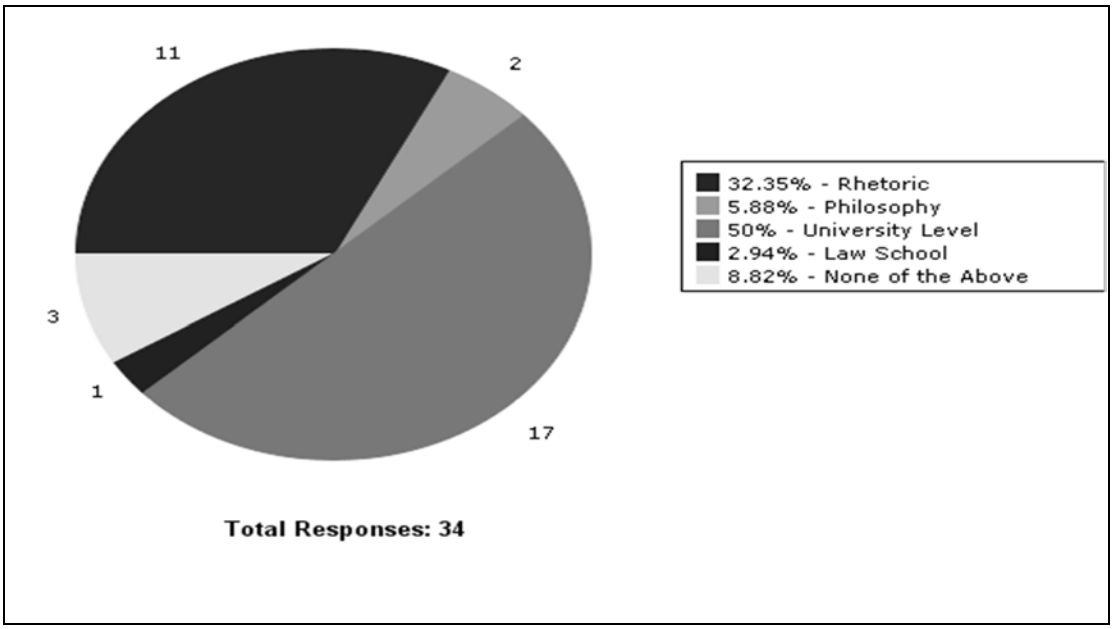

Figure 10. Education Level of Respondents

Data Collection

This case study protocol included semistructured qualitative interview procedures and general guidelines necessary for the appropriate use of the instrument. Its development preceded the data collection process. The detail of the field procedures included credentials, permission to access to sites, and sources of information. The archival data collection was appropriately designed. The investigator was not in control of the environment where the data collection took take place (Yin, 2014). Consequently, the procedures were extremely important. The investigator secured the necessary permission to access archival data, a draft of the invitation letter to solicit the participation of expert informants, as well as the procedures to collect data, and contingency plan to deal with unforeseen incidences. There was no extenuating circumstance that interfered with the data collection of the study.

Themes Developed from Data Analysis

The use of NVivo software permits qualitative researchers to code data for well-established results analysis (Kikooma, 2010). Transcribed interview sessions were formatted on a Microsoft® Word documents, according to participant number, and then inputted into NVivo (Version 9) software for data analysis. A query was conducted for regularly occurring words in the transcriptions illuminating the rise of different themes. The usage of notes facilitated the content to be collected easily from each case. Case nodes were generated in NVivo to establish 34 participants' transcriptions in a numerical identification system plus allowed easy access to each file. The NVivo program was used to track each unique node, words, and textural descriptors or phrases all through the transcripts (Kikooma, 2010). This specific process offered the investigator with insights into arrays, distinctive and reoccurring themes, and linked research results, which are noted and documented applicable in Chapter 4 and 5. Cumulative understanding of results, text search queries in NVivo bare the most recurrently occurring words stated by study participants. Thematic analysis was used in accordance with the Leeds Attribution Coding System as a means of identifying, analyzing, and reporting common patterns in the qualitative dataset in response to the central research question.

I worked thoroughly in data analysis/thematic analysis as this was a segment that needed to be succinct, focused on the voice of the participants (raw data) without restating in a different way what the participants have actually stated or intensifying narratives superfluously (Boyatzis, 1998). Coded data collected from the semistructured interviews were analyzed qualitatively, and then the qualitative thematic analysis results were

congregated with the trends apparent in the analysis. Below is a presentation of themes resulting from the thematic analysis of textual data by interview question developed from analysis of the participants' responses to the semistructured interview questions along with the archival data collected in this study.

The first Interview Question 1 was: Why do you think that Haiti is not fully connected to the Global Economy? Finding 1 was: The government of Haiti must adopt and implement a national innovation plan which would facilitate its connection to the global economy.

Interview question 2: What information technology (IT) resources are lacking in Haiti? Finding 2 was: Haiti is lacking in the availability of computer systems and internet access nationwide, in the schools, governmental offices, and businesses.

Interview question 3: How could IT be used to improve the education system of Haiti? Finding 3 was: All schools in Haiti should have computer labs and internet access for all students to improve the education system of the country.

Interview question 4: How could IT be used to develop the health care system of Haiti? Finding 4 was: The hospitals in Haiti should all be computerized with internet access to benefit from global telemedicine programs to treat patients, train nurses, doctors and other medical staff members as a means of improving healthcare in the nation.

Interview question 5: How could IT be used to promote the cultural characteristics of Haiti? Finding 5 was: The internet should be employed to offer sports events, concerts, Mardi Gras and other venues, including pay-per-view to promote the cultural characteristic of Haiti.

Interview question 6: How is information technology (IT) being used to promote tourism for Haiti? Finding 6 was: The government of Haiti should explore ways that technology can improve tourism in the nation.

Interview question 7: What Haitian governmental service can you access online? Finding 7 was: The government of Haiti should offer the online availability of obtaining a copy of birth certificate, renewal of driver's licenses, obtaining a passport, filing of taxes and other governmental services.

Evidence of Trustworthiness

Credibility

Using a variety of methods was crucial for the credibility of this qualitative study (Golafshani, 2003), thus apart from the semi-structured interviews other types of qualitative data were collected to enrich and support the findings of this case study. The semi-structured interview protocol was pilot-tested such pilot-testing established trustworthiness and credibility in the study findings (Lincoln & Guba, 1985).
Along with the interviews from participants the author wrote reflective field notes to analyze my own thinking on the data collection process, the researcher analyzed data concurrently and used triangulation to enhance the credibility of this study. Once I completed transcribing the face-to-face responses to interview questions, I met with the participants again to provide them an opportunity to ensure that the researcher accurately

reflected their point of view through the process of member checking (Merriam & Tisdell, 2015).

Transferability

When considering transferability, I followed recommendations by Stake (2010) on determining transferability of case study findings. Transferability was achieved when the researcher provided sufficient information about the research instrument and the research context, processes, participants, and researcher-participant relationship (Morrow, 2005). Given the small sample size and absence of statistical analyses, the researcher was very careful in the presentation of the research not to imply that the findings can be generalized to other populations or settings. The validity of this study's instrumentation depends on the matter of transferability. Transferability was of external validity, as both notions are involved with the amount to which the outcomes of one study can be useful to other settings (Merriam & Tisdell, 2015). This poses a challenge for many qualitative studies; however, it is plausible that the outcomes from this research can be applied to individuals beyond the participant group (Stake, 2013). Transferability in this study relied on rich, descriptive data provided by each participant which convey detailed accounts of their experience with ITI in Haiti, a strategy which may increase the likelihood of transferability (Yin, 2014).

Dependability

In establishing dependability, the study participants had the chance to review the researcher's transcription of their answers to confirm they accurately reflect the participant's view. The researcher gathered the data, analyzed it simultaneously using

qualitative content analysis, triangulation, and development of key themes by means of qualitative hand coding. Inspiring participants to review the information obtained during the interview ensured dependability by checking the researcher's perspective of the case (Yin, 2014). When the operational methods uphold the concepts advanced from the case study questions, dependability of the data was increased (Yin, 2014). The researcher can preserve a database of all information, documents, interview transcripts, etc., and offer a protocol report of how the entire case study was directed (Creswell, 2013). As for this study, all relevant files, interviews, coding drafts, were stored in a database designed to save all study data.

Confirmability

The researcher achieved a point of confirmability by enacting measures which establish a rationale that findings are evidence-based (Shenton, 2004). The conformability of the study was strengthened by using instruments which are designed based on the scholarly literature and not researcher manipulation. This strategy data interpretation process (Patton, 2015). Data collection strategies utilized in a study such as triangulation (Yin, 2017), a purposively selected variant sample (Merriam, 2014; Morse, 2015), and audit trails have been used to demonstrate what is called "commonality of assertion" and strengthen the confirmability of data results (Stake, 2013).

Generalizability

The investigator was mindful of errors in the data collection process of this study. Generalization theory would have been employed should the possibilities of disentangling multiple sources of error in the measurement procedure, become necessary.

The number of tasks or questions could have been increased or decreased if it was necessary to improve the reliability of the data in the study (Briesch, Swaminathan, Welsh, & Chafouleas, 2014).

Study Results

The problem statement and purpose of this study, was to answer the following central research question: What are the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy? For this study, seven interview questions were developed to support the findings of the central research question. Using the conceptual framework of the study, unique questions were developed and provided to each participant. Below is a narrative of study results to indicate support themes that emerged from participant interview sessions.

Interview Question 1: Why do you think that Haiti is not fully connected to the Global Economy? Two interviewees indicated the government of Haiti is responsible for the lack connectivity due to their lack of control on the economic development of the country. While another stated Haiti functions more or less like a parasite. The finances of the nation are, not properly utilized to benefit the country economically. One interviewee noted overall the country is not properly, structured economically. Another study participant concluded it is the lack of availability of the internet that limits our ability be full, connected with the global economy. This was, echoed by another participant by simply saying more internet access is necessary. In contrast, one participant concluded

the reason is that the country overall is not ready and too weak economically to be fully connected to the global economy.

From the archival data, it was discovered that the telecom industry has grown since the disaster of 2010. Now, the citizens have access to nationwide cellular service and internet access through smartphones. Digicel the largest cellular company extended its coverage to all ten regional departments of the country. Viettel developed its line-based fiber optics infrastructure. Cellular providers Voila, Digicel, and Unibank are now, fully vested with mobile online banking with over three million completed transactions and growing (Laguerre, 2013).

A respondent stated the cost is too much for most of the youth to able to afford to participate in what could help with the development of Haiti. It is not available to all and considered a luxury. Another respondent agreed that the cost of IT services is much too high. The cost should be lowered so people can do research. There was a unanimous agreement that the cost of IT services cost excessively much. The price should be lower and the service is poor. The high-cost limits access to most people. In Haiti, the price for services is very high in the cities and even much higher in the rural areas. The internet services are expensive not everybody can afford it. Interview Question 1: Why do you Think that Haiti is not Fully Connected to the Global Economy?

One interviewee indicated the knowledge base of the people and the fact that the country is weak economically as a reason for the poor connectivity. While another noted that, the country is far behind socioeconomically. One of the participants stated the country is missing so much that many people may not even know about the internet.

Another one concluded it is as we are from another planet. While one interviewee asserted there are not enough commercial activities going on the internet from Haiti. According to one interviewee, it is the fault of the government. Those in charge just worry about themselves. Another feels it is because the country does not produce enough products that are the reason the country is not fully connected. One participant just concluded simply Haiti is underdeveloped.

The researcher noted from the archival data, the Korean Agency for International Development (KOICA) funded two projects, costing $4 million USD to improve the electrical infrastructure of the town of Leogane and the industrial park of Port-au-Prince. There were new diesel generators installed in Leogane, as well as an improved interface between the central electric power company and the industrial park. The completion of the projects took one year and improved the availability of electrical to the immediate local communities. Leogane was the epicenter of the earthquake of January 12, 2010 (Country Watch, 2017).

E-Power and the new Oasis Resort is an example of the joint private ventures taking place in the development of Haiti. The two limited liability companies with a minority foreign equity, such as the Bush and Clinton Foundation invested approximately $87 million USD dollars in the project. E-Power produces 30 megawatts of electricity more than enough energy to operate a 132-room international hotel. Both companies' shareholders have committed to spend 3% of the revenues of the company to fund local social projects. The Clinton Bush Fund as a minority partner invested an additional $100,000 USD to fund a training program in the hospitality industry to prepare the future

staff of the Oasis Resort, which was under construction. The program prepared individuals for work at other and future business venues to support the tourism, as well as the service industry (Country Watch, 2017).

Laguerre (2013) asserted the two main mobile carriers, Digicel an Irish owned company and Voila a subsidiary of Trilogy International Partners a US company provides efficient cellular telephone coverage in Haiti; however, the cost of service is very high making it impossible for most Haitians. The few private ISPs that provide high-speed data charge approximately $70 USD a month for only 128 kilobits per second connection. From 2006 to 2009, the use of cellular telephones grew from 5% to close to 35%, with Digicel as the market leader followed by Voila and Haitel. The lack of cable connectivity fostered in a perfect environment for satellite services. The mobile telephone service providers were instrumental in the humanitarian relief during and after the earthquake of January 12, 2010. Digicel and Viola merged in October 2012. The ministry of economy and finance is, inextricably connected to the public finances of the country. The fundamental needs of finance and technology hasten the integration of information technology and communication of the entire financial sector of Haiti. These innovations lead to the democratization and decentralization of the national financial system. The ministry advanced the reform of public finances by relying on ITC. Taxpayers can now file and pay their income tax online. The online filing system is to encourage more people to pay their tax liabilities while reducing the number of tax evaders. The General Administration of Customs has been computerized with a reliable an online automated clearing system. Users now have direct access to conducting business activities relating

to customs. All necessary customs declarations and cargo manifests are now online. This approach promotes domestic production in information communication technology.

With the start of the fiscal year 2010 all, the customs offices were, interconnected via a satellite system in the country. With these advances, the goal is to circumvent, as well as eliminate fraud and corruption. The incorporation of IT-enabled the expansion of services while improving the efficacy of the financial systems. All government budgeting and planning were, automated. The finances of the government are, managed better because of the technology (International Monetary Fund, 2016).

Broadband will be crucial for the social and economic development of all nations in the 21st-century. Adapting e-health, e-education, e-environment, and e-government will provide greater access and capability at a lower cost. Everything must be done to make certain that Haiti builds a state of the art 21st-century infrastructure with robust features capable of reducing potential future network vulnerabilities. This is an excellent an opportunity to improve the quality of life of the citizen of the country and their work environment (Country Watch**,** 2017)**.** When applied with creativity the adaptation of a modernized ICT services can be powerful. Presently globally, approximately one billion individuals own a mobile phone; however, they do not have a bank account. Today in Kenya, more than a third of the adults use their mobile phones for online banking. This has been credited for an increase of a 30% rise in their income annually. Additionally, it cost farmers no more than $15 USD a year per hectare to use satellite-based intelligence services, which has the potential of increasing their yields by 10% per year. Ironically, the use of satellite monitoring generates just 2% of the total emissions produced by

traditional ground monitoring system; it also reduces the cost of fossil fuel, thereby, saving the farmers money.

Interview Question 2: What Information Technology (IT) Resources are Lacking in Haiti? ICTs can be instrumental in predicting disasters, as well as detecting, and monitoring climate change. The delivery of improved health care can benefit from ICT, along with the optimization of the supplies of energy. ICT can be, applied to help build smarter cities to create many more caring communities. ICT is critical for all countries to promptly, achieve all the Millennium Development Goals (MDG) outlined by the United Nation. Haiti can benefit from ICT since the magnitude of the earthquake has ruined many of the gains it made toward achieving the MDG (Laguerre**,** 2013)**.**

Haiti established fiber connectivity via a submarine cable in 2006 with Bahamas Telecommunications and was beginning to emerge. In 2006, Tyco Telecommunications completed the 1.92 terabyte link underwater physical infrastructure known as the Bahamas Domestic Submarine Network, linking with Port-au-Prince in an 1100-kilometer ring. The cable undoubtedly had an impact on penetration, Internet usage grew from 2% in 2002 to 12% in 2009. The earthquake of January 12, 2010, did not damage the submarine cable; the land base station experienced major damage (Laguerre, 2013).

Interview Question 3: How Could IT be Used to Improve the Education System of Haiti? The provost of the University of Haiti indicated there are only 24,000 students enrolled in the national university system. The majority of the students are in Port-au-Prince, in the 2011 year admitted only 3,000 additional students. The government does not prioritize university-level education, even though it is the foundation for national development.

Overall, there are 50,000 students studying at the university level nationwide. Nearly 50% of the state-based system. Beginning the academic year of 2011 many of the universities did not have access to a new digital library expending the learner's ability to visit the libraries of universities throughout the world. The university is in the process of improving the current master's program and plans to include a doctoral program in the near future (McNulty, 2017).

One interviewee answered more schools are needed that has IT ability. Also, more teachers are needed to teach IT. An additional interviewee suggested all students should have access to computer labs and internet access. One participant indicated new schools should be built equipped with computers and internet service. Another participant suggested all the schools be, computerized with access to the internet.

Interview Question 4: How Could IT be Used to Develop the Health Care System of Haiti? Another of respondent supported this idea believing that private industry should make sure that all schools primary and secondary have computer labs. A survey respondent suggested that all the offices of the doctors should be, computerized. All medical records should digitize. Another respondent also thought medical records at hospitals should be, computerized. In addition, the birth of all children should be, computerized. One participant concluded that all medical clinics and hospitals should be, computerized. A participant indicated that IT could help improve health care in Haiti by allowing research in different illnesses to come up with treatments.

An additional respondent suggested that CT scanners should be used for diagnosing diseases. Patients should have access to their records. To one participant

there is a need for financing to facilitate the use of IT. There is also a need for training on IT. Cable TV and satellites should be, made available in all communities observed a respondent. A participant highlighted that IT could help the health system by computerizing the health department, creating a website to give access to all employees. While another indicated the IT infrastructure in hospitals should be created. Noticeably, one respondent said that to improve the health system it is important to have access to communication equipment, and IT to do research. One participant indicated more hospitals are needed in Haiti; they should all be equipped with IT. More medical students and schools are needed.

One more participant stated the internet could be used to look up information for preventive purposes. All hospitals could be computerized to improve the health care services. One interviewee stated the hospitals should have computers and digital medical records. Internet services should also be available. An additional interviewee concluded medical records should be computerized.

Interview Question 5: How Could IT be Used to Promote the Cultural Characteristics of Haiti? One interviewee suggested building more movie theatres promoted with IT. Develop more cultural events promoted with the internet. Another interviewee indicated promoting the products of the artisans and sold on the internet. Books and CDs could also be sold over the internet. An additional interviewee said that all the sports events be promoted and made available on the internet. Haiti should have a website for cultural events and historical sites.

From the analysis of the archival records, it was discovered that the U. S., and the Government of Haiti along with the Inter-American Development Bank built the North Industrial Park in Cap-Haitian the largest city in northern part of the country. The first tenant is Sae-A Trading Co. Ltd., the leading garment manufacturer of Korea created 10,000 jobs initially and projected to reach 20,000 permanent jobs in one of the most underserved regions of Haiti. This constitutes the first major public-private joint venture to create stable jobs since the earthquake of January 12, 2010.

The project included the development of the local community and the infrastructure for 5,000 new homes. A wastewater management treatment plant, a modernized port and new electrical power plant to serve the industrial, as well as the local area. Also, a revitalized road network was completed to serve the park, other industries such as agriculture, financial services, food vendors, microenterprises, small farms, and tourism. The completion of the development occurred at the end of 2012. Over a 10-year period, the projected to generate in excess of $500 million USD in earnings and benefits directly affecting the well-being of nearly 120,000 Haitians. Over the long run, the industrial park is expected to grow to 65,000 stable jobs. The garment industry in Haiti would grow to over 200%. The formal private sector employment in the country would expand to nearly 20%. The garment plant constitutes the first textile mill with knitting and dyeing capability to manufacture garments made in the country.

The tax base of Haiti expected to increase due the increased employment and trade. The United States Government granted over $120 million USD in funding for power generation, local housing close to the Park, and port development. The Inter-

American Development Bank provided funding of approximately $50 million USD for the construction of factory buildings and internal infrastructure. The European Union is supporting the project by granting funds for road constructions, such as major access roads and arteries in the North (Political Risk Services, 2016).

Interview Question 6: How is Information Technology (IT) being used to Promote Tourism for Haiti? The respondents were asked in survey question ten what they believe the government of Haiti should do to improve tourism in the nation. One respondent noted that historical monuments be, created. The people should be educated in our history. In addition, the exploration of the country promoted. Another said the country could be stabilized and order is needed in the Haitian society. This thought is, also supported by another respondent the issue of security must be, dealt with. One study participant noted the historical sites must be well, maintained. Tours should be set up for the Citadelle, Labadie, etc. while an additional respondent there is a need to improve security, restore the historical monuments, improve the roads, sanitation, and build more hotels. The government needs to develop a web-page to promote tourism and feature places such as Labadie etc., commented another respondent.

The Haitian government and the World Bank granted $186,000 USD to support the manufacturing and marketing of handicrafts in Milot, which is near Cap-Haitian in the Northern part of the country. The grant is intended to train artisans in techniques to improve the production of their crafts. The funds made the rehabilitation of the workshop and equipment possible after the damages, which occurred during the earthquake of January 12, 2010. The factory is located in Lory which is in the town of Milot. The grant

also facilitates a local workshop for young artists in Basin Diamant and a gift shop to sell their crafts. Nearly 75 artists use the workshop to make the clay necessary to produce their handicrafts (Country Watch, 2017).

Interview Question 7: What Haitian Governmental Service can you Access Online? When the respondents were asked which Haitian governmental services, they access using it. Seventy-one percent of the respondent indicated they look up the results of national exams. While 50% verify election information and 53% searched for general information. Forty-seven of the participants stated they paid their taxes online. Forty-four percent indicated that they apply for business licenses, birth certificates, and register vehicles. While 41% of the survey respondents applied for a passport. Thirty-two percent read public notices, as well as the budget of the government. However, 12% of the respondents did not access any of the governmental services by using IT. Sixty-seven percent of the respondents suggested the government should employ the use of social media, such as Facebook, Tweeter, etc.… The use of cable or satellite television was, recommended by 61% of the participants. While 39% of the respondents indicated that websites be developed to promote art shows, museums, folkloric concerts, and web stores should be created to sell event tickets online. Thirty-three percent of the participants suggested using IT to promote the national parks.

Summary

The problem addressed in this empirical investigation was the political and natural chaos recently experienced by Haiti not only crippled the economic sector but also deeply affected the poorest telecommunication infrastructure in the world (Dobbins

(2017). Telecommunications must now be a focus of the reconstruction of the country. Most of the initial investment by foreign donors must target the communication services of the government along with improving the satellite, and wireless broadband capabilities of the country. Study results indicated that years' worth of work communications, has yet to yield any significant improvements to the creation of a sustainable electrical system in Haiti. The system remains weak in governance and meaningful commercial performance.

The purpose of this qualitative case study was to explore the views of stakeholders within Haiti's national culture, on how the information technology infrastructure of the country can be developed, so as for Haiti to engage in the 21st century global and digital economy. To satisfy the goal of this exploratory research, a case study research design was used, and data were collected from multiple sources. The analysis of the triangulated data from the online survey, one-on-one interviews, and archival records yielded the existence of an emerging information technology infrastructure in Haiti. The results reinforced the synthesis of knowledge from the literature, the interviews, and archival data of the study that Haiti's challenges are represented by three major trends: Inadequate social and economic development; insufficient benefits from the global economy; and a scantily planned information technology infrastructure (ITI). In Chapter 5, the author interpreted the findings and presented the implications, limitations, and recommendations from the study. Finally, the author offered a summative narrative as the conclusion of the study.

Chapter 5: Discussion, Conclusions, and Recommendations

Purpose of the Study

The purpose of this qualitative case study was to explore the views of stakeholders within Haiti's national culture, on how the information technology infrastructure of the country can be developed, so as for Haiti to engage in the 21st century global and digital economy. To satisfy the goal of this exploratory research, a case study research design was used and data were collected from multiple sources (Yin, 2014). The unit of analysis was the stakeholder within Haiti's national culture. Qualitative data were based on insights derived from in-depth interviews (Patton, 2015). Since the study concentrated on a specific segment of the Haitian society, instead of an eclectic sampling, data collection was achieved with a purposeful sample using a snowball and chain sampling strategy (Yin, 2014). Data were also collected through the maintenance of field notes (Katz, 2014), archival documentation (Patton, 2015).

The nature of this study was qualitative so that the methodology aligned with the purpose of the study and provided data for the research question. Given that the study's purpose called for a deeper understanding of the views of stakeholders within Haiti's national culture, on how the information technology infrastructure of the country can be developed, so as for Haiti to engage in the 21st century global and digital economy an exploratory case study design (Yin, 2014) was utilized to meet the study goals. The goal of qualitative research itself was to explore experiences from the viewpoint of people living within a specific context; this method was associated with the constructivist paradigm (Cooper & White, 2012). In opting for this method, consideration was given to

the type of research question that was developed. According to Yin (2014) case studies are an appropriate choice for studies with research questions that seek to explore how or why. Additionally, the topic for this investigation was focused on events that were contemporary rather than historical, so case study was an appropriate choice for this investigation (Yin, 2014).

Interpretations of the Findings

First and foremost, legislation is needed to improve technology in Haiti. The cellular telephone providers, banks, insurance companies, lawyers, and information technology, communication specialists must network to improve the information and communication technology of the country. The agreement between the Government and Viettel will guarantee a safer and sustainable future for Haiti. Economic development is best achieved when residents have the necessary tools to communicate and connect with the global economy. The $100 million USD invested will help address Haiti's improve the linkage with, and benefit from the global economy. As indicated in the literature review prior to the earthquake on January 12, 2011, the penetration of the fixed communication lines was only 1.8% making it the worst in the Latin America and Caribbean region (Infoasaid, 2012)

Some of the study participants suggested that all medical offices, be computerized, hospital medical records, and the birth records of all children should be computerized. Other participants concluded that all medical clinics and hospitals should be, computerized. IT could help improve health care in Haiti by allowing research in

different illnesses to come up with treatments and CT scanners should be used for diagnosing diseases. Patients should have access to their records.

Retrieved from the archival data, the basic needs of finance and technology accelerated the integration of information communication and technology of the financial sector of Haiti. These modernizations lead to the democratization and decentralization of the national financial system. The ministry advanced the reform of public finances by relying on ITC. Citizens can now prepare and pay their income taxes online. The General Administration of Customs is now, computerized with a dependable online-automated clearing system. All customs declarations and cargo manifests are, processed online. Haitians developed the software tools employed. Interconnected all the customs offices, in the country via a satellite system (U.S. Department of State, 2016).

Broadband will be crucial for the social and economic development of all nations in the 21st-century. The adaptation of e-health, e-education, e-environment, and e-government will provide greater access to technological capability at a lower cost. Everything must be, done to make certain that Haiti builds a state of the art 21st-century infrastructure with robust features capable of reducing potential future network vulnerabilities. This is an excellent an opportunity to improve the quality of life of the citizen of the country and their work environment. When applied creatively the adaptation of a modernized ICT can be powerful, such as predicting disasters, detect, and monitor climate change. Nearly one billion individuals own cellular phones; on the other hand, many do not own a bank account. In Kenya, more than a third adult user engaged in online banking with their mobile phones. ICT can improve the delivery of improved

healthcare, optimize the supplies of energy, and help build smarter cities to develop much more caring communities. The application of ICT is important for a country such as Haiti to realize all the Millennium Development Goals (MDG) outlined by the United Nation. Haiti can benefit from ICT since the magnitude of the earthquake has ruined many of the gains it made toward achieving the MDG (Laguerre, 2013).

In addressing whether Haiti's poorly planned ITI may be responsible for its inadequate social and economic development, the analysis of the archival records revealed that Haiti ITI was starting to emerge when it established fiber connectivity, submarine cable in 2006 with Bahamas Telecommunications. When the 1.92 terabyte link underwater physical infrastructure linking Port-au-Prince and the Bahamas in an 1100-kilometer ring were completed it impacted Internet penetration, usage increase from 2 % in 2002 to 12% in 2009. The earthquake of January 12, 2010, did not break the submarine cable; however, the land base station was damaged (Laguerre, 2013).

When the respondents were, asked what private industry should do to improve IT services in Haiti, some said they should increase the number of computers in Haiti. Improve Internet service and create IT schools to increase the knowledge base of Haitians. Others stated private industry needs to also computerize. It should be willing to pay all necessary costs. They should conduct their businesses online to give the country a better image. Private industry should make IT a normal tool to use at work. IT equipment should be, manufactured in Haiti. The price of computers should be, lowered. PCs should not be a luxury item. Private industry and the government should work together to give students access to computers with internet services at all schools.

When asked of the participants to what extent Haiti's insufficient linkage with global economy might explain its inadequate social and economic development, a summary of the responses revealed, there is a need for more technicians, contributors, and thinkers in IT. Poor development makes it difficult for us to unite to solve our problems. The rest of the world has access to online banking and online purchasing. The cost of IT in Haiti is preventing many to have access to it. There is a need for the creation of more websites. Haiti should take advantage of IT to promote the selling of local products and promote the products of Haitian artisans. While one respondent noted that most people in Haiti could not use IT, they need training. Another concluded that the country has many problems the people in charge are incompetent; Haiti is not at the level of the rest of the world. Creating the necessary IT infrastructure could be instrumental to democratize and advance the social economic development of the country. The linkage is insufficient, which is necessary for economic development.

From the data collected from the archival records, (McNulty, 2017) criticized the government for the poor status of the schools, deplorable treatment of teachers who are working with undependable salaries. Hunger at the schools is a major problem that needs to be addressed. Some teachers earn less than 4,000 gourdes, which is $100 USD and others receiving no more than 16,000 gourdes or $400 USD in salaries. The caliber of the current teachers is not complementary to a quality national education. In all ten departments of the country, create and implemented teacher development programs. Teachers should not be, employed on political cronyism; rather on their qualification and

competence. Teachers should be paid at least 50,000 gourdes which $1,250 USD as income.

ICT can be critical in improving the overall quality of education and learning. The major concerns are the problems relating to electricity, lack of money for computer systems, and the availability of technicians to the implement ICT in the school system. The private sector and the universities should create a partnership to facilitate the implementation of a comprehensive ICT system in the schools. The universities must offer the appropriate courses necessary for the development of computer networks. There are in the order of 16,080 primaries and 3,277 secondary schools in the country. Eighty-five percent are private schools, which creates a major financial burden on parents. Of the sixty-seven percent of children who enter primary school, less than 30% will finish their primary education. More than 80% will not complete their secondary years of education by the age required. Approximately, 30% of the primary school teachers are not certified. Yearly, just 400 new teachers are certified; however, needed are over 2,000 new teachers per year. The teachers are needed to successfully compete in this technical world economy (Jean-Marie & Sider, 2014).

Taiwan is helping in a significant way to help address the inadequate social and economic development by providing support in the area of health and vocational training The Village of Hope consisting of 200 modern homes for homeless families was built in the Department of Artibonite. The development includes a school, administrative office, auditorium, and a medical clinic. The village was, built on 322 hectares of land aimed at the cultivation of grain crops; each family was allocated a 1.5-hectare plot. Taiwan

erected 6 bridges, all through the region to join the local communities to facilitate local trade. The Taiwanese government provides ongoing technical assistance in agriculture and education. They planned future projects with the Haitian government in healthcare and overall infrastructure to help in the economic and social development of Haiti (Country Watch, 2017).

The Provost of the University of Haiti Jean-Henry Vernet revealed that just 24,000 students are, enrolled in the university system. The majority are in Port-au-Prince, only 3,000 new students will be admitted this year. The government has not prioritized university-level education. Nationwide 50,000 students study at the university level. Approximately, 50% are in enrolled in the public based system. Beginning this academic year many of the universities will have access to a new digital library expending the learner's ability to visit the libraries of universities throughout the world. The university is in the process of enhancing the current graduate program and plans to start a doctoral program in the not too distant future (Jean-Marie & Sider, 2014).

To determine the types of inputs necessary to modernize Haiti's ITI the online survey participants were, asked how IT is being, applied in health care. A summary of the survey responses suggested that all the offices of doctors should be, computerized. All medical records could be, digitized in the hospitals. In addition, the birth of all children should be, computerized, as well as all medical clinics and hospitals, should be computerized. IT could help improve health care in Haiti by facilitating research and treatments. CT scanners should be, used to diagnose diseases. There is a need for financing and training on IT. To improve the health system, it is critical to have

appropriate communication equipment and IT research purposes. Cable and satellites TV should be accessible in all communities.

The search for archival data regarding inputs, such as political, economic, cultural, and organizational which are necessary to modernize Haiti's ITI revealed many significant projects. The U. S., the government of Haiti and the Inter-American Development Bank built the North Industrial Park at Cap-Haitian the second largest city in the country located northern department. The seminal tenant is Sae-A Trading Co. Ltd., the leading garment company of Korea the project is, forecasted to generate 20,000 stable jobs in one of the mainly underserved areas of Haiti. This is a major public-private enterprise, which re-shaped some of the critical economic inputs which Haiti so desperately needs since the earthquake of January 12, 2010.

The project employed a systematic approach involving the development of the infrastructure of the local community. Resulting in the construction of 5,000 new homes, a wastewater management treatment plant, a modernized port, and a new electrical power plant to serve the industrial, as well as the local area. Also, a revitalized road network was completed to serve the park, other industries such as agriculture, financial services, food vendors, microenterprises, small farms, and tourism. The completion of the development was, forecasted for the end of March 2012. Over a 10-year period, the project is, expected to produce over $500 million USD in salaries and benefits which will directly impact the well-being of practically 120,000 Haitians (Country Watch, 2017).

The Inter-American Development Bank (IDB) invested $30 million USD to construct two thousand houses in the cities of Port-au-Prince, and Caracol. Since Caracol

is located in Cap-Haitian region, this project enhanced the economic impact of the North Industrial Park. The project was a joint venture between the Ministry of Economy and Finance and the IDB (Political Risk Services, 2016). A $3.3 billion USD plan to rebuild Port-au-Prince has been made public. The plans call for the construction of a commercial port, intended to impact tourism; improved coastal protection, development of a railway and marine systems, building of roads, highways, bypasses and accesses, as well as creating bus depots with retail spaces; development of the Waterfront; development of a Park and Ride system; and the establishment of walking paths in the communities. The project was supposed to generate nearly 30,000 direct jobs and 90,000 supportive jobs. The timeline of the re-construction was five years. The project would make Port-au-Prince the most modern city in the Caribbean (Country Watch, 2017). The constructions of the national palace along with various governmental buildings have yet to start.

External assistance is not above mistrust as it relates to the complications involved in the recovery of the nation after the earthquake of 2010. The international community has not offered the Haitian people the prospect of engaging in the reconstruction of the nation. Thus far, all the contracts have been awarded to foreign firms. There are no policies in place to help rejuvenate local businesses, as usual when other nations experienced natural disasters (The Heritage Foundation, 2017).

In reference to information communication technology, Laguerre (2013) found that Digicel invested in Haiti an excess of $120 million USD to improve the capacity of its national network. One hundred and twelve townships that did not have telephone and internet access are now gaining from the expansion. The cellular telephone company

improved services for 220 other service areas giving them access to national and international coverage. The quality of the service surpasses international standards.

CompHaiti's an IT supplier in Haiti launched its Education Technology Future program; with the creation of fifteen computer laboratories located in schools in all of Haiti's ten regional departments. The primary goal of the project is to provide access to technology to 20,000 students annually, it targets students from the first to the 9th grade. Additionally, the labs have the capability of employing e-Learning to take advantage of distance learning in the technical trade areas such as electricity and plumbing. The cost of each laboratory is estimated at 20,000 U.S. dollars and consists of 10 computer workstations, a network printer, projector, and whiteboard, a 4-kW inverter, 12 batteries and an 11 KW diesel generator. The CompHaiti foundation invested $450,000 USD. Through the laboratories, the programs at the labs permit to train students in a trade through distant learning. The technological innovations of the computer labs are available too; concurrently prepare teachers in distance learning through teleconferencing from the distant training center (Infoasaid, 2012).

Only the value of oil, which is considered a principal part of the world economy, exceeds that of ICT. Adapting ICT leads to the development of economic, technical, and human capital. ICTs offer easier and faster services; ICT can be helpful in education in Haiti by using video conferencing to reach remote areas. The services offered by ICT raise the quality of life for the people of Haiti and increase investment in the country (Laguerre, 2013). Haiti should take advantage of technology; its social-economic development depends on it. Further details on the project are summarized in Chapter 4.

Implications to the Study

Broadband is critical for the social and economic development of all nations in this global digital economy. Haiti is no exception. The lag in the development in the infrastructure for broadband threatens increases in employment, and economic competitiveness, as well as technological innovation, and most important of the overall well-being of the population, even in the United States (Bilbao-Osorio et al.). Haiti has yet to experience the development of its own basic infrastructures.

The data analysis also showed cellular telephone service is available in all ten departments of the country and broadband internet service is being, installed nationwide. The Haitian government has embarked on a series of relationships with private industries, educational institutions, foreign governments, various NGOs, religious organizations, and other partners. However, a national innovation plan was not found in the review of the archival records, nor was any discussed in the one on one interviews and an online survey. Consequently, a systematic approach to economic development has, not been formally adopted in Haiti. The social systems of the country have not kept up with the times, has not connected to the 24-hour digital global economy and Haiti continues to be one of the least developed societies in the world.

The successful development of countries such as Japan, Korea, and Taiwan, resulted from a strategic long-term policy that targeted and fostered their indigenous innovative capacities. Haiti should adopt and learn from their experiences. Simply applying macroeconomic theories and policies in Haiti will not lead to development. A national innovation plan and policies are also essential. To successfully, develop

economically is systematically associated with the ability of a country to obtain, understand, propagate, and apply contemporary technologies. A national innovation plan consists of complex regulations, organizations, human capital, and governmental programs that procedurally linked science and technology to a country's national economy (Bilbao-Osorio et al., 2013).

Some of the major impediments to the recovery of Haiti after the earthquake of January 2010 eliminated after the incident by its main international financial lenders through the cancelation of $890 million USD of debt, which the country owed. The United States announced it would work with all its financial global partners to cancel all additional debts owed by Haiti. The Treasury said it would ensure that the reconstruction and recovery of Haiti would be, funded through grants only (Country Watch, 2017).

Historically, nations with little direct involvement in economic matters demonstrate increased rates of growth. The relationship to policies of privatization, changes in laws to accommodate foreign and domestic businesses, along with other factors that facilitate the enhancement of the quality of life of the people in the country. This is in keeping with the views of Adam Smith. The government can easily impede economic freedom.

The conceptual framework for this study was, guided by three main thoughts: Systems theory, and the theories of modernization, and development. To be successfully developed, Haiti must reduce its growing technological gap by acquiring current technologies, and develop its domestic competence in order to progress based on their applications. Countries such as Haiti can adopt three different approaches, to acquire

technology by imitating foreign capital goods, through foreign direct investment (FDI), and entering into licensing agreements. Through its national innovative capacity, Haiti could have the ability to produce, and market a surge of innovative technologies over a long period. This innovative capacity is dependent on the strength of the country's common innovative infrastructure throughout its economy, the existence of a milieu that fosters innovation in the industrial clusters, as well as the strength of relationships between the two aforementioned factors (Otchia, 2014).

Statement on Social Change Implication

Information Communication Technology is vital if Haiti is to realize all the Millennium Development Goals established by United Nations. The IT infrastructure can endow a country with a source of competitive advantage. An advanced IT infrastructure can be a conduit to deliver accurate, significant, trustworthy, and inclusive information to all government agencies and the public. Haiti can transform itself by employing IT to improve its socio-economic development to improve the lives of its citizens.

Contribution to the Literature

This study will help supplement the limited number of inquiries conducted thus far into the information technology infrastructure of Haiti. A thorough search of the literature revealed no other such research that has been, conducted at the doctoral level. This inquiry addressed the status of information communication technology of Haiti.

Recommendations

Haiti should take full advantage of the existence of the 1.92 terabyte link underwater physical infrastructure to the Bahamas, which is cable of giving it the

potential to be fully connected to the digital global marketplace. Ironically, the fiber optic linkage experienced no damages from the 2010 earthquake. With the current developmental infrastructure project of Viettel, which will address the functionality of the required based station, the country should have full broadband global connectivity within one year (Laguerre, 2013).

The Inter-American Development Bank (IDB), and other multilateral institutions, such as NGOs have historically funded local communities' initiatives in the Caribbean and Latin America by providing technical assistance, as well as financing many projects and publishing the many exchanges of experiences and pertinent information. Conversely, only a small number of programs supporting direct and economically practicable access to ICT solutions relevant to small rural or suburban communities have been funded. The IDB should invest more into telecenters to facilitate community development as an efficient institutional solution to respond to needs of the local programs. This type of resolution assists in the establishment of local information content; access to government data, quick access to markets information and best application methods also facilitation of financial transactions between buyers and sellers. These actions can significantly raise the incomes of the people living in the rural areas of Haiti.

Conclusion

The purpose of this qualitative case study was to explore the views of stakeholders within Haiti's national culture on how the information technology infrastructure of the country can be developed so as for Haiti to engage in the 21st century global and digital economy. The participants in this research study were purposively selected. Purposive sampling does not characterize the entire Haitian population this may be considered a bias; however, it still provided valuable data for this study. Only the two largest cities of Haiti, Cap-Haitian, and Port-au-Prince were included in this inquiry.

This researcher in this study attempted to outline the causes and consequences of Haiti's poor information technology infrastructure, and to determine how it can, be updated to establish enhanced linkages with the global IT system necessary in modernizing, and developing its economic, private sector, educational, and healthcare infrastructure. Overall the analysis of the findings indicated the existence of a burgeoning IT infrastructure in Haiti. With the privatization of the old national telephone, the country has embarked on an aggressive, construction project that will broadband available in all ten regional departments of the country. In 2000, just 20,000 customers had access to the Internet service in Haiti, primarily in Port-au-Prince. Currently, 300,000 subscribers use the T-cash mobile payment system of cellular provider Voila to conduct close to 3 million transactions thus far (Infoasaid, 2012).

Muhammad Yunus the Nobel Prize Laureate for Peace who pioneered the creation of microcredit in Bangladesh who would like to develop a social enterprise in Haiti, focusing on reforestation. Professor Yunus and former President Clinton are

members of the Presidential Economic Advisory Council of Haiti. Dr. Yunus called for economic and social actions on the development of Haiti while highlighting that young people are a vital part of the reconstruction of the country. Social enterprises must play a major role in the reconstruction of the economy and social structure of the country. The Inter-American Development Bank and Dr. Yunus engaged joint ventures in Haiti. In 2010, the bank committed to spending $2.2 billion USD over a 10-year period, to help the government improve its operations and improve the quality of life. The money is given at the rate $200 million USD a year in the form of a grant. As of 2015, IDB reconstructed a new country headquarters at its original site, which destroyed in 2010 earthquake (Political Risk Services, 2016). Yunus Social Business created a modern pastry facility in St. Marc. The social business distributes its products through 50 independent street vendors. All the ingredients used are sourced locally in Haiti. Dr. Yunus describes a social business as an enterprise formed with the singular purpose of resolving a social problem in a financially self-sustainable manner (Yunus, 2016).

External assistance is not above suspicion about the present complexities of the recovery of the nation after the earthquake of 2010. The global community has not offered the opportunity to the Haitian people to engage in the rebuilding of the country. The lack of involvement of the citizens in the reconstruction process is evident since all the contracts were, granted to foreign companies. These enterprises are mostly, motivated by their earnings not the rebuilding of the local economy. Thus far, no current policies have been implemented to rejuvenate the businesses, as is typical when other nations experience natural disasters (The Heritage Foundation, 2017).

Digicel made additional investments in Haiti that exceeds $120 million USD that enhanced the capability of its national network. One hundred and twelve villages that were previously without any type of telephone and technological access are now benefiting from the expansion, which gives them the ability to call anywhere in the world, as well as to internet service. Digicel improved the communication services of 220 other service areas providing access nationally to all citizens who sign up for their services. The quality of the coverage exceeds international standards (Infoasaid, 2012).

The value of ICT is second only to oil, which constitutes the largest part of the global economy. Adaptation of ICT leads to economic, technical, and human development. Particularly, ICTs provide the development of accessibility to easier and faster services; ICT can facilitate a resolution to the education quandary in Haiti through video conferencing to remote areas. New services will improve the living conditions of the Haitian people and potentially create a surge of capital to the nation. Currently, many Haitian users are enjoying the realities of ICT such as smartphones and mobile bank payment. The use of ICT can improve quality in medicine, education, government, and environmental management. The future possibility of developing ICT merchandises and services must not be overlooked. Haiti cannot afford to ignore technology. Its future depends on it (Infoasaid 2012).

The Inter-American Development Bank (IDB) proposed an investment of $30 million USD to enable the construction of two thousand houses in the cities of Port-au-Prince and Caracol in Cap-Haitian. The first phase of the project resulted in the construction of 600 houses in Zoranje (Orange), near Cité Soleil. This was a joint venture

with the Ministry of Economy and Finance, using the Fund for Economic and Social Assistance (FAES) and the IDB. In the second phase, there will be 400 more units. One thousand homes were, built near the industrial park recently constructed. The development of the Northern Department of Haiti is, expected to influence three major sectors: Industry, agriculture, and tourism (Political Risk Services, 2016).

The mayor of Port-au-Prince announced a $3.3 billion USD plan to rebuild Port-au-Prince. The details of the plans consist of the development of a commercial port. Which will positively impact tourism; enhanced coastal protection, building of a railway system, organization of the marine system, construction of roads and highways, creation of bus depots with retail spaces, building of bypass roads and accesses, development of the Waterfront district; implementation of a Park and Ride system; and the development of walking paths in the communities. The construction project is, expected to create about 30,000 direct jobs and 90,000 additional supportive jobs. The timeline of the rehabilitation of the capital was set at five years. The project is slow to finish. Many structures including the national palace have yet to break ground. The completion of the project would make Port-au-Prince the most developed city in the Caribbean region (Country Watch, 2017). There is a multitude of ongoing projects underway in Haiti. Together, they constitute a systematic approach to addressing some of the key the developmental needs of Haiti, and ITI plays a major role in the reconstruction of the country.

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Appendix A: Semi-structured Interview Protocol

Identifier Number: ___ Date: _____

Demographic Profile:

1. Select the choices listed below that best describes you (Please Answer All Questions).

   A. Age Bracket: Below 30__; 31-50__; 51-65__; 66 and Above__

   B. Education Level: Up to Certificat D'etudes Primaire__; Rhetoric__ ; Philosophy__; University Level__; Medical School__; Law School__; Nursing School__; Technical School__

   C. Employment: Government__; Service Industry__; Clergy__; Artist__; Performer__; Agricultural__; Educator__; Manufacturing__; Self-Employed__

   D. State the Title of Your Position_____

   E. Gender: Female__; Male__

   F. Number of Years at Your Current Position__

   G. All the Above

   H. List Item(s) not Listed: _____ _____ _____

1. Why do you think that Haiti is not fully connected to the Global Economy?
2. What information technology (IT) resources are lacking in Haiti?
3. How could IT be used to improve the education system of Haiti?
4. How could IT be used to develop the health care system of Haiti?
5. How could IT be used to promote the cultural characteristics of Haiti?
6. How is information technology (IT) being used to promote tourism for Haiti?
7. What Haitian governmental service can you access online?

8. Please feel free to discuss any issues relating to IT that you feel are important that were not asked by any of the previous questions.

Thank you for your participation.

Appendix B: Sample One on One Interview Transcript

The researcher asked question # 1. Why do you think that Haiti is not fully connected to the Global Economy?

Interviewee 1: The government of Haiti is responsible for the lack connectivity due to their lack of control on the economic development of the country.

Interviewee 2 …

Interviewee 3: Haiti functions more or less like a parasite. The finances of the nation are not being properly utilized to benefit the country economically.

Interviewee 4: Overall the country is not properly structured economically.

Interviewee 5: It is the lack of availability to the internet that limits our ability be fully connected with the global economy.

Interviewee 6: More internet access is necessary.

Interviewee 7: The reason is that the country overall is not ready and to weak economically to be fully connected to the global economy.

Interviewee 8: The knowledge base of the people and the fact that the country is weak economically as a reason for the poor connectivity.

Interviewee 9: The country is far behind socioeconomically.

Interviewee 10: One of the participants stated the country is missing so much that many people may not even know about the internet.

Interviewee 11: It's like we are from another planet.

Interviewee 12: Asserted there are not enough commercial activities going on the internet from Haiti.

Interviewee 13: It is the fault of the government. Those in charge just worry about themselves.

Interviewee 14: Because the country does not produce enough products that's the reason the country is not fully connected. Simply Haiti is underdeveloped.

Appendix C: Certificate of Completion Protecting Human Research Participants

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Reynolds Alcéna** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 08/29/2010

Certification Number: 493048