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Strategies Information and Communication Technology Managers Use to Build Employee Competencies

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This is to certify that the doctoral study by

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2017

Abstract

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MBA, De Montfort University, UK, 2006

BEng, Anglia Ruskin University, UK, 1995

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

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Abstract

The World Economic Forum (WEF) found that Botswana's information and communication technology (ICT) networked readiness index (NRI) had declined from position 89 in 2012 to 104 in 2015. A decline in Botswana's ICT NRI resulted in a modest gross domestic product (GDP) growth increasing from 4.2% in 2012 to 5.0% in 2015. The purpose of this qualitative multiple case study was to explore strategies ICT service provider managers use to build employee competencies to address ICT infrastructure performance deficiencies. The target population for this study consisted of over 120 managers from 2 ICT service providers located in Gaborone and Francistown in Botswana. The conceptual framework for this study was information technology (IT) competency model. Face-to-face interviews with 15 managers and a review of 12 company documents were gathered and all interpretations from the data were subjected to member checking to ensure the trustworthiness of the study findings. The thematic analyses of participants' interviews and company documents resulted in the emergence of 3 common themes: developing professional employee competencies through training, promoting knowledge acquisition and skills transfer, and developing budgets for funding the development of employee competencies. Participants cited training and professional development as a reason for ICT infrastructure performance deficiencies. Social implications from this study include developing strategies business managers can use to build employee competencies to improve ICT infrastructure performance, which could result in improved services to citizens and enhanced national development, social transformation, and economic diversification.

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Dedication

I dedicate the successful completion of this study to my student committee members: Dr. Cheryl McMahan, Dr. Jaime Klein, and Dr. Ify Diala-Nettles. I also dedicate this study to my wife Mrs. Botsalo Moroba Rabogadi and my children Onica, Emang, and Thabiso for the love and support they gave me throughout the DBA journey. I indeed experienced an uphill struggle, having to split my time between the study, work, family, and social life. The scholarly engagement widened the scope of my worldview and capacity to view and address personal, academic, and business problems with an open mind and willingness to engage in more challenging life endeavors.

Acknowledgments

I am indebted to my Doctoral Study Chair Dr. Cheryl McMahan, Second Committee Member, Dr. Jaime Klein, University Research Reviewer, Dr. Ify Diala-Nettles, and DBA Program Director, Dr. Freda Turner. It is also gratifying to thank members of the faculty in the School of Management and Technology at Walden University for the professional support they offered during my study. The Walden University stewardship in preparing researcher-practitioners equips scholars with practical and academic learning and added substantial value to my understanding of how business leaders develop employee skills to achieve competitive advantage in a changing business environment. I would also like to thank my colleagues at Walden University who worked tirelessly to support me during the DBA journey. My sincere gratitude goes to the study participants who contributed enormously to the success of this study for their commitment and dedication to data collection and analysis. I must also extend my thanks to the executive management teams of the research sites for their cooperation in granting permission to conduct this study at their sites.

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Section 1: Foundation of the Study

A lack of skilled information and communication technology (ICT) personnel exacerbated Botswana's sharp decline in the World Economic Forum's Networked Readiness Index (NRI) between 2012 and 2015. The NRI dropped 15 points from position 89 out of 142 countries in 2012 (Duta & Bilbao-Osorio, 2012) to 104 out of 143 counties in 2015 (Duta, Bilbao-Osorio, & Lanvin, 2013, 2014; Duta, Geiger, & Lanvin, 2015). The World Economic Forum (WEF) uses the NRI as an economic and sociotechnological tool to evaluate the degree to which countries leverage ICT for increased competitiveness (Duta & Bilbao-Osorio, 2012; Duta et al., 2013, 2014; Duta et al., 2015). WEF computes the NRI measurements regarding the environment, readiness, usage, and impact based on 10 pillars and 53 indicators (Duta & Bilbao-Osorio, 2012; Duta et al., 2013, 2014; Duta et al., 2015). Shemi and Procter (2013) associated a decline in Botswana's NRI to a lack of skilled ICT professionals. The ICT infrastructure performance deficiencies are more common in governmental departments than in the parastatal and private sector organizations (Botswana Communications Regulatory Authority [BOCRA], 2014).

Background of the Problem

Botswana is among the Sub-Saharan African countries that continue to experience unsatisfactory ICT infrastructure performance, characterized by low fixed broadband Internet penetration and service connectivity affecting more than 30% of users (Esselaar & Sebusang, 2013; World Bank, 2014b). The ICT infrastructure performance negatively affected the socioeconomic and technological development in Botswana (Duta et al.,

2014) with issues of affordability affecting 35.5% of users, Internet connectivity affecting 12.2% of users, and knowledge of the use of Internet affecting 23.5% of the people in Botswana (Esselaar & Sebusang, 2013). The WEF's ICT NRI decline between 2012 and 2015 (Duta & Bilbao-Osorio, 2012; Duta et al., 2013, 2014; Duta et al., 2015) exacerbated the ICT infrastructure performance deficiencies. Multiple ICT service interruptions characterized the ICT NRI decline. Shemi and Procter (2013) associated the decline in Botswana's ICT networked readiness to a lack of skilled ICT personnel in Botswana. BOCRA (2014) and World Bank (2014a) affirmed a lack of ICT knowledge, skills, and abilities affected the ICT infrastructure performance negatively in Botswana. To address the knowledge and skills gap in the ICT sector in Botswana, managers of ICT need to develop and implement strategies for building the skills of their subordinates. The general business problem that prompted this study was managers of ICT service providers lack plans to develop employee competencies.

Problem Statement

Botswana's ICT NRI declined from position 89 in 2012 (Duta & Bilbao-Osorio, 2012) to 104 in 2015 (Duta, Geiger, & Lanvin, 2015). The decline resulted in an insignificant growth in GDP, which increased by 0.8% from 4.2% in 2012 to 5.0% in 2015 (Kariuki, Abraha, & Obuseng, 2014; Statistics Botswana, 2015). The general business problem was some ICT service provider managers lack strategies to address the poor ICT performance. The specific business problem was some ICT service provider managers require strategies to build employee competencies to address ICT infrastructure performance deficiencies.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies ICT service provider managers use to build employee competencies to address ICT infrastructure performance deficiencies. The target population for this study consisted of over 120 managers from two ICT service providers located in Gaborone and Francistown in Botswana. The two ICT service provider organizations formed the units of analysis for the study. The outcome of this study may contribute to the improvement of society by improving ICT services to become drivers of critical functions of the GDP.

Nature of the Study

I chose the qualitative method to explore strategies business managers use to build employee competencies. Barnwell (2015) and Richardson (2014) used the qualitative method to explore strategies leaders use to improve workplace performance. Baran and Jones (2016) argued researchers use interviews, focus groups, or participant observation in qualitative studies to collect, analyze, and interpret data by observing what people do and say to understand the meanings, concepts, and experiences of participants. Neither quantitative nor mixed methods were suitable for this study. I did not conduct experiments or surveys or administer questionnaires using closed-ended questions to investigate relationships among variables. A mixed method approach was not suitable for this study because of time constraints and the intense data collection process.

A multiple case study design using interviews and document review was appropriate for this study because investigating strategies business managers use to build employee competencies required direct interaction with informants to understand their

experiences. The phenomenological design was not suitable for this study because, as described by Charlick, Pincombe, McKellar, and Fielder (2016) and Hills (2015), phenomenologists investigate the meaning and lived experiences of participants to gain insights of the phenomenon studied. The ethnographic design was also not suitable for this study because I was not evaluating or describing the culture of participants. I did not use grounded theory design or narrative design because I did not intend to generate theory or tell a story.

Research Question

RQ: What strategies do ICT service provider managers use to build employee competencies to address ICT infrastructure deficiencies?

Interview Questions

1. What performance deficiencies does your organization experience from the ICT infrastructure?
2. What industry-specific technological competencies have you developed to improve the skills of your subordinates?
3. What knowledge, skills, and abilities have your employees attained to address ICT infrastructure performance deficiencies?
4. What occupational-specific technical competencies have you developed or are planning to develop for your employees?
5. What occupational-specific requirements do your employees need to become efficient and effective on service delivery?

6. What academic ICT engineering qualifications and experiences have your employees attended to improve competencies in the provision of quality services and performance?
7. To what extent are your employees willing to engage in ICT professional development and lifelong learning to improve their competencies?
8. What managerial competencies do you possess to enable you to develop skills of your subordinates?
9. What other additional information would you like to share about strategies you use to develop employee competencies?

Conceptual Framework

The IT competency model is the conceptual framework that I used to guide and shape this study. The U.S. Department of Labor, Employment, and Training (DOLETA) developed the IT competency model to assist business practitioners in developing effective strategies for building professional skills in the workplace. The use of IT competency model as a conceptual framework would help business managers' gain in-depth understanding of the concepts, assumptions, expectations, and theories related to the building of employee competencies in the workplace (Imenda, 2014; Sitko, 2013). I used the IT competency model as a lens to frame the (a) collected data, (b) focus of data analysis and interpretation, and (c) presentation of the study findings.

The U.S. DOLETA developed the IT competency model to expand competency models previously developed by McClelland (1973), Boyatzis (1982), Sandwith (1993), and Bassellier, Reich, and Benbasat (2001) to distinguish average performers from

superior performers in the workplace (Carresse & Jones, 2013). Bassellier et al. (2001) expanded the definition of managerial competencies for business managers to determine the extent to leverage new technologies and develop appropriate strategies to improve firm performance. The IT competency model comprise nine tenets: (a) personal effectiveness competencies, (b) academic competencies, (c) workplace competencies, (d) industry-wide technical competencies, (e) industry-sector professional competencies, (f) occupational-specific knowledge areas, (g) occupation-specific technical competencies, (h) occupation-specific requirements, and (i) managerial competencies (U.S. DOLETA, 2014). The concepts defined in the IT competency model provided a lens for exploring the knowledge, skills, and abilities the ICT industry practitioners and employees require in achieving competitive advantage in the workplace.

Operational Definitions

Academic competencies: Academic competencies learned in academic settings include reading, writing, and analytical skills, applied science, technology, supply chain fundamentals, and foundations of business management (U.S. Department of Labor, Employment and Training Administration [U.S. DOLETA], 2014).

Digital subscriber line (xDSL): Kristoff (2008) defined a digital subscriber line as a data communication technology that enables faster data transmissions over copper telephone lines than a conventional voice band modulation/demodulation (modem) technique can provide. Various types of xDSL include asymmetric digital subscriber line (ADSL), multi-rate digital subscriber line (MDSL), rate adaptive digital subscriber line (RADSL), symmetric digital subscriber line (SDSL), universal digital subscriber line

(UDSL), and very high bit rate digital subscriber line (VDSL). Kristoff (2008) suggested xDSL speeds typically range from 1.5Mbps to 50Mbps for home users and may be higher for industry users.

Fiber-to-the X (FTTX): Muciaccia, Gargano and Passaro (2014) identified variants of Fiber-to-the-X fiber optic access infrastructure including fiber-to-the-home (FTTH); fiber-to-the-premise (FTTP), fiber-to-the-building (FTTB), fiber-to-the node (FTTN), and fiber-to-the-curb or cabinet (FTTC). The various FTTX solutions differ in fiber termination points influencing the delivery of high speeds at predetermined distances (Muciaccia et al., 2014).

Information and communication technology (ICT): ICT refers to technologies that provide access to information through telecommunications, such as information technology (IT), satellite, fiber, copper, radio, wireless, wired, or mobile cellular networks (Pradhan, Arvin, & Norman, 2015; Swaratsingh, 2015).

Knowledge, skills, and abilities (KSA): KSA are the general skills that business leaders and managers want in an employee (Pope, 2015).

Networked Readiness Index (NRI): The Network Readiness Index measure on a scale of 1 (worst) to7 (best) of the performance of 143 economies in leveraging information and communications technologies to boost competitiveness and well-being regarding the environment, readiness, usage, and impact (Duta, Geiger, & Lanvin, 2015).

Organizational learning: Organizational learning refers to a process of acquiring information about internal and external processes to create new knowledge, skills, attitudes, behaviors, and practices (Edwards, 2016).

Personal effectiveness competencies: Personal effectiveness competencies embrace personal knowledge, abilities, and attitudes attributable to interpersonal skills and teamwork, professionalism, adaptability, dependability, and desire for lifelong learning (Greitemann, Christ, Matzat, & Reinhart, 2014; Guillaume, Houé, & Grabot, 2014; U.S. DOLETA, 2014).

Workplace competencies: Workplace competencies business leaders seek in employees include (a) collaboration skills: reading, writing, arithmetic skills, listening skills, speaking skills and (b) planning and organizing skills: innovative thinking, decision-making, and problem solving skills (U.S. DOLETA, 2014). Workplace competencies include the ability to work with technology and understanding business fundamentals (Ilies, 2014).

World Economic Forum (WEF): The World Economic Forum is an independent not-for-profit foundation established in 1971 by Professor Klaus Schwab to engage political, business, academic, and other leaders of society to improve the state of the world through global integration and digital collaboration (World Economic Forum, 2014).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions constitute what a researcher assumes to be true of the research study even before the researcher verifies them to be correct (Levy & Ellis, 2009). I assumed participants provided honest and candid answers to interview questions. Executive directors of two ICT service providers located in Gaborone and Francistown in Botswana

allowed the study to take place in their sites; they released managers to take part in the study and collect data in their custody. Managers involved in the study demonstrated the knowledge and ability to address employee competency problems. The executive directors of the two ICT service providers also allowed the review of their policies and procedures specifying clear roadmaps toward achieving a robust skills framework in the workplace. I also gained access to review other documents including strategies, ICT solutions design, and training plans.

Limitations

Limitations are weaknesses that might affect the research study results in an undesirable manner (Levy & Ellis, 2009; Merriam, 2015; Simon & Goes, 2013). I identified three key limitations that might negatively influence the success of the study. The study findings might not be transferable in other contexts because participants might not adequately represent the target population. Confining the research study to two research sites in Botswana might be a limitation for future researchers to transfer the study findings in other countries. Participants' knowledge of the research topic was a potential weakness to allow the collection of data required for analysis and interpretation of the study findings.

Delimitations

Delimitations are characteristics researchers use to limit the scope and define the boundaries of a research study (Leedy & Ormrod, 2013; Simon & Goes, 2013). Several factors limited the scope and boundary of this study. The use of qualitative multiple case study face-to-face interviews with open-ended questions set a boundary of the study

findings because exploring strategies ICT service provider managers use to build employee competencies has no clear set of outcomes. Whereas the use of IT competency model as a conceptual framework for this study addressed knowledge, skills, abilities, and attitudes, the scope of the study excluded organizational competencies, behavioral competencies, and functional competencies to improve job performance in the workplace.

Significance of the Study

Value of the Study to Business

Business leaders need a competent workforce to achieve a competitive advantage in the changing business environment. Policymakers, business practitioners, ICT industry leaders, leaders of learning institutions, and members of the public in Botswana would realize the value of this study through a successful implementation of a collaborative industry-specific education curriculum designed to address employability skills gaps in the ICT industry. To build employee competencies, industry leaders must develop a learning curriculum to drive four imperatives. These are (a) post-secondary industry-recognized education specific to market demands, (b) redesigning of innovative skills building strategies, (c) engaging employers on sectoral training and worker retraining, and (d) coordination of cross-systems and integrated industry-based education and training (U.S. Departments of Labor, Commerce, Education, Health, and Human Services, 2014). A successful delivery of these imperatives would assist ICT service provider managers to improve business practice and ICT infrastructure performance and achieve value added competitive advantage.

Contribution to Business Practice

Managers of ICT may use the outcome of this study to retool their skills, reorganize, and redesign their structures, systems, and processes to contribute to effective business practice. The ICT industry leaders may use the outcome of this study to develop cross-functional competencies through a collaborative public-private partnership to spearhead education and learning programs focusing on employability gaps and addressing market demands. With the widespread of ICT infrastructure and the availability of broadband Internet in Botswana, ICT service provider managers may work with the Ministry of Education and Skills Development to deliver training and development relevant to demands in the ICT market. The changing business environment requires business managers to possess strategic initiatives and business acumen competencies to address employability skills gaps and achieve competitive advantage.

The government of Botswana views ICT infrastructure as an investment that would significantly enhance the national development plans, social transformation, and the economic diversification drive. Improved ICT skills can sustain the economic diversification drive in Botswana (Swaratsingh, 2015). Colombo, Croce, and Grilli (2013), Jin and Cho (2015), and Mayer, Madden, Jin, and Tran (2014) demonstrated how ICT infrastructure investment is a key driver of efficiency and economic growth in developing economies. Governments around the globe view the ICT sector as a promising source of sustainable economic growth and competitiveness (Callanan, Jerman-Blažič, & Blažič, 2016; Ekuobase & Olutayo, 2016).

Implications for Social Change

The implications for positive social change would include improved social conditions, social worth, and citizen empowerment for individuals, organizations, and communities through improved ICT services by addressing the underlying challenges. Chuang (2013) argued some of the challenges concerning ICT competence building result from rapid technological development, underdeveloped interpersonal skills, and the changes required in leadership and management skills. Business managers may use the outcome of this study to develop individuals' intrapersonal, interpersonal, and management skills. Business managers may also use the outcome of this study to improve business structures, systems, processes, and practice through the integration of business processes to improve strategic and operational efficiency and effectiveness.

A Review of the Professional and Academic Literature

Understanding the employees' and managerial competencies is requisite for developing effective strategies for building employee skills in an ICT environment; hence, this was a central motivation of this literature review. I anchored the review of literature on the IT competency model, which was a conceptual framework for studying ICT competency gaps in Botswana. Based on prior studies, I reviewed strategies that business managers use to develop the employee competencies to achieve competitive advantage. A lack of strategies may lead to business managers not effectively facilitating business practices to support employees through planning, prioritization, and prudent allocation of resources to improve performance (King, 2016; McKinnon-Russel, 2015). Slade (2015) showed that "leaders exhibiting visionary and transformational leadership

style have the ability to transfer universally effective leadership attributes and competencies to employees" (p.33). Trivellas and Reklitis (2014) found managers characterized by high levels of job performance excel in practicing leadership competencies. To review these strategies, I conducted an academic and professional literature search using specific keywords, as discussed in the following section.

Literature Search Strategy

I conducted the academic and professional literature search on electronic databases located in the Walden University online library including ScienceDirect, ProQuest Central, ABI/INFORM Complete, EBSCOhost, and Walden Dissertations and Doctoral Study ScholarWorks databases. Google and Google Scholar search engines were also instrumental in the search for electronic books, peer-reviewed articles, government reports, conference papers, as well as refereed and nonrefereed articles relevant to this study. Keywords for searching literature included *capabilities, competencies, core competencies, technical skills, distinctive competencies, information and communication technology,* and *managerial competencies*. In the following subsection, I discuss how I organized the literature review in six main topics.

Organization of the Literature Review

I organized the review of the literature in six major topics: an overview of competency models, core competencies, the IT competency model, sources of IT skills, the status of broadband Internet in Botswana, and strategies for developing capabilities and skills in ICT. In reviewing the literature, I critically analyzed and synthesized sources related to the research topic in this study. The review of literature included a

discussion of the ICT competency gaps in literature and a summary of key strategies leaders may consider appropriate for developing employee competencies to increase effectiveness and efficiency in the workplace.

The IT competency model provides a conceptual framework identifying competencies business managers expect employees to possess in the workplace (Arifin & Frmanzah, 2015; Malhotra, Mavondo, Mukherjee, & Hooley, 2013). To understand these competencies, I identified essential sources of IT skills including IT governance, leadership and management capability, technology management capacity, and performance management capability. Overall, 356 literature sources are cited in this study, out of which 338 (95%) were published within 5 years of the anticipated study publication of 2017 and 18 (5%) were articles older than 5 years. Out of the 338 recent articles, 302 (89%) were peer reviewed articles, Forty-six (14%) were dissertations, 18 (5%) were books, and 25 (7%) were government reports, all published within 5 years of this study's publication. One hundred and seventy-four (51%) of the 302 peer-reviewed articles had a document object identifier (doi) assigned (see Table 1).

Table 1

Summary of Sources Cited in the Final Study

Source type	Number of sources	Percentage of sources
Total number of sources	356	
Sources older than 2012	18	5%
Sources within 5-years	338	95%
Peer reviewed sources within 5-years	302	89%
Books within 5-years	18	5%
Dissertations within 5-years	46	14%
Government reports within 5-years	25	7%
Sources assigned DOI within 5-years	174	51%

An Overview of Competency Models

Researchers and business practitioners use competency models to identify skills needed to operate in specific roles such as project management and other technical or operational competency areas (Brière, Proulx, Flores, & Laporte, 2015). In 1973, McClelland developed the first competency model, which Boyatzis (1982), Sandwith (1993), and Bassellier, Reich, B. H., & Benbasat, (2001) later expanded to address various performance competency demands. McClelland (1973) created and applied a competency model to differentiate average performers from superior performers in the workplace. A competency model is a collection of competencies defining successful performance criteria in a particular work setting (Darafarin, Mousavi, & Javazi, 2016). Managers at the U.S. Navy, General Electric, and Edison Engineering were the first to use McClelland's competency model to help managers distinguish high performers from other workers. A high performer is someone who demonstrates and contributes

positively in the organization compared to peers (Malhotra & Singh, 2016). Thus, business managers use competency models to assess employees' successful performance of tasks in the workplace.

Boyatzis (1982) developed a competency model in his book, *The Competent Manager: A Model for Effective Performance*, to further understanding of managerial skills in a business environment. Boyatzis' model comprised four components: (a) employability skills, (b) organizational environment, (c) the individual's skills, and (d) specific actions or behavior. In Boyatzis' model, an individual's competencies represent the capability the individual brings to the job situation as required by the responsibilities of the job. Williams, A. (2015) found themes students and employers perceive as relevant employability skills include the ability to engage with others, time management, work attitude, and dealing with challenges. Business manager expects employees to possess soft skills that fit the employability requirements to perform the job successfully. Managers expect employees to respond to challenges in the business environment through effective engagement and collaboration with others (Williams, A. 2015). Boyatzis (1982) argued an individual's competencies concern what the manager expects an individual to do to achieve task performance successfully.

Sandwith (1993) developed a competency model to address demands for improved quality, reduced costs, and innovation. Sandwith discussed four domains: (a) conceptual/creative, (b) leadership, (c) interpersonal, and (d) administrative/technical domains. Sandwith described the conceptual/creative domain as cognitive skills associated with comprehending essential elements of the job. This domain also entails

creative thought to enhance innovative skills. According to Sandwith, leadership is concerned with quality strategic planning and action. The interpersonal domain focuses on the ability of an individual to use communication skills to interact with others. Sandwith's administration area includes people management skills, financial management, and compliance with regulatory and legal requirements.

Guillaume et al. (2014) and McClelland (1973) argued competency models often fail to live up to the developers' promises because business managers across industries are less committed to establishing effective guidelines to monitor mastery of skills and employee engagement. The abilities of managers who apply management processes in the workplace often influence acceptable levels of managerial performance (Stan & Popescu, 2015). While managerial competency models capture relevant competencies necessary for successful job performance, Asumeng (2014) argued competency models do not emphasize career and mentoring skills as critical elements for managerial effectiveness.

Building Capabilities, Competencies, and Core Competencies

As emerging technologies evolve through relentless and highly unpredictable changes, ICT business managers must mobilize and deploy resources with appropriate capabilities and competencies to remain competitive (Greitemann, Christ, Matzat, & Reinhart, 2014; Mikalef & Pateli, 2017). Although competence and competency are invariably used interchangeably, competence refers to what people can do while competency means how they do it (Vaishya, Jha, & Srivastava, 2016). In this study, emphasis was on understanding the competencies needed to improve performance in an

ICT environment. Competencies (i.e. knowledge, skills, abilities, and experiences) refer to the behaviors and attitudes people often reflect better and making them more efficient in particular situations than others (Embo et al., 2015). Competency is a set of knowledge, skills, and abilities (KSAs) individuals, groups, or organizations use to achieve job performance (Asumeng, 2014; U.S. DLETA, 2016; Embo, Driessen, Valcke, & van der Vleuten, 2015; Guillaume et al., 2014); whereas, competence refers to a proven ability to use knowledge, skills in work and professional development (Fernández-Sanz, Gómez-Pérez, & Castillo-Martinez, 2017). High performing individuals perform better than their peers do in the workplace. Mikalef and Pateli (2017) stated that for organizations to survive and prosper under conditions of change, business managers must develop dynamic capabilities for the employees to create and modify the way in which they achieve competitive advantage. A capability to apply a set of related KSAs is essential for employees to perform critical work functions and achieve the goals of an organization successfully (Embo et al., 2015; U.S. DOLETA, 2014). Greitemann, Christ, Matzat, and Reinhart (2014) found core competencies are a combination of resources, capabilities, and skills required by business managers to solve complex technical problems in diverse contexts. Greitemann et al.'s (2014) definition of competencies was consistent with Worch, Truffer, Kabinga, Eberhard, and Markard (2013), who defined capabilities as skills and experiences to perform special activities and tasks in organizations. Discipline-specific competencies are essential for improving ICT infrastructure performance. Although Asumeng (2014) asserted ICT service provider managers need distinct personal competencies that embrace individuals'

creativity and capabilities to produce effective job performance, Chen, Chang, and Chang, Y.- C (2015) argued attributes, working conditions, and employee creativity to successfully perform tasks in any given context are yet to be understood. As Garrin (2014) argued the attainment of specific competencies may propel individuals' self-efficacy, self-determination, and self-regulation toward solving complex technical problems; leadership styles and working conditions may affect employee performance in many ways resulting in unproductive workforce. Individuals may attain specialized competencies in different settings including formal learning institutions to build employees' intrapersonal and interpersonal skills. The core constructs of intrapersonal skills include self-esteem, self-efficacy, internal locus of control, self-control, stability, emotional intelligence, and resilience, whereas, interpersonal skills involve initiating, building and maintaining relationships with peers, subordinates, and supervisors (Asumeng, 2014). Embo, Driessen, Valcke, and van der Vleuten (2015) suggested competency represents the integration of knowledge, skills, values, and attitudes at defined levels of proficiency in the workplace.

The use of performance monitoring matrices to measure managers' performance to assess the role managers play in ensuring competitive advantage may yield important benefits to organizations. Trivellas and Reklitis (2014) measured leadership competencies, managerial effectiveness, job satisfaction, and performance and found managers with high levels of job performance excel in practicing leadership competencies. Greitemann et al. (2014) determined how leaders employ technological skills business practitioners need to explore company executives' ability to identify

competency problems. Muhammed and Ahmad (2016) found marketing capabilities, research and development capabilities, and technological capability to be core to organizational performance. Muhammed and Ahmad (2016) evaluated the extent to which technology influences the generation of technological skills, distinctive technical competencies, and organizational learning, which form the basis of competitive advantage.

Building capability for technology design and management requires managers to understand different KM strategies affecting the organization's internal and external environments (Kim, Lee, Chun, & Benbasat, 2014; Skelton, 2015). Fernández-Sanz, et al. (2017) distinguished knowledge from skills by identifying "knowledge as the outcome of assimilating information through learning and skill as the ability to apply knowledge and use knowhow to complete tasks and solve problems" (p. 36). Skelton (2015) suggested that effective KM practices support managers in decision making about how, when, and where to create, apply, or evaluate the business value to achieve competitive advantage. Greitemann et al affirmed acquiring KM practices arise from selected skills to establish a competitive advantage. Greitemann et al described knowledge and skills for solving technical problems as capabilities, whereas competencies mean a combination of individual capacities. Dynamic capability created from core competencies and knowledge resources includes employees' skills, commitment, and innovation (Curraj & Vladi, 2013). Comparing data collected using 40 questionnaires completed by ICT leaders and 12 interviews with experts of ICT in Albania and Macedonia; Curraj and

Vladi (2013) found the importance of leadership toward productivity ICT in the two countries.

Information Technology Competency Model

In 2014, President Barack Obama directed agencies and Federal clearinghouses to review the effectiveness and relevance of a government-wide education and training system to the industry and market demand in the U.S. (U.S. Departments of Labor, Commerce, Education, Health, and Human Services, 2014). Agencies and Federal clearinghouses presented syntheses of education and training strategies the industry required to improve productivity and performance. Based on the agencies and Federal clearinghouses' report and recommendation, the U.S. Department of Labor, Employment, and Training (U.S DOLETA, 2014) developed an IT competency model in consultation with the Information Technology Association of America (Carresse & Jones, 2013). U.S DOLETA grounded the IT competency model on the recommendations of the agencies and Federal clearinghouses' report. The recommendations included (a) post-secondary industry recognized education related to jobs in demand, (b) redesigning of innovative skills building curricula and strategies, (c) employer/industry engagement emphasizing sectoral training and worker retraining, and (d) cross-systems coordination and integrated industry-based education and training (U.S. DOLETA, 2014). The IT competency model comprises personal effectiveness competencies, academic competencies, workplace competencies, industry-wide technical competencies, and industry-sector professional competencies. Furthermore, the IT competency model comprises occupational-specific

knowledge areas, occupation-specific technical competencies, occupation-specific requirements, and managerial competencies (U.S. DOLETA, 2014).

Business practitioners, policymakers, and academia can use the IT competency model as a blueprint for developing curricula, performance standards, and assessment instruments that measure the acquisition of knowledge and skills transfer. To remain competitive, ICT industry practitioners, policymakers, and academia can use the IT competency model to communicate the ICT industry needs to potential workers, career development professionals, education and training professionals, workforce program planners, and curriculum development specialist (U.S. DOLETA, 2016). IT competency model can enhance human resource functions such as developing recruitment, selection, and hiring criteria, placement decision, and defining performance expectations (U.S. DOLETA, 2016). I evaluated the competency areas defined in the IT competency model to understand how the concepts fit into conceptual framework of this study, how they apply to the ICT business practice, and how ICT business managers can use them to improve the economic growth and social change.

Personal effectiveness competencies. Personal effectiveness coils around key personal KSAs that support intrapersonal skills, interpersonal skills, and teamwork. Consistent with Sa'ari et al.'s (2013) assertion that competency embodies a cluster of related KSAs and personal characteristics affecting one's job performance, researchers (Embo et al., 2015; Greitemann et al., 2014; Guillaume et al., 2014) acknowledged personal effectiveness competencies as embracing one's KSAs to perform assigned tasks satisfactorily. Moreover, KSAs embody intrapersonal skills, interpersonal skills,

teamwork, and lifelong learning to achieve satisfactory task performance (U.S. DOLETA, 2014). Interpersonal skills are important not only for achieving personal goals, but also for influencing the performance of other persons (Pope, 2015). Pope (2015) suggested interpersonal skills define the ability to communicate effectively, handle conflicts, and persuade others to one's point of view. A poor interpersonal skill may be a major inhibitor of personal effectiveness in the workplace (Hardcastle, Tye, Glassey, & Hagger, 2015). Promoting personal effectiveness that underscores good intrapersonal skills, interpersonal skills, and teamwork improves productivity and encourages improved social change in the workplace

Knowledgeable and skilled personnel must produce greater performance in a given context. To keep employees productive, business managers need to improve employees KSAs (Siddiqui, 2014). Improved KSAs enable employees to maintain a positive attitude toward work and relate well with other employees. Chen, Chang, and Chang Y - C. (2015) and Kyndt and Baert (2015) found ICT employees attain competitive competencies through training, practice, and experience. The existence of a significant relationship between the actual competency level, required skills, and job performance, increasing entrepreneurship capability lead to the development of key capabilities that improve the organization's performance (Martin-Rojas et al., 2013). Employees' KSAs are key antecedents of a well thought competency development program aimed at attaining professionalism and confidence in the workplace.

Business managers need to establish broad professional KSAs necessary for the development of professional skills in the workplace. Professional KSAs encompass

academic skills such as transferable industry-driven curricula and broader interpersonal skills (Rose, 2012). For business managers to keep track of technological developments, ICT professionals must persistently retool and align their skills with the industry occupational requirements. Lin, Chen, Hsu, and Fu (2015) argued essential skills for IT professionals include the ability to solve complex problems, commitment to service excellence, effective communication, creativity, and taking advantage of opportunities. Individuals who uphold professionalism in the workplace treat others with respect and dignity and establish a high degree of trust in the workgroup.

In conclusion, interpersonal skills, teamwork, professionalism, and acceptable ethical conduct are key components of personal effectiveness business managers require in the workplace. Personal effectiveness skills embrace the individual's professionalism and work ethic, both in social and engineering disciplines. Business managers must equip employees with appropriate training and KSAs to produce results. Ethical issues related to the ICT profession and integrity are critical personal effectiveness, and qualities individuals need to demonstrate in the workplace to achieve competitiveness.

Academic competencies. The academic competencies ICT service provider managers want to see in employees include vertical and horizontal dimensions of technology-driven capabilities. Pyster et al. (2015) defined the vertical dimensions of a system as technically focused engineering capabilities (e.g., electrical engineering, mechanical engineering, information technology engineering, etc.). The horizontal technical dimensions of a system, however, include system-level quality attributes in systems architecture and integration design as well as systems development processes

(Pyster et al). In exploring the competencies outlined in the IT competency model, I explored the extent to which the vertical and horizontal dimensions of ICT systems' skills possessed by ICT employees in Botswana influence the best practice and social change. Chakraberty and Sen (2013) argued business leaders "who favor the best practice's approach believe there are distinct set of practices that, when implemented result in greater organizational effectiveness" (p. 2). I also explored the extent to which the academia incorporated the horizontal dimensions in the learning curricular in Botswana. The missing horizontal dimensions in the curricula might hugely affect employability skills graduates need to master in the ICT industry.

The academia and policymakers in Botswana focused the learning curricula more on vertical dimensions and less on the horizontal dimensions regarding systems development processes, software development, systems architecture design, systems integration, and cybersecurity. To implement these specific horizontal dimensions in ICT investment projects, ICT service provider managers in Botswana rely heavily on vendors supplying the technologies hoping the employees also gained a technology knowledge and skill transfer during the process. Whereas the learning institutions practitioners expose learners to basic skills (mathematics, information and communication technology fundamentals, science, engineering principles, etc.), graduates lack the required employability skills to enable ICT business managers address ICT infrastructure performance deficiencies. The horizontal dimension skills gap has thus contributed to mediocre performance, which has resulted in poor systems architecture designs and limited integration capability to address the ICT infrastructure performance deficiencies.

A successful merge of the learning institutions' academic competencies with ICT industry business strategies into a learning platform may position policymakers, leaders of the learning intuitions, and business practitioners to bridge the employability skills gap currently overwhelming the ICT service provider managers in Botswana. Serim, Demirbağ, and Yozgat (2014) defined employability as "the willingness and ability of an employee to be employable for various tasks or jobs in the organization" (p. 1103).

Workplace competencies. A lack of workplace competency affects employees, and managers' performance in the workplace. Workplace competencies are thus essential for improving performance. To support the importance of identifying workplace competencies in the ICT business environment, Swaratsingh (2015) conducted a qualitative case study to explore the role of ICT in public sector worker productivity in Trinidad and Tobago (T&T) to assist business managers develop strategies for improving workplace productivity. Smith (2015) suggested managers need employees who have acquired some technical experience in vertical and horizontal technical and administrative dimensions. Workplace competencies, business managers want employees to possess includes the application of KSAs and proficiency in technical and administrative business domains. The domains include planning and organizing, innovative thinking, problem solving, decision-making, working with technology and tools, and proficiency in business fundamentals (U.S. DOLETA, 2014; Esa, Selamat, Padil, & Jamaludin, 2014). Researchers such as Salleh, Sulaiman, Mohamad, and Sern, (2015) and Diemer (2016) found motivated employees who also possess relevant KSAs and expertise exhibit high performance levels in the workplace. Embo et al. (2015)

categorized components of a workplace competency framework into (a) competency-based education and competency framework, (b) workplace stakeholders, (c) workplace learning, programmatic learning and assessment, and (d) conditions for a successful workplace learning.

Industry-wide technical competencies. Industry-wide technical competencies relate to the knowledge of ICT industry practices designed to garner competitive advantage (Sa'ari et al., 2013). To demonstrate knowledge and skills in ICT infrastructure and processes, business managers must develop ICT professionals' core competencies as described by Ringim (2014). The network technology environment requires ICT service provider managers to understand which technical competencies create more impact on customer preference and experience (Stiglingh, 2014). To sum up, organizational competencies include knowledge application in the form of specific functional capabilities, corporate culture, inter-organizational technical cooperation, and innovation.

The ICT infrastructure is an essential driver of socioeconomic growth, which requires a reliable system to contribute to the GDP (Ram, Wu, & Tagg, 2014). Alsabawy, Cater-Steel, and Soar (2013) suggested business managers must measure IT infrastructure services based on the knowledge and skills of technical services, application services, and managed data services. Managers need to ensure employees demonstrate knowledge and skills in three components: ICT knowledge management, ICT operations, and ICT infrastructure (Sa'ari et al., 2013; Salleh, Sulaiman, Mohamad, & Sern, 2015). An effective performance matrix is thus necessary to assess employees'

knowledge of ICT applications and processes to balance the skills required with the skills possessed.

Leaders of learning institutions and ICT service provider managers need to recognize the role tacit knowledge transfer plays in determining the extent to which they are able to create and sustain competitive advantage**.** The ICT service provider employees' ability to grasp facts, insights, experience, and lessons learned from previous engagements with subject matter experts (SMEs) must provide the basis for sharing tacit knowledge between peers (Storey, 2013). Business managers need to identify ICT-specific skills and tools employees might apply in practice. According to Kong (2014), business managers need to reflect and judge skillfully to decide what information is dependable during problem solving. Hooper and Bunker (2013) underscored the importance of clearly communicating the use and benefits of technology in the workplace.

Industry-sector technical competencies. The industry-sector technical competencies must focus more on the specialized back-end and front-end technical skills and abilities built in the ICT learning curricula (U.S. DOLETA, 2014). Alsabawy et al. (2013) identified IT infrastructure service competencies clustered into application management, communications management, data management, architecture and standards, and education. Moreover, Sarrab, Elbasir, and Alnaeli (2016) proposed a technical quality model that captures scalability, usability, maintainability, functionality, reliability, connectivity, performance, user interface, and security, which ICT service provider managers may utilize to enhance learning and improve performance in the

workplace. The technical quality model adaptable in learning environment allows the ICT policymakers and industry practitioners to develop competencies to improve service quality. Industry practitioners in Botswana may benchmark the use of the technical quality model to cultivate new ICT skills with the view to address the increasing demand for ICT specialists in the marketplace.

In the process of instruction-based task execution, managers harness soft skills, vocational skills, entrepreneurship, and industry experience to meet essential employability skills requirements (Rahman, Hanafi, Mukhtar, & Ahmad, 2014). Business leaders, academics, and policymakers in Botswana could also benchmark from higher learning institutions' curriculum models in the USA, Canada, UK, Australia, Japan, Singapore, Taiwan, and Israel who included transformative soft skills in schools curricula to cope with 21st Century industry employability demands (William, A. 2015). Rambe and Makhalemele (2015), however, argued, the nomenclature delineating soft skills from hard skills fails to provide a meaningful distinction, which skills are fundamental and which ones are indispensable for organizational performance and success.

In a survey conducted in the Czech Republic between 2006 and 2011, Maryska, Doucek, and Novotny (2012) classified specific ICT roles in two levels: (a) core competency ICT functions and (b) ICT administrator profession. The core competency comprised essential knowledge and activities rather than the detailed technical knowledge while ICT administers profession embraced information systems (IS architect, business process analysts, and systems developers). Maryska et al. (2012) developed 16

knowledge profiles. These included IS/ICT management, analysis and design, software engineering, data and information engineering, IS/ICT knowledge, operational excellence, team leadership skills, ICT marketing knowledge, and organizational management methods, the majority of which are acutely scarce in learning institutions and ICT industry in Botswana.

Occupation-specific knowledge areas. The IT competency model refers to competencies on tiers, six, seven, and eight as occupational skills. While English-speaking countries: Australia, Canada, New Zealand, United Kingdom, Ireland, and the United States of America, have national systems of occupational clarification, none of them has a single national system for the development and regulation of professional standards (Allais, Marock, & Molebatsi, 2014). While Boahin and Hofmann (2014) suggested industry practitioners emphasize core competencies, I argue that occupational standards involve specific areas of work, where training is requisite to employees. The ICT service provider managers must therefore ensure employees have a good understanding of engineering practice, engineering planning and design, engineering operations and maintenance, systems integration and service delivery, as well as a sufficient grounding in research and development.

Occupation-specific technical competencies. Traditionally, academic institutions and ICT practitioners consider technical skills as key skills required for a career employment. In today's knowledge-intensive workplace, however, soft skills are critical for a productive workforce (Robles, 2012). BOCRA indicated a widespread shortage of skills in areas of software development, hardware development, database

administration, security, forensic science, and project management. The IT model does not specify the particular knowledge, skills, and abilities of the knowledge areas in occupations. Despite a shift to knowledge-intensive businesses, compelling business leaders to examine the underlying business environment, business leaders lacks ICT knowledge-based models to provide the necessary sociotechnical framework for the entire ICT environment (Kim, Shin, & Lee, 2015). The sociotechnical framework supports two independent yet correlative subsystems: the social and the technical (Lin, Zhang, & Li, 2016). While the technical subsystem comprises processes, tools, and technologies needed to transform inputs to outputs in any given ecosystem, the social subsystem comprises users, knowledge, relationships, and a reward system to maximize organizational performance. Specific technical skills encompass technology fundamentals (comprehensive baseline hardware and software engineering techniques, functional skills, and core skills). Kim, Shin, and Lee (2015) applied a sociotechnical framework to address problems affecting the ICT software industry to promote software innovations and redesign a more useful and productive software policy in South Korea to enhance investment in human capital.

Organizations often categorize skills into complementary levels encompassing basic problem-solving skills to handle day-to-day operations and resolve routine problems. Employees with basic technical skills possess basic knowledge of architecture and products, but less knowledge of the functions of network elements and technology. Employees possessing intermediate problem-solving skills and expertise can solve concrete and abstract problems by integrating complex knowledge sources, and share

skills through internal technical training sessions. Similarly, experts do not only handle complex operational issues, but can also bring about preventive and corrective actions to achieve permanent solutions for operational matters. Employees possessing expert knowledge can combine practical knowledge and theoretical concepts to express their knowledge and apply their skills and abilities in different forms depending on the degree of information sharing and transfer required (Drescher et al., 2013). As KM is a deliberate coordination of an organization's people, technology, and processes (Drescher et al., 2013; Thang, Quang, & Son, 2013), business managers achieve the coordination of activities by creating, sharing, and fostering continuous learning (Omotayo, 2015).

Occupation-specific requirements. Leadership and management capabilities in the ICT sector are a reflection of the ability to organize, manage, coordinate, or govern ICT activities to achieve competitive advantage (Vesalainen & Hakala, 2014). The emergence of new technologies requires new skills and new ways of driving change in the ICT business environment (Nur, Ruhizan, & Bekri, 2015). Achieving coherence between leadership, culture, and employees is critical to improving performance (Achtenhagen, Melina, & Naldi, 2013; Torki, Hajalian, & Karbasivar, 2014). To enhance ICT competencies and eliminate gaps between occupation and performance, the managers of ICT must invest in developing employees' knowledge and skills (Martín-Rojas, García-Morales, & Bolívar-Ramos, 2013) to guarantee a competent and capable workforce.

Management competencies. Managerial competency models focus more on business skills, intrapersonal skills, interpersonal skills, and leadership skills, and less on

career and mentoring skills for effective managerial performance (Asumeng, 2014). Rambe and Makhalemele (2015) described managerial competencies as a collection of technical competencies, leadership competencies, social competencies, and interpersonal competencies needed for sustaining competitive advantage. Mahlangu and Govender (2015) argued managerial competencies refer to knowledge, skills, and behaviors managers need to demonstrate at particular levels of proficiency to fulfil the required task. Whereas core competencies take different forms for different job positions, business leaders use managerial competencies to measure performance in the workplace (Bucur, 2013). Jena and Sahoo (2014) posited competencies are predictors of performance, hence, must correspondently change with the advancements in technologies and new ways of doing business. The role of managers constitutes (a) planning and prioritizing; (b) direction setting; (c) organizing and delegating, allocation of resources; (d) coordinating performance, and (e) leading others (Abbass, 2012). The IT competency model identifies 15 managerial competencies: staffing, informing, delegating, networking, mentoring, entrepreneurship, supporting others, motivating and inspiring, developing and mentoring, strategic planning/action, preparing and evaluating budget, clarifying roles, and objectives, managing conflict, developing, and organizational vision, monitoring and controlling resources (U.S DOLETA, 2014).

Business skills or technical competencies needed for the job involve planning, monitoring budgets, forecasting costs and revenues, cutting costs, mapping strategies, evaluating performance, and reporting (Asumeng, 2014). Planning and prioritization include setting the targets to achieve goals, scheduling, resourcing, and monitoring

(Abbass, 2012). Hills (2015) argued direction setting occurs when leaders express employees' performance expectations and guides employees to achieve tasks. Organizing, directing, and delegating involve managers deciding who does what, with acceptable standards and reporting (Abbass, 2012). Coordinating, implementing, controlling, and leading others include managers' efforts to exceed expectations. Primarily, the role of a manager involves fostering a climate of innovation and creativity (Chong, 2013; Yoshida, Sendjaya, Hirst, & Cooper, 2014). Managers' role also includes monitoring organizational performance, sharing corporate information, and appreciating the employees' contribution to the organization (Taisch, Heydari, Caros, & Zanetti, 2014). Managers' roles discussed epitomize knowledge, skills, and behaviors managers often demonstrate at specific levels of proficiency (Mahlangu & Govender, 2015).

To understand employees' ICT skill deficiencies, managers need to understand how practices in the workplace often change due to technological advancements (Siadaty, Gašević, & Hatala, 2016). Technological advancements often influence the required skills about the skills possessed. Business practitioners expect continual learning and adaptation to societal and technological change in the ever-changing socioeconomic environment (Siadaty et al., 2016).

A study conducted by Sa'ari et al. (2013) revealed three dimensions of managerial competencies: leadership skills, IT skills, and work ethic competencies. Sa'ari et al summed IT competency as the ability to manipulate and exploit IT technologies to manage information effectively. Exploring how strategies and managers' role may influence managerial competencies to contribute positively to the development of ICT

skills is essential (Achtenhagen et al., 2013; Charoensuk et al., 2014). A comparative study of managers in Britain and Singapore conducted by Chong (2013) revealed there are similarities and differences in the competency requirements of modern managers across cultures and work environments requiring further research.

The result of the study conducted by Martín-Rojas, García-Morales, and Bolívar-Ramos (2013) revealed a positive correlation between technological skills, distinctive technological competencies, organizational learning, and organizational performance. Bassellier et al. (2001), however, argued business leaders and employees lack the managers' potential to apply technology to maximize performance on specific tasks. Of the seven managerial core competencies: results-oriented, strategic thinking, influence and collaboration, team leadership, transformational leadership, learning, and motivation, Bucur (2013) found four competencies influence performance management. Business leaders often use core managerial competencies to influence strategic thinking, learning, motivation, and self-assessment of learning capacity.

Managers of ICT companies encourage employees to participate in programs through apprenticeship activities to facilitate training and knowledge. The plans, however, rarely succeeded in developing the desired managerial competencies (Trivellas & Drimoussis, 2013; Trivellas & Reklitis, 2014). In acknowledging discrepancies and taking into perspective the conception, Maiga, Nilsson, and Jacobs (2013) found there is no significant direct connection between IT and performance.

In conclusion, I evaluated nine competency areas defined in the IT competency model to understand how the concepts of conceptual framework align with the research

question and objectives. I also evaluated the nine competency areas to assess the extent to which the concepts apply to the ICT business practice, and how ICT business managers can use them to improve the social change. The competency areas are (a) personal effectiveness competencies, (b) academic competencies, (c) workplace competencies, (d) industry-wide competencies, (e) occupation-specific knowledge areas, (f) industry-sector technical competencies, (g) occupation-specific technical competencies, (h) occupation specific requirements, and (i) management competencies. Interpersonal skills, teamwork, and professionalism as well as acceptable ethical conduct are key components of personal effectiveness business managers require in the workplace. A successful merge of the learning institutions' academic competencies with ICT industry business strategies into a learning platform may position policymakers, leaders of the learning intuitions, and business practitioners to bridge the employability skills gaps currently overwhelming the ICT service provider managers in Botswana.

Workplace competencies, business managers want employees to possess includes the application of knowledge, skills, abilities, and proficiency in technical and administrative business domains. Managers need to ensure employees demonstrate knowledge and skills in three components: ICT knowledge management, ICT operations, and knowledge of ICT infrastructure design and optimization. Business managers, academia, and policymakers in Botswana may benchmark from the Korean system, who revised the ICT curriculum in 2001 and the educational policy of 2005 to provide a foundation for measuring ICT competency. Business leaders, academia, and policymakers in Botswana may also benchmark from higher learning institutions'

curriculum models in the USA, Canada, UK, Australia, Japan, Singapore, Taiwan, and Israel who included transformative soft skills in schools curricula to cope with 21st Century industry employability demands.

Sources of Information and Communication Technology Competencies

Business managers must leverage specific sources of competencies to build employee competencies. Chakraberty and Sen (2013) and Ukaga (2015) identified IT governance, leadership and management capability, technology management capability, and performance management capability as major sources of greater organizational effectiveness and operational excellence. Maintaining ICT infrastructure in a cost-effective and efficient manner requires managers to employ industry best practices within established IT governance (Boyles, 2015). Herwiyanti (2015) argued a positive effect exists between ICT capability and effective management. In this section, I discuss the sources relevant to building effective employee competencies in the workplace.

Information technology governance. Aligning ICT strategy with the company's business strategy requires a coordinated IT governance structure. As Lee and Setiawan (2013) stated, enforcing IT governance does not only require the accountability and shrewd oversight of business leaders over the company resources, but also requires business leaders to employ well-designed, well-understood, and transparent governance mechanism. As the IT governance guides business leaders' accountability and oversight (Adegbite et al., 2013; Bennett & Dearden, 2014), business leaders must also foster alignment with the organization's business strategy, collaborate, monitor, and provide accurate reporting on the company's performance (Chebrolu & Ness, 2013). Strategic

alignment processes aids the integration of business strategy; IT strategy, organizational business processes Chebrolu and Ness (2013), while the application of IT governance maximizes business processes through the optimal use of ICT resources (Adegbite et al., 2013; Chebrolu & Ness, 2013).

While the ICT capability strategy would lay the foundation for service delivery, there is an immediate requirement for specific skills to deliver the strategy. The effective implementation of IT governance requires managers to plan, organize, lead, and control resources in an efficient and cost effective manner (Abbas, 2012; Bennett & Dearden, 2014). Thus, to build sustainable employee competencies, the ICT service provider managers must consider IT governance as a valuable mechanism for aligning business and ICT strategy to meet the current and future needs to achieve a mastery of the overall control of ICT resources, performance, and growth (Chebrolu & Ness, 2013). Overall, business leaders need to use IT governance to exercise accountability and oversight to ensure prudent management of resources to achieve competitive advantage.

Leadership and management capabilities. ICT service provider managers have the responsibility to ensure employees work together to achieve collective goals. Latchem and Hanna (2013) indicated building employee capabilities are a major differentiator for future success. Chuang (2013) identified the essential leadership skills such as developing self-awareness and self-assurance, creating a vision and being able to sell it, developing global mindset, and developing appropriate motivational techniques and effective communication skills. Barnwell (2015) explored strategies business leaders use to develop effective leadership styles to improve workplace performance. The five

essential elements, which business managers must use to drive ICT investments, are employee engagement, shared vision, accessibility and flexibility, professional development, and implementation of ubiquitous networks (Weng & Tang, 2014). I discuss each essential element in the following subsections.

Employee engagement. Employee engagement has a bearing in strategies managers use to develop employee competencies. Vizzuso (2015) defined employee engagement as the ability to harness psychological empowerment and job security from manager-subordinate trust relationship. Managers' effective communication creates a basis for employee engagement, which leads to improved productivity and job satisfaction (Vizzuso, 2015). Richardson (2013) found (a) lived experiences of employees positively influence employee engagement, (b) employee engagement positively affects commitment and performance, and (c) trust and respect keep employees engaged. Managers must therefore develop employee engagement strategies to guide employees when executing tasks in the workplace.

Shared vision. The manager-employee exchange relationship is important in effective decision making to achieve a shared vision. As business executives internalize the organization's strategy through middle managers and lower-level employees, they strive to engage middle and lower level employees in actualizing the vision and mission, processes, and tangible products and services (Eden & Ackermann, 2013). Middle managers ensure efficiency and effectiveness of functional areas through lower-level employees. The relationship between managers and employees stimulates innovation and creative decision-making (Fischer & Montalbano, 2014). At the supervisory level,

managers expect employees to not only value others' input and expertise, but also to demonstrate willingness to learn from others. Eden and Ackermann (2013) argued the supervisory level embraces learning, diversity, resilience, conflict management, and team building to achieve a shared vision. At lower levels, managers require employees to demonstrate their ability to comprehend industry practices and support colleagues to achieve a shared vision (Eden & Ackermann, 2013). Peers must solicit ideas and opinions from one another to make decisions work better and faster.

Accessibility and flexibility. Employees' unlimited access to management to understand the requirements for performing tasks may demotivate employees to become innovative and improve productivity. Business managers must find effective ways to support, motivate, equip, and facilitate employees with the skills and abilities required to gain value from the use of ICT assets (Weng & Tang, 2014). Ghorbanian, Mo'meni, and Ghorbanian (2016) revealed that a significant and positive correlation between transformational leadership and organizational learning improves performance. The managers' knowledge incorporates not only explicitly learned qualifications (Godói-de-Sousa & Valadão Júnior, 2013), but also all the unspoken experiential learning undertaken during a person's life and required for successful task performance.

To understand how managers perceive and interpret technological capability, Vesalainen and Hakala (2014) guided management teams in five industrial suppliers through a strategic network competencies role in corporate business. Networking skills play a central role leading to the formation of other capacities. Managers need

professional skills encompassing distinct technological competencies to achieve superior performance (Feiler & Teece, 2014; Vesalainen & Hakala, 2014).

Professional development. To achieve a high degree of confidence in developing the capabilities and competencies of subordinates, managers must commit to developing subordinates' skills and competencies through training, mentoring, and coaching. Whereas business leaders in different countries acknowledge approaches of developing management and employee capabilities through action learning, (Latchem & Hanna, 2013); Trivellas and Reklitis (2014), argued business managers hardly accomplish specific technical knowledge relevant to the context in which the company operates. Managers who possess high technical and operational competencies support and direct their subordinates to understand the meaning of tasks and facilitate the development of the skills of their subordinates (Malhotra & Singh, 2016). Thus, ICT service provider managers must act as business innovators of change and timely alert their employees about potential opportunities they may benefit from the emerging ICT practices (Njoka, 2015). Accountable managers assume responsibility for their actions, act consistently, and deliver on promises.

Technology management capability. While ICT has a potential to drive socioeconomic development (UNCTAD, 2013), leaders of the 21st century still operate using 20th-century mindset, which renders them ineffective to cope with the 21st challenges (Daft, 2015). For 21st-century managers to make meaningful contributions to building competencies of employees, they must be competent in their approaches (Daft, 2015). Martin-Rojas, Fernandez, and Garcia-Sanchez (2016) examined organizational

performance through the influence of technological distinctive competencies and reflected how performing organizations generate entrepreneurship skills based on distinctive technological competencies. Professional competencies describe behaviors customers expect business managers to demonstrate when delivering services. Essential attributes of unique technological skills include teamwork, quality of work, reliability, commitment to safety, technical knowledge, customer service, communication, and responds to service requests, and problem-solving. The approach and direction toward achieving technological management capability remain elusive (Donate & Sánchez de Pablo, 2014). Managers may leverage process innovation to develop strategic tools for technological capability and skills relevant for process redesign (Boyles, 2015; Halimi, 2015).

Performance management capability. Performance management capability encompasses (a) performance measures, (b) quality improvement process, and (c) reporting mechanisms. The understanding of the organization's performance evolves with the relationship of its technological capabilities and social development (Reichert & Zawislak, 2014). To identify strategic priority areas in decision-making, managers need to promote the use of appropriate performance standards and establish indicators to help track system performance. Business managers required a deliberate effort to achieve measurable improvements in operational efficiency and effectiveness (Shen, 2013). The broadband infrastructure, for example, must play a pivotal role in building competencies of employees of ICT service providers in Botswana. Furthermore, business managers

must realize effective performance management requires the implementation of a professional development plan and training programs incorporated in the strategic plan.

Dynamic capabilities. Dynamic capabilities define organizations' capabilities of building, integrating, reconfiguring, strengthening, and releasing resources to enhance its ability to innovate and achieve competitive advantage in a changing business environment (Feiler & Teece, 2014; Lin, Su, & Higgins, 2016; Makkonen, Pohjola, Olkkonen, & Koponen, 2014). Business leaders may use dynamic capabilities to assess how dynamic competencies differ from ordinary skills and how practical skills, assists in strategy development and alignment with business objectives (Feiler & Teece, 2014; Lin, Su, & Higgins, 2016). Rozewski, Machowski, Jankowski, Prys, and Danczura (2013) indicated business managers might use dynamic competency management system (DCMS) for recruiting successful talent and create value in a managed cluster of activities.

The Status of Broadband Internet in Botswana

In this section, I focus on broad themes covering broadband Internet infrastructure performance, bandwidth ownership, knowledge of competing technologies, stimulating demand for fixed broadband Internet services, competition in the broadband Internet market, and the importance of service level agreements. Botswana transitioned from being one of the poorest countries in 1966 to a middle-income country in 2014 (World Bank, 2014c). A lack of relevant knowledge and skills for delivering quality services, however, remains a crucial limiting factor for ICT service providers in Botswana. Business managers are thus required to accelerate the technological change for lifelong

learning and development (Latchem & Hanna, 2013). Some challenges affecting growth and performance of broadband infrastructure in Botswana include broadband infrastructure performance, knowledge of competing technologies, and broadband bandwidth limitations. To enhance ICT infrastructure capacity, the government of Botswana invested hugely in a number of projects including accessibility of ICT services in rural areas (Nteletsa I and II), national fibre backbone network (Trans Kalahari), and subscriptions to two undersea cable fibre networks running in the west and east coasts of Africa to the rest of the world (Mpoeleng, 2016). While the government of Botswana embarked on these strategic national and millennium goals, policymakers, academia, and ICT industry practitioners achieved little in developing ICT professionals. Amongst the professions, Tsa Badiri Consultancy (2015) reported are in scarcity in Botswana include IT security experts (19%), applications developers/programmers (18%), engineers (21%), Webmaster designers/Web designers (29%), systems specialist (18%), IT managers (6%), and network/database administrators (7%). Due to the scarcity of these professions, the government of Botswana pays a premium of 15% to 40% of the basic salary to the professionals in the form of a scarce skills retention allowance to motivate the professionals.

Broadband Internet infrastructure performance. Although there is no universally agreed definition of broadband, Akerman, Gaarder, and Mogstad (2015) defined broadband as Internet connections with download speeds that exceeds 256 kbps. Broadband speed vary from country to country ranging from download data transfer rates at least 256 kbps on the low end as in Botswana, South Africa, and Namibia, to faster

than 1.5Mbps on the high end as in Finland, Sweden, USA, and Singapore. Whereas Stork, Calandro, and Gillwald (2013) suggested while the 2007/2008 African ICT access and use survey demonstrated little access to the Internet on the African continent, the Internet customers increasingly need to know the performance of their broadband Internet links. Factors not attributed to the incompetence of employees of ICT service providers such as network bandwidth bottlenecks continue to stifle broadband infrastructure performance in Botswana.

Policymakers, regulators, and ICT service providers need to develop approaches for measuring network performance to address broadband infrastructure deficiencies. Little consensus has been reached however, on which method to use to measure broadband Internet service quality (Rajabiun, & Middleton, 2014). Szymanski (2016) argued whereas, the Internet is essentially a best effort routing network where the delivery of packet of data transmitted cannot be guaranteed, business leaders can use broadband Internet to reorganize and reshape the company processes to improve service quality and performance.

Broadband bandwidth limitations. Botswana completed its national fiber ring spanning 2000 km in 2012. A key objective of the fiber ring was to support high-speed broadband Internet access in urban, rural, and tourism locations (BOCRA, 2014). The goal of deploying, expanding, and optimizing ICT networks in Botswana was to increase service performance and operational efficiency (BOCRA, 2014). Mayer et al. (2014) and Colombo et al. (2013) indicated that investment in ICT is a potential driver of efficiency and economic growth in Botswana. The liberalization of the Botswana

Telecommunications market in 2006 resulted in the fixed broadband subscription growth from 1% in 2005 to 8.5% in 2013, compared with the organic mobile subscription growth of 30% in 2005 to 164% in 2012 (BuddeComm, 2013; World Bank, 2014c). The ICT service export is another key indicator resulting in a sluggish growth of 2.75% in 2005 to 5.49% in 2010 but experienced spontaneous growth of 45.31% in 2011 though the growth slightly dropped to 40.89% in 2012 (BuddeComm, 2013). Monopolizing broadband bandwidth ownership forces small ICT retailers to spend dearly on traffic terminated by the ICT wholesaler at end user termination points (Cooper, 2013).

The broadband supply chain in Botswana comprises international connectivity, which involves huge settlement cost at several landing points. The broadband supply also covers Metropolitan, access links, and fixed or mobile local access networks (BOCRA, 2014). The supply of broadband bandwidth by international and local ICT wholesalers has thus hindered the development of broadband Internet competency, due to a lack of transparency (BOCRA, 2014). Business managers need to orchestrate ICT strategies for redefining the market and firm-specific competencies to influence effective bandwidth management and quality network connections. Minges (2016) indicated low-income and middle-income countries may benefit about 1.38% increase in GDP for a 10% increase in broadband penetration, whereas, high-income countries enjoy a 1.21% in per capita GDP growth in each 10% increase in broadband penetration.

Knowledge of competing technologies. Advanced and some developing markets use four types of fixed broadband technologies: digital subscriber line (xDSL); FTTN; fiber-to-the-home/business (FTTH/B); and hybrid fiber coax. Whereas most developed

countries rely on fixed broadband technologies such as fiber and digital subscriber lines, accessing broadband services in developing countries remain scarce. Although Botswana Telecommunications Limited (BTCL) deployed xDSL from 2005, Botswana would only realize the evolution of DSL technology as Botswana Fiber Network (BOFINET) uses the new FTTH following the adoption of a new national broadband strategy (BOCRA, 2014).

BTCL has the advantage of using emerging technologies such as asymmetric DSL2+, symmetric DSL (SDSL), and very high bit rate DSL (VDSL) to facilitate transmission of high-speed data in the last mile. ICT service providers use ADSL to allow access to high speed over long distances through the existing telephone lines. BOCRA (2014) revealed the need for a commercial strategy constrains the decision to upgrade the existing ADSL infrastructure to SDSL. In developed countries, for broadband connections closer to the customer premises, ICT service providers use VDSL technology to give a significantly higher speed to customers. To improve broadband Internet performance, especially in rural areas to provide access to essential health, finance, education, and other social services, service providers need to deploy WiMAX to substitute xDSL and FTTx broadband technologies (Hodge, Carson, Carson, Newman, & Garret, 2016).

Stimulating demand for fixed broadband Internet services. The growing demand for the broadband Internet led to numerous traffic volume disparities between ICT service providers. Newly developed Internet application services use more bandwidth sensitive to latency than earlier application services (Lee, Shin, & Lee, 2015).

Market demand determinants (e.g., income and retail price), network size, complementary technologies, geographical and demographic characteristics, affect the uptake of broadband and competition (Mayer, Madden, Jin, & Tran, 2014; Srinuan & Bohlin, 2013). Stimulating the demand for broadband Internet services also requires managers of ICT service providers to take into account the speed at which consumers can access the Internet and retrieve information quicker, compared to traditional dial-up access approach (Srinuan & Bohlin, 2013). Managers of ICT service providers, however, may use their employees' Internet skills as a baseline for addressing the demand for broadband Internet services (Gamukama, Popov, & Larsson, 2014; Srinuan & Bohlin, 2013).

Competition in the broadband Internet market. Jorgenson and Vu (2016) cautioned ICT policymakers to consider not only its management and regulation, but also its broader impact on economy, society, and governance. Jorgenson and Vu suggested seven ICT policy framework for service quality-determining factors as: (a) connectivity and access, (b) usage, (c) legal and regulatory, (d) production and trade, (e) skills and human resources, (f) cybersecurity, and (g) new applications. To address issues related to the ICT connectivity and usage, Angelou and Economides (2013) developed a strategy for three-staged model: (a) passive network (PassNet) for dark fiber installation, (b) active network (ActNet) for dark fiber activation, and (c) provision of bandwidth services (SerPro) for provisioning of broadband services. When using the three-staged model, policymakers and leaders of ICT often draw a distinction between quantity competition for physical infrastructure (dark fiber deployment) and price competition for broadband

and services (Angelou, & Economides, 2013). Failure to draw a distinction between PassNet, ActNet, and broadband service provision may result in the incumbent service provider (or broadband wholesalers) monopolizing ownership of broadband bandwidth (Angelou & Economides, 2013).

Two types of competition have developed in broadband markets: (a) interplatform competition and (b) intraplatform competition. According to Fageda, Rubio-Campillo, and Termes-Rifé (2014), inter-platform competition involves two technology platforms (typically xDSL and cable platforms) in the same area, whereas intra-platform competition is a competition between operators using the same technology platform, hence requiring regulatory intervention. The sophistication of competition in broadband markets requires policymakers to make appropriate decisions on which system to adopt between facility-based and service-based plans (Lee, Shin, & Lee, S., 2015). Whereas Rajabiun and Middleton (2014) argued open access, policies (i.e., allowing interconnection) reduce the incumbent operators' incentives to invest in network facilities operators may have to share with others. Following the telecommunications market liberation in 2006 in Botswana, the regulator (former Botswana Telecommunications Authority) imposed on BTC (formerly state owned incumbent) who had a significant market power related to the legacy infrastructure monopoly. Briglauer, Gugler, and Haxhimusa (2015) indicated countries with open access policies developed higher quality broadband systems through service-based or intraplatform competition. Bacache, Bourreau, and Gaudin (2014) argued a service-based competition takes place when

entrants rent access to the incumbents' network, whereas, facility-based competition involves competitors building their infrastructure to provide services to customers.

Briglauer et al. (2015) argued a facilities-to-service-based approach might contribute to higher and faster broadband diffusion than the service-to-facilities-based competition. Facilities-based competition induces earlier peaks in broadband penetration (Briglauer et al., 2015). Briglauer et al. however, raised a new perspective on the role of service-based competition as an enhancer for service quality and facility-based competition as a booster of early and rapid broadband diffusion.

BOCRA (2014) operationalized the regulation on the sharing of passive infrastructure in 2012 to encourage the exchange of support among all licensed operators. First, parties must always assess the cost of backhauling Internet traffic from local Internet access points, especially in rural areas. Second, the public telecommunications operators (PTOs) must offer the excess capacity to small ICT service providers on a competitive basis. ICT service providers need to be resilient to the changing customer demand and potential network failures by provisioning excess capacity to meet future needs.

Importance and effective use of service level agreements. A service agreement (SLA) is a formal written agreement developed jointly by a service recipient and a service provider (Kim, Lee, Koo, & Nam, 2013). The ICT business practitioners predominantly employ two types of SLAs: peering SLA and transit SLA. With a peering SLA, the service provider and a client have equal relationship; whereas, with a transit SLA is an agreement in which a service provider supplies transport services to the other

(Stojanovic, Kostic-Ljubisavljevic, & Radonjic-Djogatovic, 2013). ICT service providers prefer to peer with providers of similar size, which are also often willing to form alliances (Szymanski, 2016). Entering into an SLA for broadband Internet service enables companies to reorganize and reshape the business processes to improve service quality and performance (Bertschek et al., 2013). ICT service providers enter into peering or transit interconnection agreements to achieve universal connectivity and exchange traffic at affordable cost (Szymanski, 2016).

Despite the increasing demand for bandwidth, multimedia services, and real-time application, ICT service providers cannot guarantee the delivery of transmitted data nor can provide differentiated service quality to customers (Szymanski, 2016). To measure the broadband quality of service, managers of ICT service providers must evaluate technical merits of their companies in the context of competency, reliability, and responsiveness to customer needs (Rahman et al., 2013). Leaders of ICT service providers must evaluate technical merits in the context of service availability, security, and reliability of the Internet service, as well as responsiveness to customer, needs (Rahman et al., 2013).

Measuring the speed of connection is only a fraction of broadband Internet connection problems, compared to measuring and monitoring the consistency of end-to-end data performance. The ability to measure and monitor end-to-end network performance involves developing employees' skills to use techniques such as Abdellkefi, Jiang, Helvik, Biczok, and Calu's (2014) service characterization of Internet path (SCI) developed. Abdellkefi et al. (2014) used the SCI technique to measure and monitor

broadband network aggregate delay, average delay, and a total loss of performance signals. Rajabiun and Middleton (2013), however, recommended two primary approaches for collecting speed measurements developed by Canadian policymakers. The approaches are (a) quick tests, which include Ookla metrics and the network diagnostic test and (b) static tests, which involve the use of measurements from a variety of tools and techniques including Akamai, Google, YouTube, and Netflix (Rajabiun & Middleton, 2013). ICT service provider engineers in Botswana may use the recommended quick tests, static test, or other tools and techniques to measure and monitor the end-to-end broadband Internet connection to ensure quality of service assurance for customers.

Rajabiun and Middleton (2013) indicated that broadband speed measurements are a function of investment in broadband infrastructure. The technique relies on the end-to-end delay and loss measurements to enable the construction of aggregate delay, average delay, and a total loss of performance signals, which degrades service quality regarding network availability (Rajabiun & Middleton, 2013). The generated packets of data from synchronized end-systems, using a tool called Rude/Crude, to ensure the reliability of the path and delivery of quality service at termination points.

Strategies for Building Capacity and Competencies

While ICT service provider managers need to develop effective strategies for building employee competencies, strategies business managers use to develop and promote employee technical competencies are not always consistent. AON Hewitt (2013) uses four dimensions to build and measure high potential individuals. First,

fundamental dimensions involve understanding employee's cognitive or strategic thinking ability and personality traits (i.e., interpersonal skills, sociability, dominance, emotional stability, and resilience). Second, growth dimensions involve learning and motivation. Third, career dimensions involve leadership, performance, and knowledge (AON Hewitt, 2013). Leaders and managers build and measure high potential around individual's cognitive skills, personality, learning ability, leadership skills, motivation, performance, and knowledge (AON Hewitt, 2013).

To meet the ICT industry demands for professional competencies, managers need to equip ICT professionals with a combination of strategic, technical, and managerial capabilities (Ude, 2015). Learning does not only occur in a classroom. Business managers may enhance academic and professional training and development through the implementation of other types of development activities including on-the-job training, position enhancement (job enlargement and enrichment), self-directed learning projects, special assignments, and excursion tours (U.S. Department of State, Bureau of Human Resources, 2006). Business managers may also achieve employee development through engaging employees in cross training, formal training (internal or external), matrix teams (work groups, cross functional teams, task forces, problem solving teams, ot committees), and mentoring (U.S. Department of State, Bureau of Human Resources, 2006).

Combining strategic functional competencies enhances business performance through technological innovation, differentiation, and service quality (Ude, 2015). Salleh et al. (2015) argued combining skills in specific technical areas and technology management capability allows business practitioners to build capacity and competencies

into six broad categories. The categories are (a) knowledge acquisition and transfer, (b) knowledge of specific technical areas, (c) knowledge of technology management, (d) knowledge of management processes, (e) knowledge of business functions, and (f) learning organization versus organizational learning. I discussed each of the categories in the following subsections.

Knowledge acquisition and transfer capability. The creation, acquisition, and transfer of knowledge to improve performance in the workplace are often difficult to achieve. Respondents cried of high reliance on consultants, for example, the department spends over BWP 7million (US$ 700, 000.00) a month on companies contracted to fix computers (ICT1Respondent#1; ICT1Respondent#4; ICT1Respondent#9). Business managers often fail to support the development of technology and knowledge transfer initiatives to improve productivity in the workplace (Osabutey, Williams, & Debrah, 2013). ICT managers need to learn and understand that knowledge acquisition and transfer embrace the organization's capability to maximize productivity (Sola & Ayobami, 2013). For the ICT sector to remain competitive, business managers need to develop strategies and create knowledge assets regarding people, processes, and technology that are difficult to imitate (Omotayo, 2015). Lopez, Carrillo, and Bustamante (2013) identified 10 KM programs to promote knowledge transfer among peers. The programs are (a) Intranet-based program, (b) content administration program, (c) work group program, (d) workflow program, (e) artificial intelligence-based program, (f) business intelligence program, (g) knowledge mapping program, (h) supporting innovation tools, (i) competitive intelligence tools, and (k) knowledge portals. Intranet-

based tools systematize explicit knowledge across departments and workflows in an organization. Omotayo (2015) argued both government and non-government institutions must leverage the creation, management, sharing, and utilization of knowledge management assets to succeed in the changing business environment. The effective use of knowledge management processes may assist ICT service provider managers to transfer knowledge and develop employee competencies that match the changing demands.

Identifying the weaknesses hindering the technology knowledge creation, acquisition, and transfer may stimulate the development of strategies to build new knowledge capabilities in the workplace. In knowledge-intensive organizations, managers achieve mutual support and knowledge sharing among professionals through trust relationships and less restrictive lines of authority (Hosein, 2013). When exploring the technology knowledge transfer in the construction industry in Ghana, Osabutey, Williams, and Debrah (2013) found significant weaknesses in technology and knowledge transfer across the industry sectors, and between foreign and local firms. The weaknesses were a result of business managers' failure to build technological capabilities and competencies of employees through knowledge sharing and transfer practices. A lack of strategies for building employee competencies presents a major weakness across all sectors in developing economies.

Bureaucracy, centralization, and duplication of resources exacerbate the lack of coordination and information sharing in developing economies. Traditional practices such as centralization of authority and duplication of resources inhibit the effective use of

knowledge-based assets and they are major causes of inefficient ICT infrastructure performance (Kamal, Hackney, & Ali, 2012). Amayah (2013) argued despite significant changes in the public sector moving from traditional practices of bureaucracy to managerial practice, research on developing employees' competencies has remained scant. Farhanghi, Abbaspour, and Ghassemi (2013) demonstrated how IT affected the structure of an organization through increased vertical integration of information and security. Internet knowledge portals provide the integration of heterogeneous information sources (Lopez et al., 2013). Business practitioners funnel knowledge and information through properly structured work groups and knowledge portals to achieve common goals. Thus, the learning curricula must prepare learners with integrated skills necessary for addressing the current and future needs. Employees need to be equipped with a combination of technical, business, and managerial skills. Rajaguru, Matanda, and Raju (2014) argued whereas the industry demands ICT professionals knowledgeable in technology, business operations, and interpersonal skills to lead organizational activities, the curricula to meet educational requirements for future ICT professionals are obsolete. In exploring managers' ability to identify cognitive skills of employees need, García-Carbonell, Martín-Alcázar, & Sánchez-Gardey (2014), found capabilities of the organizations and its resources play a pivotal role in formulating and implementing compelling strategies for achieving competitive advantage. For the learning curricula to address the business needs, business practitioners and the academia must have a common platform the policymaker could also evaluate to ensure compliance.

Building employee competencies requires visionary and agile transformational leadership to set the direction toward achieving competitive advantage. The results of a study conducted by Ghorbanian et al. (2016) revealed transformational leadership influences performance through organizational learning and innovation. Positive correlations exist among transformational leadership, organizational learning, organizational innovation, and organizational performance (Ghorbanian, Mo'meni, & Ghorbanian, 2016; Haselberger, 2016). The Botswana Innovation Hub (BIH) recently established to uncover among youth and other groupthink and talent stakeholders, creativity and innovation needed for science and technology research and development would improve organization performed through transformation in this context. Business managers realize the benefits of learning through information acquisition, information dissemination, shared interpretation, and development (Djonlagic et al., 2013). The KM processes provide a baseline for a positive evolution of employees' competencies for managers to achieve strategic alignment and prosperity. A transformational leadership may foster the creation, acquisition, and transfer of tacit knowledge among employees through a coordinated organizational learning platform to improve performance in the workplace.

Knowledge of specific technical areas. Reliance on specific technical areas may yield satisfactory performance results in the changing business environment and technology advancement. ICT professionals need to acquire relevant practical technical competencies to provide quality service in the workplace (Karkoulian, Messarra, & McCarthy, 2013). Knowledge of specific technical areas requires ICT professionals to

specialize and acquire specialty experience in specific professional disciplines. Specialty experience involves a broad body of knowledge encompassing technical capabilities at foundational, career, and expert levels in organizations. Specialty experience is often scarcely available in organizations because both the learning institutions and business companies often fail to expose learners and employees to the necessary KM process. The learning institutions in collaboration with the trade and business practitioners must equip ICT professionals with specialty knowledge at all levels to enable them to demonstrate mastery of advanced knowledge and experience relevant to the business environment. Moskaliuk, Bokhorst, and Cress (2016) argued professional effectiveness and lifelong learning rely mainly on the individuals' ability to integrate knowledge gained from their own and others' experiences to improve task performance. Industry business managers, policymakers, and the academia can only achieve the desired ICT professional knowledge if they can develop a common framework for addressing the specific skills the ICT industry requires.

Knowledge of technology management. Understanding the level of technological practices and standards is often a difficult undertaking in businesses. The ICT managers' elusiveness in understanding effective technology management practices exacerbated challenges of acquiring and securing the desired knowledge of management of technology to improve skills and create competitive advantage in the workplace (Rehman, Asghar, & Ahmad, 2015). Researchers (Dzekashu & McCollum, 2014; Ravishankar & Pan, 2013; Roth, 2016; Zhang, 2013) defined knowledge of technology management as the organization's ability to utilize knowledge resources successfully.

Utilizing knowledge resources involves the managers' ability to develop human capital, structural capital, and relational capital to marshal value-creating strategies and compete intensely in the market to achieve competitive advantage (Yaseen, Dajani, & Hasan, 2016). Yaseen, Dajani, and Hasan (2016) argued whereas business managers consider intellectual capital a crucial factor in business, the extent of tacit knowledge in human capital remains unknown. Business managers, however, may rely on the known structural capital knowledge embedded in systems, databases, and programs to improve productivity and achieve competitive advantage. Business managers should manage technological knowledge intellectual resource to achieve seamless application and integration of technologies within and outside the organization. Knowledge of technology management is thus the most important resource in organizations which managers must consider fundamental in creating competitive strategies for building employee competencies.

Knowledge management processes. Prior researchers achieved little in understanding the extent to which individuals contribute tacit knowledge to organizational performance. Chugh (2013) argued the understanding of KM and the extent of which individuals contribute their explicit and tacit knowledge in the workplace remains elusive. Omotayo (2015) described KM as a framework for designing the organization's strategy, structures, and process to enable the organization develop, organize, utilize, and retain their employee' knowledge with the view to improve productivity and performance. KM processes involve access to experience and knowledge to create new capabilities (Chugh, 2013; Ravishankar & Pan, 2013). KM,

motivation, personal development, strategic planning, negotiation skills, and teamwork play a pivotal role in building employees' technological capabilities in the development of competitive strategies to improve performance and achieve competitive advantage.

Business managers however, have not aligned the knowledge and experience employees attain from KM processes with business strategies to achieve competitive advantage. Managers achieve competitive edge by not only creating, acquiring, and transferring tacit and explicit knowledge, but also by aligning and integrating KM processes with the business strategy (Foss, Lyngsie, & Zahra, 2013). Identifying external knowledge sources from which to generate new knowledge may assist business managers align and integrate knowledge with business strategies to improve performance (Foss et al., 2013; Plaatjies & Mitrovic, 2014; Ramorola, 2013). Aligning and integrating employees' explicit and tacit knowledge with business strategies may stimulate employees' motivation for improving productivity and performance in the workplace.

The use of KM capability to improve productivity and deliver quality of service may assist ICT service provider managers improve performance in the workplace. Acquiring knowledge of technology management forms the basis of intellectual capital for any organization (Bchini, 2015; Deinert, Homan, Boer, Voelpel, & Gutermann, 2015). Thus, business leaders need to realize knowledge constitutes valuable inimitable and intangible assets for creating, disseminating, sharing, transferring, and sustaining the firm's competitive advantage (Bchini, 2015; Erden, Klang, Sydler, & von Krogh, 2014; Kim et al., 2014).

Knowledge of business functions. The prioritization of technology management's knowhow and the ability to acquire and transfer knowledge across collaborating business functions must succeed the development of employee competencies in an ICT environment (Mirchandani, & Lederer, 2014). Business managers leverage employees' knowledge capital through shared strategic, tactical, and operational goals to boost the knowledge creation process and to motivate and empower knowledge workers to achieve collective goals (Birasnav, 2014). Developing and fostering innovative IT-based solutions to improve employees' competencies and service delivery are thematic imperatives managers of ICT service providers strive to achieve globally. ICT employees often strive to internalize the experiences of others with the view to applying proven solutions to their specific situations to achieve superior results (Moskaliuk et al., 2016). The work initially pioneered by Davenport in 1994 led to the integration of KM processes with business strategies to develop the necessary experience (McIver, Lengnick-Hall, M. L., Lengnick-Hall, & Ramachandran, 2012). Experience embodies *know-what* and *know-why* competencies (Karkoulian, Massarra, & McCarthy, 2013).

Learning organizations vs. organizational learning. While researchers use the terms learning organizations (LO) and organizational learning (OL) interchangeably, OL is a process while LO signifies an outcome (Karkoulian et al., 2013). Organizational learning in its basic form is the process by which business leaders introduce new practices in the workplace to achieve competitive advantage (Djonlagic, Delic, & Kovaceviv-Rahmanovic, 2013). Organizational learning is an essential building block for

KM processes for organizational success. Bartsch, et al. (2013) defined organizational learning as a process of coordinated changes to improve and support the organization's strategic and operational goals. Karkoulian, Massarra, and McCarthy (2013) found learning organization (LO) and KM are distinct processes in the development of the capabilities of employees. Karkoulian et al. (2013) conducted a quantitative survey involving retail business employees working in organizations in Lebanon, using Bartlett's test, Pearson correlation, factor analysis, and regression analysis, to examine and analyze the hypotheses to determine if there is a significant relationship between different LO dimensions. Karkoulian et al.'s (2013) study provided insights for business managers to embed formal and informal KM process into the culture of their organizations to create a dynamic learning environment. Karkoulian et al. (2013) evaluated the following seven dimensions of learning organizations: continuous learning; inquiry and dialogue; team learning; embedded systems; empowerment; systems connections; and strategic leadership to build competencies, which business leaders could utilize to realize organizational learning process and outcomes. Karkoulian et al. (2013) also found strategic leaders significantly relate to knowledge acquisition and knowledge utilization.

Organizational learning embraces the organization's capability to create, acquire, store, refine, share, transfer, and integrate knowledge processes with the view to create organizational value and maximize productivity (Sola & Ayobami, 2013). Bartsch, Ebers, and Maurer (2013) emphasized business leaders need to recognize and acknowledge organizational learning as a collective learning process. The process aided by training, experience, experimentation, and interaction, to enhance an individual's

competency, knowledge, skills, and attitudes. Rezaei, Bagheri, Allameh, Mobarakeh, and Mardani (2014) found organizational culture, organizational learning, organizational structure, organizational innovation, and IT, influence organizational performance. Rezaei et al. (2014) found organizational learning and technological capabilities influence change and concluded KM enablers affect innovation through education.

A coordinated learning and innovation program is necessary in the development of technological capabilities. Yu, Dong, Shen, Khalifa, and Hao (2013) identified KM processes (creation, storage, acquisition, sharing, and transfer) and organizational learning (OL) as essential means for promoting learning and innovation. The identification of KM and OL processes in the development of technological capabilities and competencies resulted from a quantitative survey involving 114 firms in China. Hansen and Ockwell (2014) identified innovative learning and technological capability building steps in emerging economies may adopt in the workplace. Hansen and Ockwell (2014) found pursuing learning from foreign partners and combining it with civic education, results in meaningful progress in attaining technological capability. Technological capabilities are not only relevant, but also critical for ICT sectors in emerging economies such as Botswana.

In this section, I discussed strategies managers use to build employee competencies focusing on (a) knowledge acquisition and transfer, (b) knowledge of specific technical areas, (c).knowledge of technology management, (d) knowledge of business functions, and learning organization vs. organizational learning. Weaknesses in knowledge transfer exist across the ICT industry sector, especially between foreign and

local firms. The public and private sector institutions rely heavily on ICT vendors and services providers from all over the world, making ICT knowledge transfer mandatory for the public and private sector employees to learn and become competent. To build robust competency structures across the ICT industry in Botswana, business practitioners must in collaboration with the academia, facilitate the alignment of employee competency needs to business strategies as a mandatory requirement.

Conclusions

The review of literature focused on (a) nine tenets of the IT competency model, (b) sources of ICT competencies, (c) status of ICT broadband Internet in Botswana, and (d) strategies for building employee competencies. A holistic framework is necessary to consolidate competencies U.S. DOLETA (2014) identified in the IT competency model to guide the industry-driven programs for the policymaker in conjunction with learning institutions to address the employability skills gap in Botswana. Policymakers, academia, and ICT practitioners must collectively design an industry-specific competency-based technical service portfolio to groom ICT competencies at grassroots level. Business managers need to foster superior technical and managerial ICT knowledge and skills to rebuild business processes, reshape organizational structure and culture, and respond rigorously to environmental changes (Briglauer et al., 2015). When building capability for knowledge of technology design and management, however, business managers need to realize different KM strategies affected by the organization's internal and external environments (Kim, Lee, Chun, & Benbasat, 2014; Skelton, 2015). Rebuilding the ICT competency is critical for harnessing economic growth and sustainability.

Personal ICT competencies underline interpersonal and professional skills necessary to achieve shared goals. The academic competencies students learn in the university setting must include specialized fundamental skills and personal management skills. Understanding employees' ICT skill deficiencies require managers to understand changes in the workplace practices often brought by technological advancements. Through the literature search, the constructs: ICT governance, management capability, technology management capacity, and performance management capability presented essential sources of ICT competence in the ICT industry. Like the corporate governance recently developed by the Botswana Stock Exchange (BSE), which guides the governing charter comprising board of directors, auditors, risk governance, IT/IS governance, stakeholder relationships, corporate reporting, and board appraisal (Jossiah, Themba, & Matenge, 2016), the ICT industry practitioners must develop an ICT governance to guide practices in the industry.

Although BTCL deployed xDSL from 2005, Botswana as a country would only realize the evolution of DSL technology as BOFINET deploys the new FTTH, following the adoption of a new national broadband strategy (BOCRA, 2014). While policymakers and ICT service provider managers develop approaches for measuring network performance to address broadband infrastructure deficiencies, there is little consensus on which method to use (Rajabiun, & Middleton, 2013, 2014). Challenges affecting the broadband infrastructure performance in Botswana include a lack of knowledge and expertise in various competing technologies.

Gaps in Literature

Through the review of the professional and academic literature, a number of gaps identified in the literature relate to management practice in ICT business environment. The role ICT service provider managers play in developing employee competencies is not evident in the ICT sector in Botswana. The managers' role of transferring and imparting knowledge and skills to employees remain indefinable.

Despite a noteworthy change in the public and private sectors having moved from the 20th-century practices of bureaucracy to process-led 21st-century practices, business practitioners made little progress in developing employees' competencies in the workplace (Amayah, 2013). Business managers lack strategies to develop the employee skills (Greitemann et al., 2014). The ICT managers and employees' failure to exploit knowledge they possess and the knowledge required has resulted in a knowledge gap that limits the creation of value for recognizing opportunities and achieving competitive advantage (Donate & Sánchez de Pablo, 2015). Adaption to new technologies, disparity between skills possessed and skills required, and new management practices are some of the critical challenges hindering the development of employee competencies.

Managers need to learn and build the capacity to develop employee knowledge, skills, and abilities relevant for the pace of technology evolution and advancements necessary to improve performance in the workplace. The approach and direction toward achieving technological management capability remain elusive (Donate & Sánchez de Pablo, 2014). The understanding of knowledge and the extent to which individuals contribute tacit knowledge to organizations remains subtle (Chugh, 2013). The IT

competency model omitted the career and mentoring skills as critical competencies for managerial and employees' effectiveness.

Despite a myriad of competency models developed for other industries, researchers have not reached a consensus regarding the understanding of how the various competency models support one another. While ICT has a potential to drive infrastructure development, education, healthcare, or private sector modernization, managers of the 21st century still operate using 20th-century methods and techniques (Daft, 2015). Whereas there has been a growing interest in the development of competencies in areas of education, training, and engineering; the competency assessment and measurement of performance in a workplace remains obscure (Suhairom, Musta'amal, Amin, & Johari, 2014). U.S. DOLETA (2014) however, focused more on hard skills, but less on generic employability skills (Parasuraman & Prasad, 2015). Although the U.S. DOLETA developed the IT competency model to distinguish superior from mediocre performance, there is still a lack of alignment between skills acquired versus skills required in the ICT industry. Thus, a collective understanding of the degree to which enhanced competencies can stimulate economic growth is essential.

Competency models developed for other disciplines focus on leadership and management skills such as human resource (Halimi, 2015), hospitality and tourism management (Schoffstall, 2013). Other competency models include strategy and business model in telecommunications (Ghezzi, Cortimiglia, & Frank, 2015). The engineering competency model establishes guidelines for industry leaders, employers, and human resource professionals to gain a clear understanding of the skills and abilities

necessary to advance and succeed in the industry (Hayden, 2015). Stakeholders (e.g., policymakers, business practitioner, academia, and legislators) need to work together in building a framework for developing composite employee competencies to achieve sustainable contribution to economic growth.

Transition

In section 1, I provided a brief overview of the background to the business problem to set the stage for this study. To achieve the research objectives, I aligned the specific business problem with the research question and the purpose statement. Qualitative research method and a multiple case study design were appropriate approaches for this study. The study contributed a significant value to the business practice and to positive societal change. The conceptual framework of this study was IT competency. I organized the review of literature in the following thematic areas: an overview of competency models, core competencies, IT competency model, sources of IT skills, the status of broadband Internet in Botswana, and strategies for building capabilities and skills in ICT infrastructure. Gaps in literature associated with management practices hampered the development of employee competencies in the workplace.

In section 2, I described the role of the researcher in data collection. Addressing bias in this study required a clear understanding of the researcher's relationship with the topic, participants, and describing the researcher's role related to ethics and the Belmont Report protocol. The eligibility criteria for selecting participants included managerial position. I identified data collection instruments, steps for data collection techniques,

data organization techniques, and steps for analyzing data. I used triangulation of data sources, member checking, and data saturation to ensure the quality and accuracy of the study findings.

In Section 3, I determined the extent to which themes and patterns found in data collected provided evidence to support the study outcome. I made recommendations for policymakers and business practitioners to improve the business practice and social change. I also generated new questions for future research based on the outcome of the study and recommendations for action.

Section 2: The Project

In this section, I describe the role of the researcher as a primary instrument in data collection. The eligibility criteria of participants, identifying strategies for gaining access to participants, and establishing a working relationship with members are critical for data collection and analysis. I describe the extent of which a qualitative research method and multiple case study design were more appropriate for this study than other approaches. Describing the population and sampling methods involves identifying the population of the study, justifying the use of a snowball sampling technique, and the sample size for achieving data saturation. A discussion of ethics and the Belmont Report, underlining mitigation strategies for addressing bias and ensuring adherence to ethical standards is vital for the protection of the research subjects. To ensure the use of appropriate research method, I discuss data collection instruments, data collection techniques, data organization, steps for data analysis and a thorough interpretation of the study findings.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies ICT service provider managers use to develop skills of their subordinates to address ICT infrastructure performance deficiencies. The target population for this study included over 120 managers of two ICT service providers located in Gaborone and Francistown in Botswana. The two ICT service provider organizations formed the units of analysis for the study. Yin (1994) stated the case study units of analysis include individuals, groups, organizations, or institutions. The outcome of this study may improve the lives of

individuals, organizations, communities, and society by modifying ICT services to become drivers of critical functions of the gross domestic product.

Role of the Researcher

In this qualitative research, I was the primary instrument for data collection. A qualitative researcher is a primary instrument through which data collection occurs (Glynne, 2015; Pessu, 2015; Simon & Goes, 2013). My role was also to identify and address forms of bias that influenced the outcome of the study.

As a primary instrument of data collection in this study, I recruited participants, conducted interviews, reviewed company documents, analyzed the collected data, interpreted the study findings, and reported the results. I also outlined the assumptions, limitations, the scope and boundary of the study, and addressed forms of bias to support the objective of the study and research questions. I had no personal or work relationship with the topic, participants, or area of the research interest that I might have used to influence the executive directors of the research sites to provide the initial contact details of managers I recruited and selected to participate in the study.

My role related to the ethics and the Belmont Report protocol was to ensure compliance with the principles of respect for persons, beneficence, and justice. Ethical concerns were not compromised, no harm befell participants. Participants signed the informed consent form to ensure participation in the study was voluntary. Obtaining the informed consent involved informing the subjects of their rights, the purpose of the study, and procedures of participation including the duration of participation and the potential risks and benefits of participating in the study.

Researchers mitigate bias by identifying and recognizing their preferences such as a desire for respect, a feeling of sympathy for others, failure to accept criticism, and inappropriately affirming the characters of others (Edwards & Holland, 2013). For researchers to become aware of their personal biases, they must recognize themselves as part of the research process (Edwards & Holland, 2013). In recognizing my preferences and the importance of avoiding bias, I used member checking to ensure self-control and mitigation of bias.

The rationale for an interview protocol (Appendix E) is not only to provide a set of questions, but also to provide a procedure for guiding the researcher through the interview process (Castillo-Montoya, 2016). I used the interview protocol script at the beginning of the meeting as a reminder to share my background information and my role in the study with participants. Prior to signing the informed consent form, respondents fully understood the purpose of the study as well as whether there would be foreseeable risks or benefits. At the end of the interview, I thanked interviewees for their assistance and contribution in making the interviews a success. I gave respondents an assurance that I would use the information they provided during interviews and document review solely for the purpose of this study and would not divulge the information to anybody, other than for contributing to conclusions drawn from the study findings.

Participants

To be eligible, participants in this study were ICT service provider managers who had worked for at least one year in the same organization. Of the fifteen managers who participated in this study, two were chief engineers, one was a director, one was a deputy

director, and seven were chief systems analysts, all employed in IT and engineering departments. A training coordinator employed under corporate services, a customer care and sales manager employed under customer relation management, and a contract and settlement manager employed under strategy and development participated in this study as well. To ensure participants satisfied the eligibility criteria for the study, I used snowball sampling to reach out to the executive directors of the two ICT service providers to request that they provide the initial contact details of managers in their organizations.

Gaining access to potential participants and persuading them to partake in the research study involved convincing gatekeepers and leaders to grant permission to use their sites for research and engage their employees in the research study. Monahan and Fisher (2015) indicated establishing contacts and gaining permission to conduct qualitative research could be a time-consuming and stressful process. In this study, the ICT service provider executive directors received letters of cooperation (Appendix A) requesting them to provide the initial contact details of managers in their organizations. After receiving the IRB approval to conduct data collection, I recruited participants holding managerial positions by sending them e-mails with attachments: (a) invitation for interview, (b) permission to conduct research study, (c) data use agreement, and (d) consent form. I made a follow up to each one of the 15 participants by phone after five days requesting an appointment at a time and place suitable for them.

Establishing a working relationship with participants involved engaging participants to share their experiences and to know each other better (MacDonald, 2013;

MacDonald & Montford, 2014; Pederson, 2013). MacDonald and Montford (2014) indicated that researchers build working relationships through understanding one another for important data collection to occur. Pederson (2013) found a working relationship established through personal interview yields greater participants' willingness to share their experiences meaningfully in data collection. Nwankwo (2015) made the first contact with members by sending them an e-mail of introduction and the purpose of the study. Likewise, at the first contact meeting with participants, I introduced myself and informed them about the purpose of the study, the permission granted for conducting the study with them, and the procedure for taking part in the study.

Research Method and Design

Research Method

Researchers use qualitative, quantitative, or mixed methods to address research questions (Fassinger & Morrow, 2013; Hills, 2015). Qualitative research method was appropriate for a study seeking to explore strategies ICT service provider managers use to build employee competencies. I intended to gain in-depth understanding of the managers' experiences about the phenomenon under investigation. In qualitative research, the researcher collects data relevant to the understanding of the meaning attached to objects (Hills, 2015). Qualitative researchers need a deeper understanding of human experiences to understand the meaning of people's lives as experienced under real-world conditions, which cannot easily reduced to statistical inferences (Johnson & Christensen, 2014; Pacho, 2015; Rubin & Babbie, 2014; Yin, 2014).

Qualitative and quantitative research methods differ in analytical objectives, the type of questions posed, focus, philosophical roots, design characteristics, data collection approaches, and type of data collected and analyzed (Johnson & Christensen, 2014; Ritchie, Lewis, Nicholls, & Ormston, 2014). While qualitative researchers maintain a naturalistic stance using open-ended questions and field observations, quantitative researchers focus on standardized data collection to allow statistical comparisons using closed-ended questionnaires and surveys. Quantitative researchers use experimental designs, quasi-experimental designs, and nonexperimental correlational designs to examine cause and effect and relationships among variables such as knowledge, skills, abilities, or attitudes (Boyles, 2015; Diemer, 2016; Semukono, Orobia, Arinaitwe, 2013). Researchers using quantitative methods emphasize objective statistical, mathematical, or numerical measurements of data collected using experiments, structured questionnaires, and surveys (Lee et al., 2015; Saglam & Milanova, 2013). Obtaining statistical data using this method was not feasible for the proposed study. Quantitative methods are a deductive and objective process of inquiry, which emphasize generalizable statistical findings (Rubin & Babbie, 2014; Tariq & Woodman, 2013). Researchers typically select the quantitative approach to test theories using empirical data. Quantitative designs were not appropriate for addressing the present research problem because variables were not explicitly measurable in the present research problem and adequate literature did not exist to support hypotheses statements.

Researchers using mixed methods employ both inductive and deductive reasoning to support the findings obtained using both quantitative and qualitative methods

(Ramnarine-Singh, 2014). In mixed methods research, researchers focus on collecting, analyzing, and mixing both quantitative and qualitative data in a single study to address the same research questions (Johnson & Christensen, 2014; Tariq & Woodman, 2013). Researchers combine quantitative and qualitative methods to attain complementarity, development of another method, initiation of areas of incongruence, expansion, and triangulation (Tariq & Woodman, 2013). I did not use the mixed methods because the findings of the proposed qualitative study would address the research problem, and there would be no need to complement the findings and conclusions of this qualitative study with quantitative study findings, nor a need for the development of the qualitative method from the findings of quantitative study results.

Research Design

Qualitative researchers may use case study, phenomenological, ethnographic, grounded theory, or narrative designs depending on the appropriateness and suitability of the approach to the research problem and objectives. A multiple case study research was suitable for a study to explore strategies ICT service provider managers use to build employee competencies. Researchers conducting multiple case study research explore and analyze within and across naturalistic settings (Hyett, Kenny, & Dickson-Swift, 2014). Researchers such as Yin (2014) employ case study designs when (a) the objective is to answer how and when questions, (b) the researcher cannot manipulate the behavior of participants, and (c) contextual and boundaries are not clear between the phenomenon and the context. A case study design is useful whenever there is a need to obtain in-depth understanding of an issue, event, or phenomenon in its real-life context (Owonikoko,

2016). In-depth understanding refers to the detail, richness, completeness, and wholeness of evidence gathered from the collected data (Fusch & Ness, 2015; Netshitangani, 2014).

Phenomenology, ethnography, narrative, or grounded theory did not offer means to investigate complex social cases to gain the in-depth understanding of the phenomenon studied as narrated by Hyett et al. (2014). Researchers such as Charlick, Pincombe, McKellar, and Fielder (2016), Hills (2015) and Jardim (2015) found phenomenological researchers are interested in how people interpret their lived experiences, or how people make sense of their lives. Dante (2015) and Yin (2014) argued the rebuilding of lived experiences make a phenomenological design a qualitative method for discovering the shared social phenomenon, which made the approach inappropriate for understanding the experiences of participants in a business environment where the boundaries between the phenomenon and the context are not clear. Likewise, ethnography is a design for the descriptive study of people's culture (Moulson, 2015), which made it inappropriate for this study. In addition, grounded theory is a strategy whose purpose is to generate a theory from data (Hussein, Hirst, Salyers, & Osuji, 2014; Khan, 2014). I did not use in this study because the rigidity of the design might not allow the desired openness of research questions researchers find in case study designs. Narrative inquiry is a way of inquiring into the experience of other people based on storytelling regarding how they experience or have experienced the world in which they live (Huber, Caine, Huber, & Steeves, 2013). The narrative approach was not appropriate for this study because the method is prone to moral and ethical dilemmas.

To ensure data saturation, I engaged 15 participants in face-to-face interviews to understand their experiences of developing employee competencies to improve performance. Latham (2014) posited the sample size is sufficient when additional interviews do not yield new information, resulting in data saturation. New information or new themes did not emerge after 15 interviews; hence, I did not sample more participants using the same selection criteria to reach data saturation. Fusch and Ness (2015) argued data saturation occurs when the researcher receives no new information, no new coding, no new themes, or new patterns in the collected data. Qualitative researchers put greater emphasis on gathering diverse data on a limited number of cases to the point of data saturation (Fusch & Ness, 2015; O'Reilly & Kiyimba, 2013).

Population and Sampling

In this section, I discuss the population of the study, the sampling method and the sample size sufficient to reach data saturation. I also discuss the eligibility criteria for selecting managers of ICT service providers to participate in this study. I sum up the discussions in the following subsections. I also discuss the eligibility criteria for selecting managers of ICT service providers to participate in this study. I sum up the discussions in the following subsections.

Population

The target population for this study consisted of over 120 managers of two ICT service providers located in Gaborone and Francistown in Botswana. The two ICT service provider organizations formed the units of analysis for the study. Yin (1994) stated the case study units of analysis include individuals, groups, organizations, or

institutions. I recruited and selected participants holding managerial positions including chief engineers, directors, chief systems analysts, principal systems managers, contracts managers, strategy development mangers, and commercial managers. I used a cross-case synthesis technique to ensure managers in the two organizations foretold similar results or produce contrasting results when responding to face-to-face open-ended interview questions.

Sampling Method

I used snowball sampling to select participants for this study. Snowball sampling is the type of a purposive sampling that researchers use to choose informants who identify other informants from the target population (Benoot, Hannes, & Bilsen, 2016; Denscombe, 2014; Ishak & Bakar, 2013; Palinkas et al., 2013). Using the snowball sampling method, I identified the executive directors of ICT service providers who provided the initial contact details of managers in their organizations who I then recruited and selected to participate in this study. The use of snowball sampling allowed participants to provide contact details of other potential participants.

Sample Size

The sample size for this qualitative multiple case study was 15 participants. Qualitative researchers collect and analyze data until they achieve data saturation (Chaurasia, 2015; Fusch & Ness, 2015; Marshall, Cardon, Poddar, & Fontenot, 2013). Marshall, Cardon, Poddar, and Fontenot (2013) stated a sample size of 15-30 participants is adequate for qualitative case study researchers employing face-to-face interviews to reach data saturation. Data saturation occurs when no new themes, problems, or findings

emerge from the analyses and interpretation of the collected data (Fusch & Ness, 2015; Marshall et al., 2013). I interviewed 15 participants and reached data saturation after interviewing 15 participants. I therefore did not select additional participants for interviews. To promote rigor and avoid pitfalls that might have arose from premature interpretation of research data, inadequate depth of interview responses, or failure to identify and address researcher bias, I engaged participants in member checking by sending them their respective interview transcripts to validate the accuracy of the information they provided during the interview. Participants made some corrections to the interview transcripts and provided their feedback by email. I also sent by email a summary of the study findings requesting participants to validate the accuracy of the findings.

Eligibility Criteria

The selection criteria of participants were a managerial position with a minimum of one year working in the same company. Participants shared their experiences of the ICT infrastructure performance in relation to employee knowledge, skills, and abilities. Participants had sufficient insights related to the lacking ICT industry-specific competencies required to improve performance in the workplace.

Ethical Research

The study participants indicated their decision to partake by signing the informed consent form before taking part in face-to-face interviews and document review. The informed consent is a process of agreeing to participate in research voluntarily based on the participant's full understanding of what participation means regarding risks and

benefits (Mouton, Malan, Kimppa, & Venter, 2015). The use of the informed consent form in this study allowed me to explain the purpose of the study, duration of the study, and the procedures of participating, as well as the benefits of the study to the economy of the country. Participants had at least five days to ask questions before making decisions to participate in the study by signing the informed consent form. Of the eighteen potential participants who honored my invitation for interview, three did not sign the consent form; two of which were no longer working for the research sites, and another was on maternity leave, hence, the three did not participate in the study.

Participation procedures included withdrawal from the study, the potential risks and benefits, incentives for participating in the study, privacy of participants, and confidentiality of research materials. Participation was voluntary; participants were informed withdrawal or discontinuation of participation in the study was entirely at their discretion and did not carry any punishment. Participants did not receive any incentives in the form of payments, because payments might raise ethical concerns pertaining to the individual's ability to make informed choices based on benefits of participation (Office of the Human Research Protection Program, 2013).

In compliance with Walden University's ethical standards and principles of beneficence, justice, and respect for the rights of persons, no ethical concerns befell or caused any harm to participants. There were no foreseeable risks or discomforts in the study. I did not expose participants to any psychological, economical, professional, or privacy risks. Signing a confidentiality agreement (Appendix B) and data use agreement (Appendix C) confirmed that I agreed with the ICT service provider executive directors

that I would not disclose or discuss any confidential information with others including friends and families. Privacy and confidentiality are important components of research involving human subjects (Adams & Callahan, 2014). I did not divulge information, release, sell, alter or destroy any confidential information except as I might be duly authorized to do so. Withholding the demographic details and site descriptions in a final report in a manner not to allow the reader to deduce identity information was vital. The use of coded names ensured anonymity and protected names of individuals or organizations to keep the participants and organizations confidential. Keeping research data safe in a locked cabinet has a significant short-term benefit to current researchers and long-term benefits to future studies (Houghton & Gruen, 2014). I will keep both audio-recorded tapes and transcribed interview records in a locked cabinet for 5 years. I will keep a working file of the study and other research data in a synchronized Dropbox and backup copies in google drive, as well as in a password protected server at work.

Data Collection Instruments

The researcher as a primary instrument administers in-depth face-to-face interviews and document reviews to gain a deeper understanding of the experiences through direct interaction with participants (Kaczynski, Salmona, & Smith, 2014). Face-to-face interviews and document review were the instruments for data collection in this study. I engaged participants in member checking by sending them their respective interview transcripts to validate the accuracy of the information they provided during the interview. Participants made some corrections to the interview transcripts and provided

their feedback by email. I also sent by email a summary of the study findings requesting participants to validate the accuracy of the findings.

Face-to-Face Interviews

Strategies ICT service provider managers use to build employee competencies to address ICT infrastructure performance deficiencies was a key question addressed by conducting face-to-face interviews using eight open-ended questions. Face-to-face interviews are popular and widely used means of collecting qualitative data to allow the researcher to get firsthand information directly from informants (Zohrabi, 2013). Researchers use face-to-face interviews to understand the world from the subjects' point of view and to unfold the meaning of people's experiences (Pacho, 2015; Peters & Halcomb, 2015; Woods, 2015). Woods (2015) defined an interview as a meeting or conversation between two or more individuals whom the researcher engages in gathering firsthand information. Barbosa-McCoy (2016) conducted a qualitative multiple case study using face-to-face interviews to explore motivational strategies hotel general managers used to enhance employee performance. Mojtahed, Nunes, Martins, and Peng (2014) conducted face-to-face interviews using open-ended questions to allow interviewer-respondent interactions, open conversations to exchange views, and understanding the meaning between the interviewer and interviewee. Netshitangani (2014) argued the success of qualitative interviews depends on the skill of the interviewer than on the quality of the questions. The goal of the data collection instrument focused on understanding the ICT infrastructure performance deficiencies participants were experiencing from services provided by ICT service providers. I also designed the data

collection instrument to establish extent to which ICT service provider employees' possessed requisite knowledge, skills, and abilities to ensure quality service and performance in the workplace. On average, recording of the 15 interviews using the audacity software took approximately 1 hour.

Document Review

Reviewing documents to collect secondary data was also key to understanding practices and standards the two agencies employ to improve performance in the workplace. Laursen (2013) collected qualitative case study data from a review of documents and interviews with leaders responsible for administration, provision, and regulation of Medicaid services in Arizona. Strategy development documents, training plan, ICT solutions architecture design blueprints, strategy documents, and performance management appraisals were part of the documents reviewed. I obtained the documents from some of the interviewees to allow a systematic review of the company documents by carrying out a content analysis to identify core elements and the recurring themes and patterns relevant to the strategies business managers use to build the employee competencies.

Member Checking

I employed member checking to allow participants the opportunity to check, edit, clarify, and approve the accuracy of the information they provided during the interview sessions. I sent by email the consolidated findings to participants and asked each one of them to check, edit, clarify, and approve the accuracy of the findings as a reflection of the information they provided during the interview. Thirteen out 15 respondents edited the

summary and confirmed the accuracy by sending their corrected versions back on average after 5 days. I also shared a summary of the themes emerged from the analysis and asked them to provided strategies they would use to build competencies of their subordinates per each theme and only five participants responded with feedback that I incorporated in the findings. Anney (2014), Chamberlin (2015), Nwankwo (2015), and Texel (2015) stated researchers engage participants in a member checking process to evaluate, edit, comment, clarify, or confirm the accuracy of the findings and provide additional information. Member checking, also known as response validation, or informant feedback (Anney, 2014) was an appropriate technique for enhancing the trustworthiness of the data collection and the study findings in this study. Researchers may engage participants in member checking in informal interviews, journal entries, or focus groups during or near the end of data collection (Anney, 2014). I also afforded the participants in informal interviews the opportunity to review the interpretation of the collected data to determine the accuracy of the study findings.

Data Collection Technique

The researcher as a primary instrument administers in-depth face-to-face interviews and document reviews to gain a deeper understanding of the experiences through direct interaction with participants (Kaczynski, Salmona, & Smith, 2014). Face-to-face interviews and document review were the instruments for data collection in this study. Participants used member checking to validate the accuracy of the information they provided during interviews. I sent by email the consolidated findings to participants

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collection instrument to establish the extent to which ICT service provider employees' possessed requisite knowledge, skills, and abilities to ensure quality service and performance in the workplace. On average, recording of the 15 interviews using the audacity software took approximately 1 hour.

Preparation for Interview. In preparation for the interview, I undertook steps outlined in the interview protocol (Appendix E). The steps included (a) obtaining the signed permits from executive directors of research sites for gaining access to research sites, (b) obtaining initial contact details of participants, and (c) contacting participants by email to make appointments for one-on-one meeting and a follow up by telephone. Appointees adjusted the interview appointment date and time, as they desired.

Introduction to interview. At the first contact meeting, I greeted the interviewee by name and introduced myself by name and as a researcher at Walden University conducting a research study to explore strategies ICT service provider managers use to build employee competencies. I explained in detail the purpose of the study and the key research question as well as how the question links to the conceptual framework. As outlined in the interview protocol, I explained the importance of the information the interviewee provided as well as how the society would benefit from the study findings.

Recording responses. As interviewees are often uncomfortable when they know the researcher is recording their responses, I informed the interviewee that I recorded the interview using a non-obstructive audacity software installed in my laptop only. All interviewees agreed to the recording of interview. Audio recording the interview was

important to ensure that I did not miss any of the interviewee's discussion points and insights.

Sharing the confidentiality documents. Once the introduction was completed, I discussed and shared with the interviewee the confidentiality documents signed with the executive directors. The documents were a letter of cooperation, confidentiality agreement, data use agreement, and the informed consent form. Sharing the confidentiality documents involved explaining the purpose of the informed consent form and the procedure of participating. I outlined the details of the steps in the interview protocol.

Conduct the interview. At the interview, I greeted the interviewee by hand and thanked him or her for honoring the invitation to this interview. I presented to the interviewee the interview protocol (Appendix E) and the purpose of the interview protocol. I presented all the seven steps of conducting the interview as explained in the interview protocol ensuring the participants fully understand any foreseeable risks and benefits of participating in the study.

Asking open-ended questions. After the interviewee had understood and agreed to sign the informed consent form, I started the interview by asking the interviewee the open-ended questions as they appeared on the interview protocol and recorded the responses. I asked every question in the order given in the interview protocol. While it was important to capture all the important comments, I ensured taking notes did not disrupt the flow of the conversation. On average interviews took up to one hour. The use of the interview protocol (Appendix E) guided the collection of the information about

interviewees prior to them responding to the interview questions. Castillo-Montoya (2016) suggested the interview protocol is a script of valuable information the interviewer shares with participants at the beginning and conclusion of the interview. The advantage of using an interview protocol was the interviewer and interviewees understood one another better.

Asking probing questions. When the interviewee gave a brief cursory answer to a question, I elicited a more thoughtful and thorough response by encouraging him or her to elaborate and clarify his or her response to the question. I listened carefully for recurring and new opinions or experience, and at the same time identifying themes. Immediately after each interview, I reviewed the recording and commenced transcription of the interview word for word in line with Appendix F.

Concluding the interview. In concluding the interview, participants had the opportunity to share any additional information or comments. I also asked interviewees to provide recommendations or solutions in addressing the problem. Before thanking the interviewees for their significant contribution to the study, I summarized the major comments and asked participants if they had any questions or comments. After completing the interview, I sent by e-mail a follow-up thank you note to the interviewees.

Document review. Reviewing documents to collect secondary data was also key to understanding practices and standards the two agencies employ to improve performance in the workplace. Laursen (2013) collected qualitative case study data from a review of documents and interviews with leaders responsible for administration, provision, and regulation of Medicaid services in Arizona. Strategy development

documents, training plan, ICT solutions architecture design blueprints, strategy documents, and performance management appraisals were part of the documents reviewed. I obtained the documents from some of the interviewees to allow a systematic review of the company documents by carrying out a content analysis to identify core elements and the recurring themes and patterns relevant to the strategies business managers use to build the employee competencies.

Member Checking

I employed member checking to allow participants the opportunity to check, edit, clarify, and approve the accuracy of the information they provided during interviews. I sent by email the consolidated findings to participants and asked each one of them to check, edit, clarify, and approve the accuracy of the findings as a reflection of the information they provided during the interview. Thirteen out 15 respondents edited the summary and confirmed the accuracy by sending their corrected versions back on average after 5 days. I also shared a summary of the themes emerged from the analysis and asked them to provided strategies they would use to build competencies of their subordinates per each theme and only five participants responded with feedback that I incorporated in the findings. Anney (2014), Chamberlin (2015), Nwankwo (2015), and Texel (2015) stated researchers engage participants in a member checking process to evaluate, edit, comment, clarify, or confirm the accuracy of the findings and provide additional information. Member checking, also known as response validation, or informant feedback (Anney, 2014) was an appropriate technique for enhancing the trustworthiness of the data collection and the study findings in this study. Researchers

may engage participants in member checking in informal interviews, journal entries, or focus groups during or near the end of data collection (Anney, 2014). I also afforded the participants in informal interviews the opportunity to review the interpretation of the collected data to determine the accuracy of the study findings.

After receiving an IRB approval notification # 09-28-16-0301994 dated September 28, 2016, I recruited 15 participants from ICT1 and ICT2 to partake in a face-to-face interview and document review. The face-to-face interview involved using eight interactive steps outlined in the interview protocol. The steps were (a) preparation for interview, (b) introduction to interview, (c) discussion of confidentiality documents, (d) conducting the interview, (e) asking open-ended questions, (f) asking probing questions, (g) recording the responses, and (h) concluding the interview. Below is a detailed description of the steps undertaken using interview protocol (Appendix E).

Document Review

I used the document review protocol (Appendix J) to review documents of the two ICT service providers. The purpose of this protocol was to provide guidance to the collection of secondary data. I used the protocol to inform the participants about the types of documents I needed to review. I also informed participants to provide the following documents in person for review: HR strategy, training and development strategy, knowledge and skills audit report, knowledge and skills transfer strategy, capability and competency measurements matrices, recruitment and selection policy, retention strategy, incentives and reward system, and performance management reports. Indicators and attributes developed for each criterion assisted in determining the degree

to which ICT service provider managers use strategies to build competencies of their subordinates.

The appreciation of the strategic foundations (vision and mission) and the structure (roles and responsibilities of strategic business units) demonstrated the degree to which managers build the competencies of their subordinates. Documented policies, strategies for recruitment, induction, and deployment of employees showed the extent to which managers recruited and deployed talent to address ICT infrastructure performance deficiencies. Likewise, documented training policy and strategy development, as well as plans for capacity and competency building, demonstrated the depth and breadth of training and developing employees to improve performance.

Advantages and Disadvantages of Face-to-Face Interview and Document Review

Collecting data using interview presented numerous advantages. Researchers allow informants to respond to open-ended questions designed to elicit revealing information about the phenomenon investigated. Researchers using face-to-face interviews achieve interviewer-respondent interaction (Rodriguez, Sana, & Sisk, 2014). Participants represented diverse backgrounds and viewpoints, hence, requiring the researcher to facilitate the interview responses to be in a non-directive manner (Yu & Leung, 2015). As a researcher, I got the firsthand information and gathered detailed data in a relatively easy and inexpensive way. I also easily obtained rapport and built strong relationships with interviewees in the study. The use of face-to-face interview raised awareness, interest, and enthusiasm among interviewees and the researcher might have the opportunity to contact interviewees at a later stage to clarify issues as needed.

While gathering data from participants using face-to-face interviews can be relatively easy, Denscombe (2014) found the method to be time-consuming and expensive. I eliminated time and cost disadvantages by recording and transcribing interviews using the audacity software. The other disadvantage of using face-to-face interview is selecting the right respondent. There were no hard-to-reach participants, who would have been a challenge for scheduling interviews.

Developing a document review protocol assisted in the identification of a systematic consideration of multiple documents obtained from research sites, ensuring I did not miss any valuable information during the interview. I reviewed documents listed in Table 3. The review and analysis of documents obtained from participants was relatively inexpensive and provided a good source of background information and insights about the organizations. The disadvantages of using document analysis may arise from information not properly organized or not available or out-of-date. The process of collecting, reviewing, and analyzing documents may also be time-consuming

Data Organization Technique

File naming conventions, reflexive journaling, indexing, and research logs are some conventional techniques researchers use to organize research data for ease of tracking and management. I created folders using unique filenames in a password-protected, Web-based Zotero virtual library to keep and track my research files. I kept audio data streams, interview transcripts, and document review data in a password-protected Zotero library, Google drive, and Dropbox as well in a password-protected folder on a server at work and an external computer hard drive for five years. The final

research report withheld coded demographic details and site descriptions to disallow readers to deduce identity information. Data stored in Zotero, Google drive, and Dropbox, as well as copies of files stored in external computer hard drive media would only be disposed and discarded after five years in compliance with the Walden University policy.

Keeping a reflective journal and a research log of all other activities and research materials, pre- and post-data collection and analysis, ensured transparency and assisted in the elimination of bias. The reflective journal maintained consisted of events and experiences occurred before, during, and after the interviews and document review. The reflective journal included a log of reflection of personal introspection and perceptions, which have the potential to influence the objectivity of the study.

Data Analysis

Method triangulation was the most appropriate data analysis technique to gain assurance that I obtained the meaning and interpretation relevant to the data in the analysis of interview transcripts and document review information in this multiple case study. Flick (2014) defined qualitative data analysis as a rigorous process of selecting units of data, articulating the qualitative meaning and the relevance of similarities and differences between and among data collected. Analyzing qualitative data also involves ensuring reliability and validity in the data analysis and providing plausible explanations for the findings (Yin, 2016). Triangulation means using more than one method to search for commonalities in the collected data and validating research findings by comparing data to understand the phenomenon investigated (Guion, Diehl, & McDonald, 2002). In

carrying out the method triangulation of interview transcripts and documents review data, I confirmed the evidence obtained through a cross-case analysis using a five-phase cycle procedure recommended by Yin (2016). The five phases were (a) compiling, (b) disassembling, (c) reassembling, (d) interpreting, and (e) concluding (Yin, 2016). In this study, I analyzed data using Yin's (2016) five-phase cycle outlined the following phases.

Phase 1: Compile Database

The steps I used in the compile database phase were as follows. First, I conducted face-to-face interviews using the interview protocol (Appendix E). Second, I transcribed each interview using an interview transcription procedure (Appendix F), each time recording the transcripts responses on Appendix E. Third, I used the document review protocol (Appendix J) to conduct a document review of documents obtained from the two ICT service providers. Fourth, I performed a manual coding of the interview transcriptions in Appendices E and document review data in Appendices J before organizing the results of the compile phase for the next phase.

Phase 2: Disassemble Data

The steps I took in disassembling research data were as follows. First, I organized specific data obtained from the face-to-face interviews by codenames and the reviewed documents by subject. Second, I identified salient themes, recurring ideas, and patterns in the data collected. Third, I organized interviewee transcript and document review for manual coding before importing them onto NVivo10 software. I chose NVivo10 after evaluating three modern computer-aided qualitative data analysis (CAQDAS) software packages: Atlas.ti, NVivo, and MAXQDA, to determine a software application suitable

for analyzing information in this study. Researchers using NVivo10 software application can capture and work with Web pages and online PDFs using an NCapture Web browser (QSR International, 2013). Using w NVivo10 software application was essential for a systematic manual and electronic coding of data collected using interview and document review instruments. Odumodu (2014) and Person (2013) used the NVivo software application to not only perform coding and pattern matching of emerging themes but also to take advantage of the computing power and the ability to handle large volumes of data in one place with minimal error.

Fourth, I applied manual coding to interviewee transcripts and electronic documents and identified emerging themes, recurring ideas and patterns. Fifth, I created two folders, namely interview-data and documents review data in NVivo10 software application. Sixth, I imported interview transcripts onto an interview_data folder in NVivo10 and created nodes onto which I coded each interview transcription (see Figure 1). Lastly, I imported documents onto a document_review_data folder in NViVo10 and likewise created nodes where I coded each document (see Figure 2).

Disassembling interview and document review data in the compile database phase involved capturing data in the original interview transcripts or document review data for coding. Organizing ideas and concepts for coding entails identifying salient themes, recurring ideas and patterns in the data collected (Flick, 2014). After coding the interview and document review data manually, import and performed electronic coding on research materials by phrases, theme, or pattern in paragraph or sentences using NVivo10, I developed thematic categories as nodal parents. The thematic categories

were (a) ICT infrastructure deficiencies, (b) employees' willingness to engage in professional development, (c) occupational requirements to achieve efficiency and effectiveness, (d) leadership and management competencies, and (e) technical competencies developed to improve skills (see Figure 1). I then developed specific nodes for each category as indicated in Figure 1. For documents review, I arranged categories into four thematic areas and developed nodes and sub nodes for each as shown in Figure 2. The thematic areas were (a) strategy (as-is), (b) strategy (to-be), (c) services management, and (d) enterprise IT capabilities based on the documents being reviewed. Foote (2016) imported data from interviews and observations into NVivo10, categorized project management phases of conceptual, development, and implementation. The logical and sequential steps I undertook in reassembling data are as follows. First, I organized data into smaller segments and sort grouped them into nodes and sub nodes for coding (see Figure 1 and Figure 2). Second, I determined patterns and themes from the collected data and remove redundancies and bias. Third, I built code blocks and correlate themes with the literature review and the IT competency model as a conceptual frame of the study. Fourth, I ensured the analyzed data was accurate and consistent with the research question. Fifth, I coded and arranged data into manageable overarching themes. Sixth, I compared and contrasted the overarching themes to uncover cases that appeared similar. Seventh, I searched for alternative explanations on themes emerging from data and took precautions to ensure the emerging themes were not vulnerable to any form of bias. Lastly, I compiled the results of the reassembling phase for interpretation.

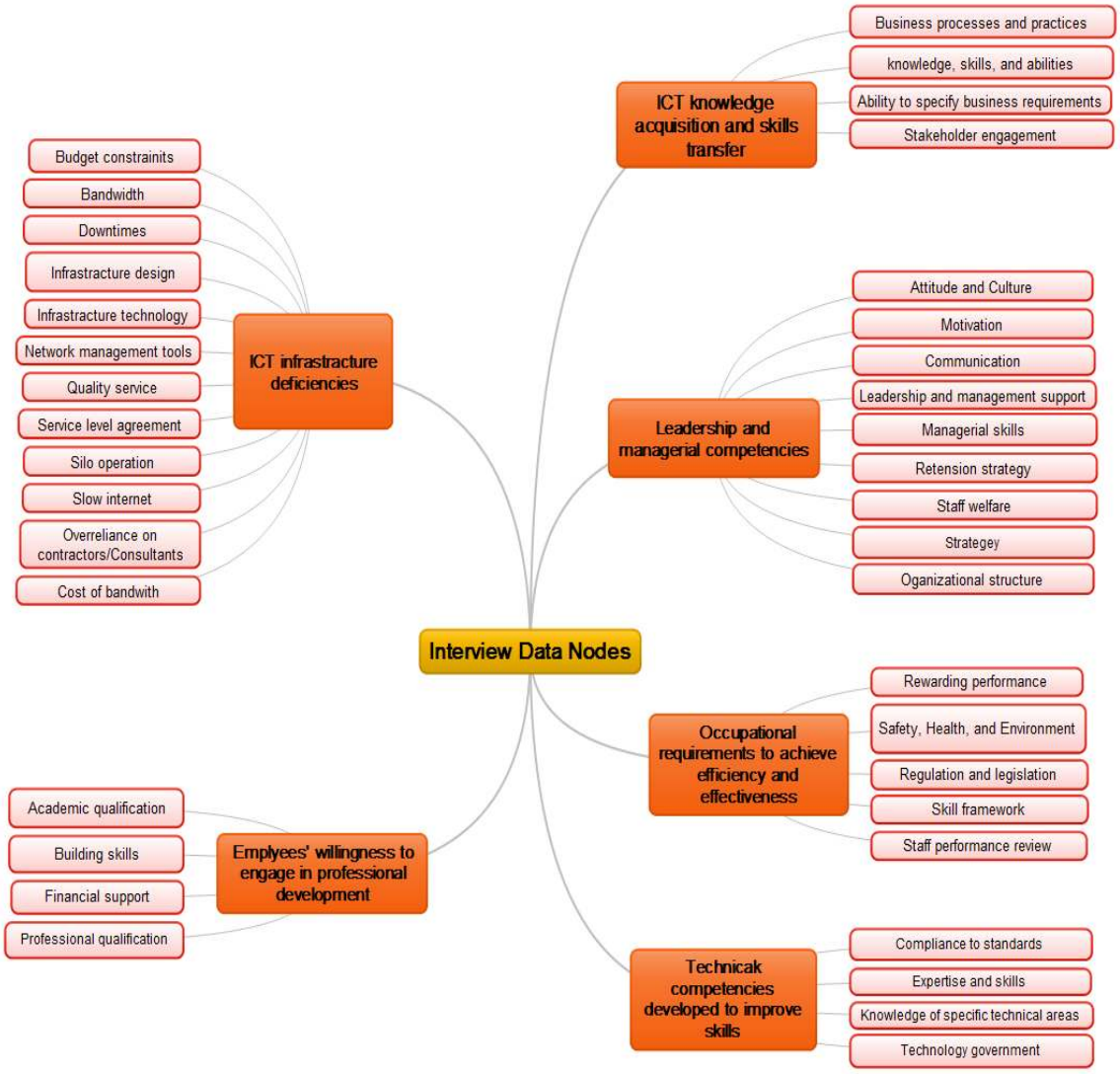

Figure 1. Interview data nodes

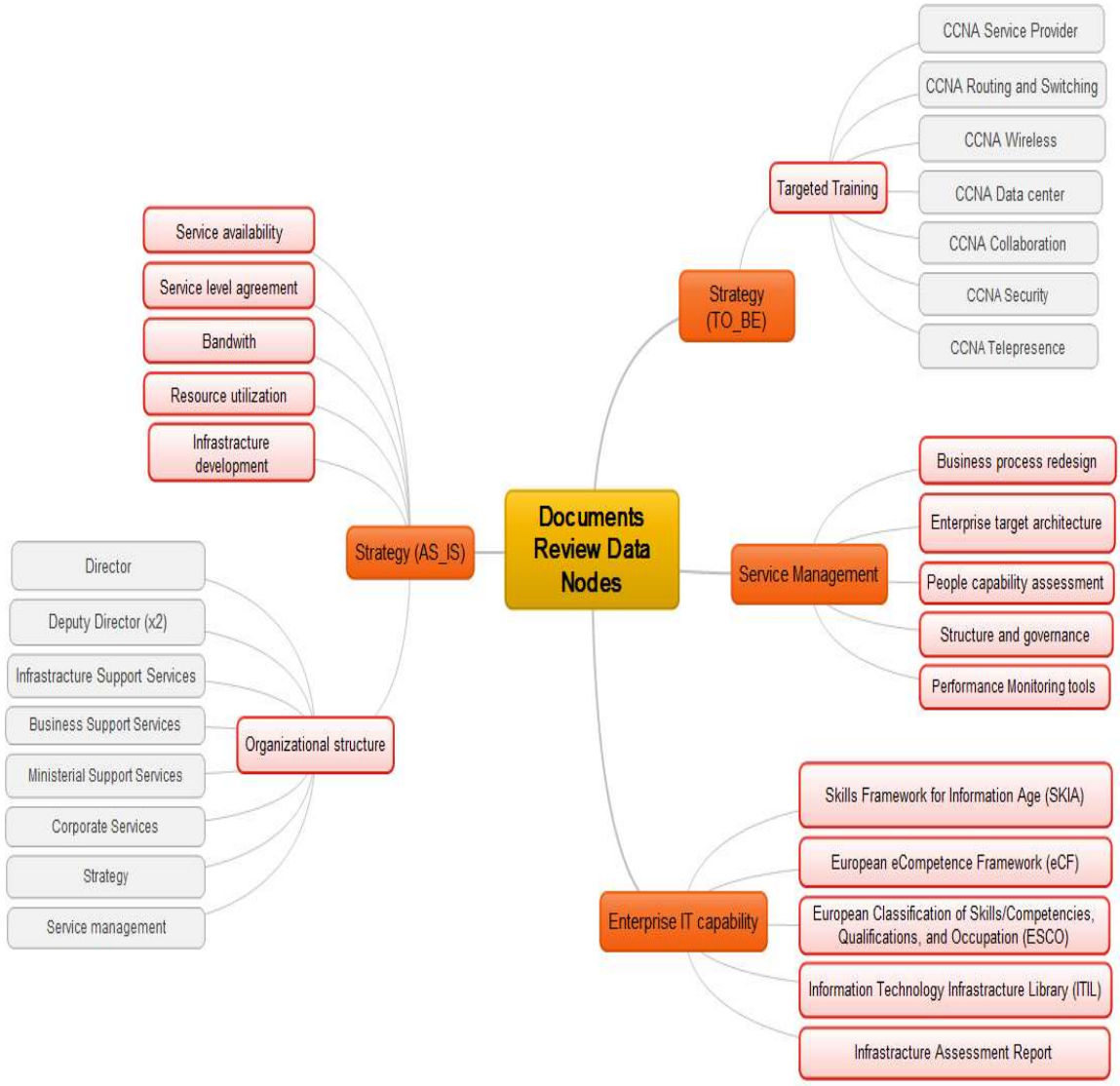

Figure 2. Documents review data nodes

Phase 3: Reassemble Data

The themes that emerged from coding and analysis of data were (a) lack of employees' requisite skills for ICT network design optimization to achieve high-speed bandwidth, (b) lack of employees' responsiveness to network outages to achieve service availability at 99.95%, (c) budget limitation, (d) training and professional development limitation, (e) enterprise ICT competencies, and (f) knowledge acquisition and skills transfer. Onwuegbuzie, Leech, and Collins (2012) defined constant comparison as a process of reducing data sources to codes and developing themes from codes in data analysis. Researchers achieve constant comparison using three stages of coding. The stages are (a) open coding (organizing data into smaller segments and assigning them codes), (b) axial coding (grouping codes into smaller categories), and (c) selective coding, where the researcher integrates and refines a theory (Onwuegbuzie, Leech, & Collins, 2012). Analyzing coded data involves (a) discovering and sorting themes and subthemes, (b) building code blocks, and (c) correlating the successes in the literature and the theoretical/conceptual framework (Mathu & Chinomona, 2013).

Qualitative researchers use coding to reduce bias and strengthen the credibility of the study findings (Kornhaber, de Jong, & McLean, 2015). Researchers perform coding on the collected data to generate similar themes and patterns for data analysis. In this study, open and axial coding was appropriate for assigning codes to small segments of interview and documents review to group similar categories into coded segments. Researchers reassemble data to uncover cases that appear similar but are a mismatch on

proximity (Yin, 2016). Contrasting items or cases may lead to bias and compromise the robustness of the study. During the analysis of interview and document review, I took precautions to ensure the emerging themes are not vulnerable to researcher bias, sampling bias, or procedural bias. Engaging in rival thinking involves the researcher's ability to search for alternative explanations on themes emerging from the data source (Yin, 2016). Yin argued engaging in rival explanation is common in quantitative studies to test the null hypothesis. Engaging in rival thinking assisted in focusing on the key themes, and correlating the key issues of the literature (including new studies published since writing the proposal) as well as the IT competency model guiding this study. The procedure for engaging in rival explanations was not be appropriate for data analysis in this study.

Understanding the meaning relevant to the research question eliminated redundancies and determined themes from the collected data. Building overarching themes in data entailed coding and arranging data into manageable themes to facilitate thorough interpretation of the findings. Identifying and reassembling patterns involved looking for similarities in identical items, the frequency of occurrence, sequence, and corroboration. Yin (2016) suggested three procedures researchers may use in the reassembly phase: making constant comparisons, watching for negative cases, and engaging in rival thinking. Researchers performing constant comparison identify similarities and contrasts among items in data sources (Yin, 2016).

Phase 4: Interpret Data

Using interview protocol (Appendix E) and document review checklist (Appendix J), I summarized the descriptive interpretations of the findings. First, I compared the

results of interview and document review to the goals of the study. Second, I contrasted conflicting views among the emerging themes, categorized, and put together themes with similar patterns. Third, I confirmed whether the interpretations justified the findings. Fourth, I made recommendations regarding building of employee competencies to improve performance. Lastly, I made recommendations and confirm whether the interpretation justified the conclusions.

Descriptive interpretation was an appropriate procedure for interpreting, discussing, and reporting the results of this study than the explanation interpretation approach (Yin, 2016). Engaging in an in-depth description to interpret, discuss, and report the emerging themes to reveal similarities and contrasts between interview and document review data obtained from face-to-face interviews and the review of documents was essential. Persson (2013) and Gay (2016) employed a description procedure to interpret and discuss themes emerging from the reassembling of interview data and archival records. Gay (2016) argued interpreting data using descriptive interpretations involves a discussion of individual ideas to explore the contrasts and similarities relevant to addressing issues about the strategies managers use to develop employee competencies.

Phase 5: Concluding Data Analysis

The steps I took in the final phase of analyzing data included the following. First, I documented and discussed the key findings of the study. Second, I collated the findings to the research questions and literature review using method triangulation using NVivo10 software. Third, I stated how the outcomes of the study contribute to the business

practice. Fourth, I stated the implications of the study outcomes would have on social change. Fifth, I recommended the actions policymakers, business practitioners, academia, and ICT managers must take to develop the competencies of their subordinates to improve performance. Lastly, I identified questions that need further research and make recommendations for future research.

Case study researchers discuss and document the study findings focusing on priority themes interpreted in the reassembling and interpretation phases. In the discussion of the results of each case obtained from the analysis of source data, I assessed their relationship and significance to the literature review and conceptual framework guiding the study. Odumodu (2014) compiled a list of key findings per theme from individual case results to extrapolate the significance of the findings to the literature review and conceptual framework that guided the study. In discussing the key findings, I compared and contrasted the interview and document review data by theme and collated the findings to the research questions and literature review through method triangulation. I used the validated study findings to state how the outcomes of the study would contribute to the business practice and improve societal change.

Reliability and Validity

The reliability of a research centers on the consistency and accuracy of its findings. To establish the consistency, accuracy, applicability, and neutrality of the study findings in qualitative research, researchers use trustworthiness strategies to ensure the quality and integrity of the study results. Qualitative researchers use dependability, credibility, transferability, and confirmability to ensure the quality and completeness of

the study results (Anney, 2014; Lincoln & Guba, 1985). The trustworthiness criteria, however, are not measurable and need to be enhanced using transcript review, member checking, and data saturation. I addressed the dependability, credibility, transferability, and confirmability of the findings of the study using member checking and data saturation to ensure the quality of the results.

Dependability

Researchers address dependability to ensure the study findings are repeatedly consistent and dependable over time and different conditions (Anney, 2014). Dependability does not only refer to the consistency and stability of data over time and under various conditions but also entails establishing a reliable process of reporting consistent and accurate study results and conclusions (Anney, 2014). Anney (2014) argued participants must evaluate the findings, interpretation, and recommendations of the study to ensure data collected support the research findings. I involved participants in member checking process to establish the extent to which the results of research are dependable. Participants took part in a member checking process to evaluate the research findings, interpretations of the study results, the recommendations, and conclusions of the study to validate the consistency and stability of study over time. Hills (2015) and Zohrabi (2013) emphasized researchers must engage participants to check whether the study findings, interpretations of the findings, and conclusions reflect the information members shared with the researcher.

Credibility

To establish the credibility and underpin the relative truth of the study findings, researchers use triangulation to validate the completeness and integrity of the data collection instruments (Anney, 2014; Zohrabi, 2013). Researchers also demonstrate the truth of the study findings to ensure the quality of data, accuracy of the interpretation of data, and the credibility of the results (Lincoln & Guba, 1985). To demonstrate the reliability of the study results and conclusions, I used method triangulation to obtain corroborating evidence by thoroughly assessing the integrity of participants' responses and document review data. In comparing and contrasting different views of participants, I identified similarities and differences between data sources, extract themes and relationships, and draw a concise conclusion of the study.

Transferability

Anney (2014) defined transferability as the degree to which future researchers can transfer the results of the current research study to other contexts. To enable future researchers' judgment about how well the proposed study setting can fit in other contexts, I explained in detail all the research methodology in this study (i.e., snowball selection of participants, data collection, data analysis, data interpretation, discussion, and reporting of the findings). Facilitating transferability through a detailed description of the research methodology and selection of participants using snowballing technique would enable future researchers to determine transferable study results and use the results to form their opinions on future research. Marshall and Rossman (2016) suggested enhancing transferability requires the researchers reading the study to determine whether the

research findings are transferable to other contexts. Future researchers would determine whether the conclusions drawn from data collection, analysis, and interpretation of data regarding the effective strategies ICT service provider managers use for building employee competencies would be transferable in other contexts.

Confirmability

Confirmability refers to the degree to which other researchers can corroborate the interpretation of the current study results (Anney, 2014). Qualitative researchers use confirmability to reinforce the extent to which respondents shape the findings of a study (Lincoln & Guba, 1985). To confirm the quality, accuracy, and authenticity of the results of research in this study, I used method triangulation to compare and contrast conclusions obtained from the analysis of interview and document review data. Method triangulation involves combining multiple methods such as primary and secondary interviews, reports, and observations to provide confirmation of the findings, as well as to increase the validity, and enhance the understanding of the phenomenon studied. Anney (2014) and Zohrabi (2013) established confirmability to determine the neutrality of the findings in preference to the objectivity of the study using confirmability audit and reflexivity journals.

Data Saturation

Researchers such as Fusch and Ness (2015) and Latham (2014), Marshall et al., (2013) argued data saturation occurs when the researcher no longer receives: new information, new coding, new themes, or new patterns in the interpretation of the data collected. Marshall et al. (2013) argued data saturation entails bringing new participants

into the study until reaching data replication or redundancy. I reached data saturation on the twelfth interview because no new information or themes emerged, hence, I did not recruit any more participants for further interviews.

Transition and Summary

I began Section 2 with a restatement of the purpose statement, a discussion of the role of the researcher in data collection, including the researcher's role related to ethics advocated in the Belmont report. The eligibility criteria for the study participants included managerial position. The population of this qualitative multiple case study included more than 120 managers of ICT service providers located in Gaborone and Francistown in Botswana. The application of ethical standards to protect the rights of participants and maintain the confidentiality of data and the privacy of individuals was crucial to ensure potential risks do not befall research subjects. Participation in the study was voluntary and participants agreeing to participate signed the informed consent form.

Data collection involving face-to-face interviews and document reviews was suitable for this study. I considered Yin's (2016) strategies of compiling, disassembling, reassembling, and interpreting data to be vital for guiding the analysis and interpretation of the study findings in this study. I validated the study outcomes using method triangulation and member checking to enhance the dependability, credibility, transferability, and confirmability of the study findings.

In section 3, I collate the key study findings to the research question and the conceptual framework. The identification of gaps in literature and recommendations of strategies business managers consider appropriate for building employee competencies

contributed significantly to the business practice, economic growth, and future research. I make recommendations for future researchers to find out whether the study outcomes are transferable in other contexts.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative multiple case study was to explore strategies ICT service provider managers use to develop employee competencies to address ICT infrastructure performance deficiencies. Following the IRB approval # 09-28-16-0301994 notification dated September 28, 2016, I recruited 15 participants from the two organizations, ICT1 and ICT2, to partake in individual face-to-face interviews and arranged for document reviews to gain a deeper understanding of the phenomenon investigated. From October 4, 2016, to November 10, 2016, I collected data from 15 managers using face-to-face interviews. Managers signed the consent form before the interview. I then transcribed each interview word for word per every open-ended question, including responses to probing questions. I identified participants by codenames (see Table 2). Data saturation occurred on the fifteenth interview. I also reviewed 12 company documents (10 documents for ICT1 and two documents for ICT2) obtained from participants. I identified the documents by subject (see Table 3). After performing transcriptions and manually coding data from the 15 interviews, I imported the interview transcriptions onto NVivo10 software for Windows and coded each one of them before I conducted the analysis on interview data. I arranged the interview data into six first order nodes and 38-second order subnodes for coding and analysis (see Figure 1). I also imported the electronic documents into NVivo10 software and arranged them into four nodes and 17 sub nodes for coding and analysis (see Figure 2).

Table 2

Participants

Interview date	Participant	Gender	Codename	Organization
10042016	Participant 1	F	ICT1Respondent#1	ICT1
10062016	Participant 2	M	ICT1Respondent#2	ICT1
10052016	Participant 3	M	ICT1Respondent#3	ICT1
10112016	Participant 4	M	ICT1Respondent#4	ICT1
10132016	Participant 5	M	ICT1Respondent#5	ICT1
10142016	Participant 6	F	ICT1Respondent#6	ICT1
10072016	Participant 7	M	ICT1Respondent#7	ICT1
10272016	Participant 8	F	ICT1Respondent#8	ICT1
10272016	Participant 9	M	ICT1Respondent#9	ICT1
10062016	Participant 10	M	ICT2Respondent#10	ICT2
10082016	Participant 11	M	ICT2Respondent#11	ICT2
10262016	Participant 12	F	ICT2Respondent#12	ICT2
10262016	Participant 13	M	ICT2Respondent#13	ICT2
10192016	Participant 14	M	ICT2Respondent#14	ICT2
10052016	Participant 15	M	ICT2Respondent#15	ICT2

Table 3

Documents

Document	Codename
Skills Matrix	ICT1_Document#1
Strategy 2016-2019 (AS_IS)	ICT1_Document#2
Cyber Strategy (Final Draft)	ICT1_Document#3
Rewards Guidelines	ICT1_Document#4
Professional Profiles	ICT1_Document#5
Reorganization	ICT1_Document#6
Organizational Capability process	ICT1_Document#7
Skills Framework for Information Age	ICT1_Document#8
Infrastructure Assessment Report	ICT1_Document#9
2016/2017 Training Plan	ICT1_Document#10
Business case	ICT2_Document#11
Broadband strategy	ICT2_Document#12

Presentation of the Findings

The central research question was: *What strategies do ICT service provider managers use to build the competencies of their subordinates to address ICT infrastructure performance deficiencies?* After receiving the IRB notification, I recruited and interviewed 15 managers from two ICT service providers (ICT1 and ICT2) operating in Gaborone and Francistown in Botswana. I interviewed participants and transcribed each interview, then imported each interview and document review data onto NVivo10 software. After importing the interview and electronic document data onto the NVivo10 software application, I arranged interview data into six first order nodes and 38-second order subnodes for coding of interview data (see Figure 1). I also imported documents shown in Table 3 onto NVivo10 and arranged them into four nodes and 17 subnodes for coding and analysis (see Figure 2).

The use of a method triangulation and thematic analyses resulted in the emergence of six themes: (a) developing essential employee skills to address ICT network design and optimization, (b) developing employees' ability to restore network outages to achieve acceptable service assurance and availability, (c) developing budgets to finance the development of employee competencies. Respondents also cited (a) professional training and development, (b) developing enterprise IT capabilities, and (c) promoting employees' knowledge acquisition and skills transfer as reasons hindering the development of employee competencies. Thus, ICT service provider managers lack appropriate strategies for building employee skills necessary to address ICT infrastructure deficiencies.

A majority of respondents indicated employees lack different skills across the entire skill areas (ICT1Respondent#1; ICT1Respondent#2; ICT1Respondent#3; ICT1Respondent#5; ICT1Respondent#9). ICT1Respondent#9 stated an effort to develop business processes to guide the department in developing capabilities and competencies to not only spearhead efficiency and effectiveness but also to ensure one generation passes the skills to another did not bear fruit. I discuss each of the six themes in the following subsections.

Theme 1: Developing Employees' Skills for Addressing ICT Network Design Optimization to Achieve High-Speed Bandwidth

BOCRA has licensed ICT1 to provide government ministries and departments in Botswana with ICT services through a government data network (GDN). The ministries and departments connect to the GDN using bandwidth capacities ranging between 256kbps and 4Mbps (ICT1Respondent#3; ICT1Respondent#5; ICT1Respondent#7). Managers of ICT1 indicated they are not providing quality services, citing poor Internet and e-mail services primarily because the network availability is far lower than the expected availability level of 99.95% (ICT1Respondent#3; ICT1Respondent#9). Government departments implemented enterprise planning resource (ERP) systems using the GDN and some leased line connections not supporting quality of service parameters that conform to a service availability of 99.95%, hence, resulting in slow bandwidth and compromised services (ICT1Respondent#3; ICT1Respondent#5; ICT2Respondent#10; ICT2Respondent#11). ICT2Respondent #10 stated the performance deficiencies they experience from the technology used. Managers of ICT service providers get the

technologies from different vendors, and some vendors are providing them with systems that do not meet various aspects of compliance, such as various ITU standards, which makes it difficult for the systems to perform to the required levels.

Different government departments and other private entities voiced their concerns at a recent ICT forum regarding slow bandwidth affecting service delivery in the public service (ICT2Respondent #12; ICT2Respondent #14). Respondents stated optimization and dimensioning of ICT network capacity do not align with the service and application requirements due to lack of employee competencies. Managers of ICT2, however, indicated there was sufficient bandwidth in the country to support customer needs. Managers of ICT2 also stated the issue of slow bandwidth was due to the customers' inability to specify appropriate bandwidth requirements when connecting services, which results in inappropriate resource utilization and bottlenecks in the network (ICT2Respondent #11; ICT2Respondent #12; ICT2Respondent #13). Managers of ICT2 indicated there is a backhaul bandwidth in the country to address slow bandwidth, showing limitations in the last mile access, which in this case is the responsibility of ICT1 (ICT2Respondent#10).

To address insufficient bandwidth, fixed operators should replace ADSL services and collaborate with the wholesale provider to benefit from FTTx technology deployment (ICT2Respondent#10). Managers of ICT2 must accelerate WiFi deployment to cover mass population such as residential, office parks, and all other hotspots (ICT2Respondent#10). Mobile operators also should adapt the infrastructure sharing principles to avoid duplication of resources (ICT2Respondent#10). Departments would

benefit substantially from the ICT2's FTTx project deployed in government offices to improve bandwidth capacity requirements to up to 200Mbps at affordable prices (ICT2Respondent#10; ICT2Respondent#11; ICT2Respondent#12; ICT2Respondent#13).

Muciaccia et al. (2014) identified options of fiber-to-the-X fiber optic access infrastructure. The options include FTTH, FTTP, FTTB, FTTN, and FTTC, which would benefit not only the business community but also the public service in Botswana through coordinated efforts by ICT2 and stakeholders. Consistent with respondents regarding the experiences of slow Internet and systems downtimes, a Microsoft representative, after an assessment of the critical infrastructure components, reported some shortcomings that worsened system downtimes (ICT1_Document#9). The identified weaknesses were (a) dysfunctional proxy servers; (b) evidence of constant brute force attacks on the active directory, especially on old Windows XP machines; and (c) some data centers (ICT1_Document#9). The audit report further revealed some domain controllers were offline when they were supposed to be functional. The auditor also found security violations of some active directories replicated on demilitarized zones (DMZ). There was no backup solution in place (ICT1_Document#9). The identified malfunctions worsened the slow bandwidth and service degradation.

Strategies for Building Employee Competencies to Address ICT Infrastructure Performance Deficiencies

Strategies identified in Table 4 and Table 5 seek to develop core competencies for engineers, graduate engineers, as well as engineering managers. Developing competencies for ICT engineers and new graduates (see Table 4 and Table 5) would

impart problem-solving skills, interpersonal skills, communication skills, and teamwork, thereby ensuring personal effectiveness competencies in line with the conceptual framework shaping this study. To ensure employees apply learning and knowledge of emerging technologies, employees must have the ability to build a mastery of techniques and use modern ICT tools to improve performance in the workplace. In the quest to build ICT enterprise capacity, Ramorola (2014) addressed the question *where to start – infrastructure or capacity building* based on the objective to: "determine if teachers have access to technology equipment, investigate if teachers are trained to use technology for teaching and learning activities, and if there are ICT policies to support the curriculum" (p. 3650). Estonia's *Tiger Leap* program during 2001to 2005 was developed to appraise the ICT skills of teachers, implement in-service training of teachers in ICT through a certification program, run courses on the methodology of ICT applications for teachers in secondary schools, and evaluation of the effectiveness of ICT in education.

Table 4

Developing Core Competencies for ICT Engineers and New Graduates

Strategic objective	**Specific goals**	**Key deliverables**
Develop core competencies for ICT engineers and new graduates	Develop intellectual lifelong learning skills taught from the earliest stages and through accreditation agencies for engineers and new graduates	Engineers and new graduates must possess competencies to: • develop problem solving, critical and creative thinking skills • develop interpersonal, teamwork, and effective communication skills • develop self-assessment and self-drive skills • develop effective change management skills
	Engineering tertiary and vocational curricular to incorporate outcome-based accreditation programs for engineers and new graduates	Engineers and new graduates must develop: • a mastery of knowledge, techniques, skills, and modern ICT tools • the ability to apply current knowledge to emerging applications of Internet and cloud computing • the ability to identify, analyze, and solve technical problems • the ability to understand professional and ethical, responsibilities • a commitment to quality, timeliness, and continuous improvement

Table 5

Developing Core Competencies for Engineering Managers

Strategic objective	**Specific goals**	**Key deliverables**
Develop core competencies for engineering managers	Develop the desired technical competencies to improve performance	Engineering managers must possess technical competencies to: • develop a mastery of decision support analysis • develop resource optimization and utilization • develop risk aversion strategies • develop information technology management appraisal system
	Develop the required managerial competencies to improve performance	Engineering managers must possess management competencies to: • develop strategic and operational planning • champion effective change management programs • realize project management success • develop human resource planning and selection • prudent allocation of resources
	Develop leadership competencies to improve performance	Engineering managers must possess leadership competencies for: • vision and direction setting • oversight accountability • effective communication • teamwork • developing work ethics and social responsibility • championing cultural awareness

Likewise, engineering managers must possess managerial competencies for strategic and operational planning and a mastery of decision support systems in line with the conceptual framework of this study (see Table 4). Sadok, Chatta, and Bednar (2016) provided research aligned to the theme associated with the demand for requisite skills for ICT network design optimization to achieve high-speed bandwidth. Sadok et al. (2016) suggested broadband quality and speed (e.g., downstream and upstream speeds) chiefly determine the value of ICT services and applications. While ICT business managers are under pressure to measure and monitor ICT infrastructure network performance, Rajabiun and Middleton (2014) indicated researchers made little consensus on which method to use to measure Internet service quality.

Cordero (2016), however, proposed user-experience metrics for evaluating transport performance and specified bandwidth and delay aggregation benefit metrics for multipath transmission control protocol (MPTCP). The metrics are bandwidth and delay aggregation benefit. In this section, a focus is on understanding MPTCP bandwidth utilization and measurements to achieve quality service in the ICT infrastructure. Cordero (2016) defined the bandwidth aggregation benefit between two points as the average goodput realized over time via a reliable TCP or MPTCP and defined the time taken from the packet to travel from source to destination devices. Steiner, Barlet-Ros, and Bonaventure (2015), evaluated TCP packets received and sent by servers hosting MPTCP Linux kernel implementation and an FTP server with two IP address (IPv4 and IPv6).

The knowledge and skills of using appropriate tools and techniques for measuring and evaluating the end-to-end path of a transmission network have a strategic fit toward the IT competency model as it applies to personal effectiveness competencies as well as knowledge of industry-specific technical areas. Without the use of appropriate broadband bandwidth measurement tools, business managers cannot guarantee the delivery of packets of data transmitted over the network, nor can they guarantee the quality of service and performance for shaping the business processes (Szymanski, 2016). Building employee competencies on measuring and evaluating network bandwidth performance may reduce the effects of slow bandwidth and improve performance. Sadok et al. (2016) presented the upstream and downstream bandwidth speeds that business managers may consider for different services and applications when designing and dimension bandwidth requirements for ERP systems and other data centers (see Table 6). Properly designed ICT infrastructure networks with bandwidth speeds shown in Table 6, may allow profiling of broadband speeds per user requirements (Riddlesden & Singleton, 2014).

Table 6

Bandwidth Speed Ranges Recommended for Various Services and Applications Requirements

Speed range	**Service or application**	**Recommended speeds for services in Botswana**
500kbps – 1Mbps	• Basic e-mail • Web browsing (simple systems) • Low quality video	• basic office e-mail • basic web browsing in offices
1Mbps – 5Mbps	• Web browsing (complex systems) • E-mail (large size attachments) • Video phone • Remote surveillance • File sharing (small/medium) • Streaming music • Telecommuting (ordinary)	• Web browsing in offices • E-mail by managers • Video phone • File sharing (small/medium) • Streaming music
5Mbps – 10Mbps	• Telecommuting (converged services) • File sharing (large) • Video downloading • Low definition telepresence • Medical file sharing (basic) • Remote education	• File sharing (large) • Video downloading • Low definition telepresence • Medical file sharing (basic) • Remote education
10Mbps – 100Mbps	• Telemedicine • Educational services • HDTV channels • Telecommuting (high quality) • High-quality telepresence • HD surveillance	• Telemedicine • Educational services • HDTV channels • Telecommuting (high quality) • High-quality telepresence • HD surveillance
100Mbps – 1Gbps	• HD Telemedicine • Multiple educational services, Broadcast video (full HD) • Remote server services for telecommuting	• Multiple educational services, Broadcast video (full HD) • Remote server services for
1Gbps – 10Gbps	• Research applications • Telepresence using uncompressed HD video streams • Telemedicine remote control of scientific/medical instruments	• Research applications • Telepresence using uncompressed HD video streams

Theme 2: Developing Employees' Ability to Restore Network Outages to Achieve Service Assurance and Availability at 99.95%

In this study, prolonged ICT infrastructure outages are attributable to some factors. The factors include single points of failure due to a lack of redundancy in transmission links, poorly optimized network and obsolete equipment, outdated data center equipment, technologies not complying with standards, and infrastructure design deficiencies (ICT1Respondent#1; ICT1Respondent#3; ICT1Respondent#9; ICT2Respondent#10; ICT2Respondent#14). ICT1Respondent#3 related to ICT infrastructure weaknesses in three broad categories. First, outages that come because of having multiple single points of failure in the infrastructure (e.g., in wide area network (WANs), local area network (LANs), or in data centers) are the main sources of service disruption and service unavailability. Second, a lack of a robust capacity and network resource management capability (e.g., broadband capacity, processor capacity, or any other network resources) is another deficiency area managers of ICT1 do not have strategies to address harmoniously (ICT1Respondent#3).

Respondents indicated the performance deficiencies are attributable to multiple single points of failure in the core network and data center (ICT1Respondent#3; ICT1Respondent#9; ICT2Respondent#10; ICT1Respondent#14). A lack of analytical skill sets and overreliance on contractors and consultants exacerbate prolonged network and system downtimes (ICT1Respondent#9; ICT2Respondent#10). ICT1Respondent#3 cited two zones of the network affected by a single point of failures because of no redundancies in the network. The zones are the national backbone being a single fiber

ring, which is under the control of ICT2. Access infrastructure provided by Botswana Telecoms Corporation Limited (BTCL) like Metro Ethernet base stations also presents a single point of failures. ICT1Respondent#1, ICT1Respondent#9, and ICT2Respondent#10, however, attributed the ICT infrastructure failures to old and outdated technologies deployed by government ministries and departments. ICT2Respondent#10 stated the impact of technologies not complying with some standards is huge in the sense that the services provided do not support service requirements, which in the long run makes it difficult for end users to utilize the services. ICT2Respondent#11 stated before the implementation of the ongoing GDN evolution project, an extensive audit of government infrastructure was undertaken to understand the causes of multiple downtimes. ICT2Respondent#11, however, did not share or state the results of the audit and its significance to the ongoing project. Mogotlhwane and Underwood (2013) indicated outsourcing of IS/IT services remains to be a major problem in Botswana government because of the department's failure to manage the process. The strategies managers of ICT1 would use to build employee competencies focus on the target service management portfolio and SFIA initiatives.

Strategies for Implementing Network Resilience and Optimization Strategies to Achieve Quality of Service

Implementing ICT infrastructure resilience and optimization requires ICT service provider employees' knowledge and in-depth understanding of network and data center deployment and optimization strategies including server resource capabilities, network resource capabilities, and end-to-end network management and control strategies (Tso,

Jouet, & Pezaros, 2016). ICT2Respondent#11 indicated their employees have many deficiencies including the ability to monitor the network infrastructure such as transmission link performance, data center, and other network resource management. ICT2Respondent#11 indicated graduates managers of ICT2 employs might have the right qualifications but do not have the right competencies, skills, and experiences to be able to monitor the infrastructure sufficiently. With appropriate competency and skill sets, ICT service provider engineers would address the increasing demand for data center design and network optimization. ICT service provider engineers would have skills required to manage network and server resources in the ICT infrastructure, and they would secure and protect data and information traversing the network to achieve high throughputs and efficient resource utilization. In following subsections, I discuss strategies ICT service provider managers may use to build competencies of the subordinates to improve performance.

Network and data center deployment and optimization strategies. Data center topology and optimization strategies involve the implementation of several non-blocking architecture designs. The models include (a) conventional, Clos/fat-tree, DCell, or BCube data center architectures and (b) server-centric data center architecture design (Tso et al., 2016). Although Clos/Fat-tree architecture design requires homogeneous switches and large numbers of links, the topology fosters high performance and resilience than the conventional data center topologies (Tso et al., 2016). Operators commonly deploy BCube and DCell topologies in server-centric architectures for multihop communications (Tso et al., 2016). Understanding the different data center designs

would enable ICT service provider employees to design, build, operate, and monitor scalable data centers to specific user requirements and performance expectations.

Implementing Clos/Fat-tree, BCube, and DCell topologies allows thousands of racks and servers in a data center (Tso et al., 2016; Zhao, Hu, Zhang, 2017). Data center integrators use optical circuit switches (OCS), and micro-electro-mechanical systems (MEMS) switches to connect all the top-of-rack (ToR) switches for seamless traffic routing and switching (Zhao et al., 2017). The quality of service (QoS) requirements, cabling, and latency losses associated with data center solutions require data center integrators to employ OCS and MEMS to achieve scalability and optimal performance. Data center integrators implement OCS and MEMs in bidirectional and self-healing optical add/drop multiplexers (ROADM) ring to drop wavelengths from the ring to the ToR switches (Zhao et al., 2017). ICT service provider employees must implement optimization strategies to reduce data center server-to-network and server-to-storage cabling by more than 70%, hence lower the cost, complexity, and power requirements (Zhou, Li, & Chen, 2016). Understanding the data center design would enable ICT service provider employees to monitor and trace transmission and latency losses, hence apply appropriate interventions to improve QoS and performance.

Regardless of the architecture type, the deployment of energy efficient measures plays a crucial role in reducing the operational expenditure (OPEX) by 20%. A reduction in OPEX results in a corresponding increase in profit margins (Lin, Wei, Sunho, Feifei, & Kun, 2015; Xu, Dai, Huang, Yang, & Wen, 2017). Lemus and Adam (2013) estimated the total cost of ownership (TCO) of a rack in a data center to US$120, 000.00 over a

useful life of the equipment with both the capital expenditure (CAPEX) and operational costs accounting for 50% each. According to Lemus and Adam, one data center rack consumes 20% of the total lifetime operating expense of a rack in a data center, while engineering and power equipment consume 18%. Xu, Huang, Yang, and Wen, (2017) found, whereas data center architecture built with the best wiring and connection practice can achieve high network performance through multi-routing, the design waste energy when the devices are in low utilization as the data center traffic is typically smaller than moderate usage peak.

Thus, ICT service provider managers in Botswana may use energy efficient measures including the use of reliability-aware server consolidation strategies using onsite solar panel technologies, windmill power generators, backup generators, and traffic aggregation and scheduling techniques (Deng, Liu, Jin, Liao, & Liu, 2014). To ensure maximization of energy efficiency, Xu et al. (2017) suggested ICT engineers might aggregate traffic into fewer switches or ports and turn more switches or ports into sleep mode to allow for a minimum power consumption. Engineers may also suspend delay-sensitive traffic during periods of power shortage until energy efficient paths are available. Despite the data center evolution from tightly coupled silo series data centers (DC 1.0) to the modern virtualized data centers with massive computing capability (DC 2.0). Participants in this study did not have knowledge of data center optimization nor knowledge of data center performance and reliability metrics. The employees of ICT service providers rely too heavily on vendor support and lack knowledge of traffic aggregation techniques and scheduling methods in data center environments.

Server resource management strategies. The server resource management involves different types of virtualization consolidation strategies including server resource-aware consolidation, energy-aware consolidation, service level agreement-aware consolidation schemes (SLA -aware consolidation), and network-aware consolidation plan (Tso et al. 2016). Thus, traditional and cloud data centers have different server architecture designs that require different power consumption rates for delay-sensitive and delay-tolerant workloads (Peng, Kang, Al-Hazemi, & Youn, 2017). A detailed discussion of server resources-aware consolidation strategy and SLA -aware consolidation plan in the following subsection seeks to underpin the importance of evaluating, monitoring, and implementing server resource performance metric in data center environments.

Server resource-aware consolidation strategies. Virtualization technologies and server consolidation strategies have increasingly become drivers of high resource utilization and energy-efficiency techniques in modern data center environments (Jersak & Ferreto, 2016). Virtualization refers to creating a virtual representation of a real or physical IT resource such as computer server, storage, and network, which may represent server virtualization and data virtualization (Barlow, 2015). Whereas server virtualization allows applications to use computer and memory resources allocated to them without regard to the underlying physical configuration, data virtualization provides a virtual data view that integrates the underlying physical resources. The resources may include files, database records, and software as a service (SaaS) applications such as billing data, email, or registration data.

Service level agreement-aware consolidation strategies. Some consolidation strategies solely focus on balancing the tradeoff between the cloud applications service level agreement (SLA) and energy costs of the hosting servers (Deng et al., 2014). Deng, Liu, Jin, Liao, and Liu (2014) proposed a reliability-aware server consolidation strategy (RACE) to address when and how to perform energy-efficient server consolidation in a reliability friendly and profitable way. Deng et al. (2014) recommended consolidating virtual machines (VMs) hosting applications into subsets of physical machines (PMs) via VM migration to allow switching the PMs to power saving mode or shutdown. Jersak and Ferreto (2016), however, indicated consolidating VMs into the same server might lead to severe performance degradation and SLA violation known as VM interference

Network resource management strategies. Strategies for implementing network resources involve knowledge of data center traffic characteristics, data center traffic engineering, network-aware consolidation schemes, energy-aware traffic engineering, utilization-aware traffic engineering, and latency-aware traffic engineering (Tso et al., 2016). The sophistication of ICT network resource management requires a cohesive development of people capabilities, competence, and professionalism ensuring the exchange of technical expertise and knowledge transfer. Network optimization bridges design, integration, and operation for service providers to provide innovation through superior network performance and collaborative workforce (Schrutt, 2016). Multimedia packets need to be transmitted under noisy channel conditions, of which the packet link-loss probability after retransmission could be described as the probability of all retransmitted packet failing to pass the link (Lin, et al., 2015).

End-to-end network management and control strategies. Network resilience and service flexibility have become increasingly critical to enterprise service providers, systems integrators, and operators who need always-on availability and diverse connectivity requirements to deliver best-in-class services to customers. Surajit and Tamaghna (2015) investigated the minimum power routing problem in an end-to-end outage probability restricted multichip networks to determine suitable network elements to leverage the energy-efficiency of transmissions. Surajit and Tamaghna proposed a decode-and-forward relay as a solution for power allocation strategies based on multihop wireless networks.

Theme 3: Developing Budgets for Building Employee Competencies

Despite prioritizing academic training for employees to pursue diploma and degree programs, managers of ICT1 only trained fewer than 10% of the workforce due to a limited budget (ICT1Respondent#1; ICT1Respondent#8; ICT1Respondent#9). In 2014, for example, the department only afforded to train nine employees to attain diploma and degree qualifications in different disciplines (ICT1Respondent#8). Respondents indicated, while most government ERP systems and networks operate on obsolete equipment and outdated technologies, the department could not train employees to support the systems primarily due to a limited budget (ICT1Respondent#1; ICT1Respondent#3; ICT1Respondent #9). Units operate outdated networking and data center technologies, which are susceptible to failures and attacks. Operating systems and applications run on outdated versions and employees cannot upgrade them because of the

limited budget (ICT1Respondent#1; ICT1Respondent#6; ICT1Respondent#9; ICT2Respondent#14).

Without sufficient budget, managers are unable to develop strategies for building employee competencies as they may desire (ICT1Respondent#3; ICT1Respondent#9). In spite of budget constraints, managers of ICT1 would only upgrade 256 sites out of a total of 1500 through the ongoing GDN evolution project (ICT1Respondent#3; ICT1Respondent#4). Leaders of ICT1 engaged the managers of ICT2 as project managers and Cisco Networks as the solution provider for the GDN evolution project (ICT1Respondent#3; ICT1Respondent#9; ICT2Respondent#14). ICT2Respondent#10, however, indicated unless and until ICT1 as an organization changes its culture and mindset, even after deploying a new system to improve service delivery, they are likely to encounter difficulties because of limited end user technical expertise to ensure the systems are working properly. ICT1Respondent#9 stated that, because the department lacks knowledge of aligning ICT to business strategy, even when projects are mooted as per clients' requirements, the management of the department always seem not to be responsive to customers' needs. Given the increasing budget limitations, managers of ICT2 strive to continuously engage shareholders and encourage financial prudence within the organization to be able to build the competencies of their employees in new technologies and be able to effectively monitor the performance of clients' network infrastructure and quality service delivery (ICT2Respondent#10; IC21Respondent#11).

Strategies for Building Employee Competencies Using Limited Budget

Developing comprehensive budgets for funding employees' competency building involves an annualized total cost of ownership (TCO) embracing a variety of costing variances. Based on his costing model, Stewart and Hrenewich (2009) argued a lack of accurate information on costs of ICT often hampers effective decision making on ICT budget proposals. Stewart and Hrenewich suggested essential steps in effective planning, budgeting, and funding of ICT resources involves providing sufficient cost information to avoid under budgeting and misallocation of resources. First, business managers must identify and classify all costs into cost elements. Second, business managers should identify the cost drivers of all the activities that cause costs to move. Third, business managers must attribute the cost elements to the cost drivers to create a set of measurable activity costing. Fourth, business managers must aggregate the output of the previous three stages to determine the total cost of the system and subcomponents. A lack of information beyond the desired purchase and licensing costs of a system has led ICT1 in this study to fare poorly on budgeting for their ICT solutions, including budgeting for building competencies of their subordinates. Benchmarking on Stewart and Hrenewich's (2009) costing model, I recommend a strategy reflecting the TCO business managers may use to estimate a comprehensive budget for building ICT employee competencies (see Table 7).

Table 7

Developing a Comprehensive Budget for Building Employee Competencies

Strategic objective	Specific goals	Key deliverables
Developing a comprehensive budgeting framework based on Stewart and Hrenewich's (2009) costing model	Develop a total cost of ownership for funding government employees' academic and professional development	Identify and classify all cost elements for employees' academic and professional development including • direct costs of tuition fees, study materials, examination fees, and • accreditation fees • indirect costs of travel and accommodation fees • Internet access fees • stipend per employee abroad
		Identify cost drivers of employees' academic and professional development
		Determine academic and professional training cost estimates per employee

Theme 4: Training and Professional Development

Although employees of ICT1 and ICT2 are individually engaged in professional development through self-study, there is no indication of management support other than occasional reimbursement of examination fees for employees authorized to undergo online self-study with Cisco or Microsoft (ICT1Respondent#1; ICT1Respondent#2; ICT2Respondent#10; ICT1Respondent#12). Currently, the uncoordinated ad hoc long-term academic training has proven ineffective to build employee competencies (ICT1Respondent#3; ICT1Respondent#9). The strategies managers of ICT2 use include intensive training of engineers to undertake first level support locally and engaging employees to understand the value of agility in developing employee competencies (ICT2Respondent#11). Managers of ICT2 also continue to establish satellite offices at

strategic business centers to ensure engineers and technicians are within reasonable proximity to the infrastructure (ICT2Respondent#10, ICT2Respondent#11; ICT2Respondent#12; ICT2Respondent#13). Managers of ICT1 and ICT2 also strengthen supplier and customer relationships through effective service level agreements (ICT1Respondent#2; ICT1Respondent#3; ICT1Respondent#9; ICT2Respondent#11). Respondents attributed a lack of proper training plans to the insufficient annual budget allocated to ICT1 (ICT1Respondent#1; ICT1Respondent#2; ICT1Respondent#5; ICT1Respondent#9). Initially, ICT1 had a staff complement of 256 and the establishment increased to 834 after the department was decentralized, but the budget ceiling remained unchanged (ICT1Respondent#1; ICT1Respondent#4; ICT1Respondent#9). The government allocates the ministry accountable for ICT1 a budget of BWP10million (approximately (USD 1 million) a year. The ministry then apportions the budget to several other departments that also have several thousand employees (ICT1Respondent #9).

Without a proper training plan, IT officers seconded to other ministries for ministerial on-site services are facing a dilemma of who is to facilitate training for them because they are not accounted under the ministry training budget and managers of ICT1 often exclude them under the department's training budget (ICT1Respondent #1; ICT1Respondent #2; ICT1Respondent #5). Respondents cited management of ICT1 as claiming to have transferred IT officers to the ministries and therefore departments are responsible for their training. The administration of the departments, however, views IT officers seconded to them as not in the ministry training budget and therefore their

department, being ICT1 is responsible for their training (ICT1Respondent #1; ICT1Respondent #2; ICT1Respondent #5). Officers seconded to the ministries are most disadvantaged regarding training (ICT1Respondent#1; ICT1Respondent#2; ICT1Respondent#8). In contrast to ICT1, however, managers of ICT2 strongly advocate for the training of employees in technology-specific competencies. They regularly develop their employees' competencies through in-house training and system-specific training abroad as well as arranging for attachments with major organizations for skills transfer (ICT2Respondent #10; ICT2Respondent #11; ICT2Respondent #12).

In reviewing documents, I found the targeted training to address the existing situation faced by managers of ICT1 has only been limited to entry-level Cisco courses. The course includes CCNA service provider, Telepresence, CCNA Wireless, CCNA data center, CCNA routing and switching, CCNA collaboration, and security, which the majority of employees has attained already. ICT1Respondent#4 confirmed, although the department has not provided professional training consistently, a few IT officers have acquired Cisco CCNA and CCNP while those assigned to work in a datacenter possess professional qualifications on Oracle, Linux, SQL databases, and management of security firewalls. In the ICT1's targeted training plan, however, there is no mention of other critical professional and certification courses such as installation, configuration, and administration of FortiGate security systems, Microsoft SharePoint, Microsoft Exchange Server, VMware and virtualization, Microsoft SQL, or knowledge of cyber security and cyber forensics. ICT2Respondent #14 reported because ICT2 is mostly a telecommunications-oriented organization, their employees' lack networking and security

skills. The organization currently relies on vendor support through service level agreements.

Currently, it is not clear whether the Botswana Qualifications Authority (BQA) recognizes professional qualifications to ensure people are not only equipped with long-term academic requirements but also with relevant short-term industry-specific expertise. Failing to invest in human capital through professional development to enhance employees' knowledge of specific technical areas is failing to realize the benefits of competitive advantage that ICT can bring to the economy. The failure confirms a lack of leadership and management capability. Business managers need to identify professionals in areas of software development, cyber security, database administrations, systems and network administration, configuration management, and project management based on leadership experience, communication skills, performance management capability, and expertise in IT governance (Martina, Hana, & Jiri, 2012).

Strategies for Building Employee Competencies through Training and Development

The development of strategic initiatives with higher learning and training institutions locally and internationally, such as the Botswana International University of Science and Technology (BIUST) and Commonwealth Telecommunication Organization (CTO), would enable ICT2 managers to build the competencies of their employees (ICT2Respondent #11). Plans are in place to pay examination fees for employees engaging in online professional certification because only a few have certified in some Cisco and Microsoft professional courses (ICT2Respondent #14). Tsa Badiri Consultancy (2015) reported scarce ICT professionals falling within the premium basic

salaries of 10% to 15% including IT security experts (19%), applications developers/programmers (18%), engineers (21%), Webmaster designers/Web designers (29%), systems specialist (18%), six percent of IT managers, and seven percent of network/database administrators. Thus, the availability of scarce skills is low across all the essential fields. Business managers need to emphasize a coordinated training and encourage employees to embrace learning through self-study online programs.

The development of a professional lifelong learning program for trainers requires business managers to recognize and support skilled workers who train in addition to their main work in institutions and those who are full-time trainers in vocational education and training centers (European Center for the Development of Vocational Training, 2014.). Unlike in ICT1, managers of ICT2 build employee competencies by incorporating professional certification courses in specific technology projects to provide only tested links for customers (ICT2Respondent#10; ICT2Respondent#11; ICT2Respondent#15). One of the strategies managers of ICT2 use to build employee competencies is attaching employees to international telecommunications partners to gain exposure to best practice implementation strategies. Another strategy managers of ICT2 use is developing employee skills by deploying new products FTTx, FTTB at the last mile and WiFi hotspots (ICT2Respondent#10; ICT2Respondent#15). Furthermore, managers of ICT2 periodically revise their tariff rebalancing strategies to reduce pricing on products and services to increase service affordability (ICT2Respondent#11; ICT2Respondent#12; ICT2Respondent#13). Finland, Germany, UK, Belgium, and France are some of the

European countries that support the training of trainers for lifelong learning in VETs (European Center for the Development of Vocational Training, 2014.)

Table 8

Developing a Professional Lifelong Learning Program for Trainers

Strategic objectives	**Specific goals**	**Key deliverables**
Develop a professional lifelong learning program of trainers in vocational education and training (VET) and ICT institutions	Develop training program for ICT professional trainers to develop trainers' ICT competencies	Training for ICT professional trainers to deliver : • qualification or competence standards • all areas of ICT competence • competent and qualified trainers to ensure high quality workplace training
Develop a policy framework that supports and recognize trainers as a shared responsibility	Develop a policy to provide guidelines and direction for ICT trainers	• support for trainers must be part of a broader agenda and national priorities

Developing professional ICT skills through formal learning allows employees the opportunity to have access to properly designed training programs that include a variety of learning styles, whereas informal learning allows employees to learn at their pace while they work (Radakovic & Antonijevic, 2013). Wroten (2014) found applying a 70:20:10 model allows employees to attain 70% experiential/experience by learning and developing through the day-to-day tasks, challenges, and practice. The model allows 20% human exposure by learning with others from coaching, exploiting personal networks, and other collaborative and cooperative actions (Wroten, 2014). The model also allows 10% formal education by learning and developing through structured training courses and programs (Wroten, 2014). I showed strategies recommended for developing professional ICT qualifications and skills essential in the marketplace in Table 9.

Table 9

Develop Professional ICT Qualifications through Formal Education and Informal Training Using 70:20:10 Model

Strategic objectives	Expected outcome	Goals
Develop professional ICT skills for through formal education and informal training using 70:20:10 model	Develop highly qualified ICT professionals through formal learning	• telecommunications specialists • networking and IP specialists • software development specialists • computer specialists • IT security specialists • cyber forensic specialists • project management • research and development
Establish ICT-based e-learning in technical learning institutions using 70:20:10 model	Develop industry-driven e-learning curriculum	Knowledge and skills in: • digital systems designs • software design and programming • radio engineering • information and knowledge-based systems • telecommunications • Web design and development • applications development

Theme 5: Developing Effective Enterprise IT Capabilities

To develop the desired IT capabilities, managers need to build a robust support structure for identifying and implementing appropriate IT capabilities (Ringim, 2014). Managers of ICT1 are currently undertaking to develop a capacity model that redefines some core capabilities and competencies of the entire organization to aid employees who wish to engage in professional development. The model, as indicated in the documents, specifically centers on the main strategic imperatives (ICT1_Document#6, ICT1_Document#7, and ICT1_Document#8). These include an enterprise architecture

capability focusing on the business, technology, and operations and a research and development capability to increase business value through innovation. The ability to perform enhanced service analytics focusing on people, processes, and technology and protect information would also be essential. The IT skills would incorporate certifications with a syllabus and examinations describing best practice not only offered by Cisco or Microsoft but also offered by other companies like SANS or Koenig (ICT1Respondent #3; ICT1Respondent #9). The SFIA would enable the department to address critical skills deficiencies through a maturity capability roadmap encompassing (a) strategy and architecture, (b) change and transformation, (c) development and implementation, and (d) delivery and operations. The strategy and design category underscore information strategy, advice and guidance, business strategy and planning, and technical strategy and planning. Notably, the information strategy underpins IT governance, IT strategy and planning, information management, information systems coordination, information security, information assurance, analytics, and information content publishing, which are key to effectiveness and operational efficiency. The effective implementation of IT governance would enable managers of ICT1 and ICT2 not only to specify an accountability framework, but also to evaluate and employ well-designed, well-understood, and transparent governance mechanism. Managers of ICT1 had trained more than 200 employees on the ITIL framework for managing projects, but the philosophy of ITIL framework was never practiced to achieve success in project implementation (ICT1Respondent #8; ICT1Respondent #14).

Alreemy, Chang, Walters, and Wills (2016) stated IT governance is a process that guides and controls investments, decisions, and practices relating to IT within the organization to achieve competitive advantage. IT governance encompasses guidelines, actions, functions, and tasks of employees in a structured manner. The target SFIA framework would assign seven levels of responsibility (level 7 being highest and level 1 lowest), regarding autonomy, influence, complexity, and business skills (ICT1_Document#8). An employee with the greatest responsibility (level 7) would have an autonomy that assigns him or her the authority over all aspects of a significant area of work including policy formulation and application (ICT1_Document#8). An officer assigned this responsibility would be accountable for actions and decisions made by self and others.

Respondents from ICT1 and ICT2 indicated a prevalence of silo operations that has led to learning institutions not addressing the industry skills requirements and thus producing qualifications that are less relevant to the sector needs. Educational backgrounds attained from the local universities, for example, do not adequately support the industry specific occupation requirements (ICT1Respondent#3, ICT1Respondent#9; ICT1Respondent#14). ICT1Respondent#3 stated local schools in Botswana equip graduates with more theory and less practice, and thus graduates have difficulties adapting to the industry.

Strategies for Building an Enterprise with Dynamic ICT Capabilities

A capability-based framework developed by Worch et al. (2013) explained how policy and regulatory requirements influence infrastructure performance deficiencies

resulting from policy, regulatory environment, and unskilled workforce. Infrastructure performance deficiencies result from the insufficient availability of knowledge, expertise, and experience in organizations. Worch et al. (2013) warned capability gaps emerge, if the existing capabilities diminish while a task remains unaltered. As a foundation for building employees' competencies, ICT1Respondent#3 revealed that the ongoing GDN evolution project would enable the department to embark on developing the skills framework for the information age (SFIA). ICT1Respondent#3 indicated for the office to be efficient and effective, the ICT industry specific expertise must be commensurate with a unified ICT industry-specific skills framework developed by the academia, policymakers, industry practitioners, and stakeholders specifically to address ICT employability skills gaps. The communication gap between ICT and technology policy specialists who understand the potential benefits and implications of new technologies prevails in Botswana. Similarly, ICT2 vowed to intensify mentoring and coaching programs and consistently engage vendors to come up with plans of transferring skills to employees with the view to build employee competencies.

Wolf Management Consulting, LLC. (2016), defined a capable enterprise as an organization that achieves consistently superior performance; one that consistently delivers superior value to its enterprise innovates more rapidly and is difficult to imitate. A strategy recommended for ICT business managers to develop an agile ICT enterprise capable of achieving superior performance is in Table 10. Managers may leverage process innovation to develop strategic tools for technological capability and skills relevant for process redesign and transformation (Boyles, 2015; Halimi, 2015). For an

organization to deliver superior performance, it has to embrace three components of organizational commitment: continuance commitment, normative commitment, and affective commitment (Muneer, Iqbal, Khan, & Long, 2014). Muneer, Iqbal, Khan, and Long (2014) defined organizational commitment as the ability to stabilize or oblige employees to focus on actions relevant to the growth of the organization, whereas, continuance commitment refers to a commitment based on the cost that employee associates to leave the organization.

Table 10

Establishing an Agile ICT Enterprise for Superior Performance

Strategic objective	**Specific goals**	**Key deliverables**
Establish agile ICT Enterprise that is efficient, optimized, and extensible	Build an effective 21st Century ICT enterprise	• develop an adaptable roadmap identifying business priorities • develop an enterprise ICT strategy that aligns with the business strategy • define an enterprise information vision to determine future-state business capabilities
	Develop an enterprise information vision based on the business value	• develop and walk the capability maturity model within the blueprint and roadmap process
	Assess and evaluate the organizational readiness and ICT governance	• establish ICT governance ensuring alignment to people, processes, and technology • assess and understand the current ICT infrastructure • define and implement the future-state ICT infrastructure architecture • establish the gaps and determine what is needed to get from the current to the future state

Theme 6: Promoting Employees' Knowledge Acquisition and Skills Transfer

Inadequate employees' knowledge and skills resulted in government departments deploying poor infrastructure designs and substandard technologies (ICT1Respondent#9; ICT2Respondent#10). Reichart and Zawislak (2014) argued managers' knowledge of technology management is essential for quality service delivery to meet business requirements and customer expectations. For ICT engineers and a pool of new graduates to experience a functional core of engineering knowledge and skills, they must have the capacity to specify requirements for safety, reliability, environmental, cost, operational, and maintenance objectives. Business managers must ensure the engineers' tasks of conceiving and designing products, processes, and systems based on scientific models to predict behavior. Business managers must prepare conducive facilities and resources for engineers to critically review target systems operations and maintenance best practices to achieve superior productivity and performance. Developing core competencies for ICT engineers and new graduates (see Table 4) may assist business managers to build, optimize, and operate ICT infrastructure designs for achieving high-speed Internet and services. Business managers often promote engineers to management positions without a proper transitioning from engineer to becoming a manager to gain management and leadership skills. Developing core competencies for engineering managers (see Table 4) may bring value to the organization.

Managers of ICT1, however, took a holistic approach of implementing multiple strategies to not only build employee competencies and address ICT infrastructure performance deficiencies, but also to address the entire organization regarding the

structure, people, processes, and technology. Thus, ICT1 has developed an enhanced strategy to offer a service management portfolio focusing on: (a) structure reorganization and governance, (b) business process redesign, (c) building employees' capability, and (d) enterprise architecture redesign. Maintaining a robust and scalable ICT infrastructure requires managers to employ industry best practices within an established IT governance (Boyles, 2015). The review of documents revealed the scope of the desired reorganization and service management portfolio (ICT1_Document#6; ICT1_Document#7). Managers of ICT2, however, vowed to intensify in-house mentorship and coaching programs to ensure the job skills transfer between vendors and employees as well as between experienced staff members and new graduates (ICT2Respondent#11; ICT2Respondent#12).

Strategy for Promoting Knowledge Acquisition and Skills Transfer

Different organizations use different methods, tools, meetings, and task groups to share tacit and explicit knowledge. Tacit knowledge means knowledge that is not easily recognized, articulated, documented, or encoded. The most typical example of tacit knowledge is expertise. Investigating the relationship between organizational justice and knowledge sharing constitute a potential research area (Yeşil & Dereli, 2013). The most commonly used knowledge sharing methods is peering assist, after action review, storytelling, mentoring, and coaching. Sharing knowledge through meetings involves a community of practice (networking), forums and meetings, workshops, training, seminar, and knowledge fairs. Tools available for effective knowledge sharing include extranets, expertise locator systems, collaboration, electronic databases, and magazines.

Researchers (Leu & Abbas, 2016; Osabutey et al., 2013) maintained the acquisition and transfer of knowledge to improve performance in the workplace is often difficult to achieve. Business managers often fail to support the development of technology and knowledge transfer initiatives to improve productivity in the workplace (Maruta, 2014). Leu and Abbas (2016) defined knowledge acquisition as the ability to "understand the experience representing the real phenomenon in detail and abstraction required" (p. 1). Maruta (2014) argued the ability of people in organizations to produce goods and services depends on what they currently know and on the knowledge acquired and created by past and present members of the group, and thus embedded in the routines and the machinery of production. Maruta (2014) reiterated 'businesses without their own knowledge creation capabilities can only depend on experience externally available" (p. 30). The Maruta's assertion is affirmed employees of ICT1's overreliance on external contractors because they have not created nor acquired their knowledge.

Understanding the barriers to knowledge sharing must be the first step to identifying solutions and strategies of building a knowledge sharing culture. Dale (2013) categorized potential obstacles to effective collaboration into three groups: (a) resistance-based on real or perceived threats, (b) lack of willingness due to current ways of working practice, and (c) inability to collaborate due to lack of skills/tools or other structural issues. Knowledge and information hoarding (centralization), a culture that values one person (real hierarchy, command and control), skeptical middle management, fear of rejection, afraid to ask, and fear of change are the primary sources of resistance-based barriers to knowledge sharing in the workplace (Dale, 2013). A lack of a clear business

case, lack of support from the top, rigid job descriptions, micromanagement, dissonance, and culture are key to the unwillingness to collaborate and share knowledge in the workplace (Dale, 2013). No tools, poor tools, too many tools, digital divide, information overload, and lack of time, inadequate training, education, support, and security are some of the key hindrances to effective collaboration and knowledge sharing in the workplace (Dale, 2013). Business managers may use knowledge value chain to build employees' competencies to improve performance margins (see Figure 3). The knowledge value chain presents eight knowledge processes and five knowledge enablers, which business managers may utilize to benefit from the value of their employees' tacit and explicit knowledge. The eight knowledge processes are knowledge identification, knowledge acquisition, knowledge codification, knowledge storage, knowledge dissemination, knowledge refinement, knowledge application, and knowledge creation (Dale, 2013). The five knowledge enablers are knowledge culture, knowledge system, organizational memory, knowledge sharing, and benchmarking (Dale, 2013).

Developing ICT Knowledge Acquisition and Skills Transfer Capacity

Knowledge residing on individuals that allows them to acquire, create, store, share, transfer, and apply their expertise when carrying out their jobs in professional practice, forms the foundation of the organization's competitive advantage (Masor, Mustaffa, & Salleh, 2015). The transfer and acquisition of tacit and explicit knowledge between knowledge providers and knowledge recipients in an ICT environment remain crucial and relies on knowledge provider's willingness to transfer knowledge and the recipient's willingness to access and acquire knowledge (Wehn & Montalvo, 2016). In a

professional business practice, the receipt's willingness to gain knowledge and expertise depends on the cognitive ability and absorptive capacity to learn. Wehn and Montalvo (2016) distinguished the knowledge provider's willingness to transfer knowledge from knowledge recipient's willingness to access the knowledge. Determinants of the knowledge provider's willingness to transfer knowledge include attitude toward knowledge transfer, pressure to transfer knowledge, and control over knowledge transfer. Knowledge recipient's willingness to access knowledge, however, usually stem from the recipient's attitude toward knowledge transfer, pressure to access knowledge, and control over accession transfer (Wehn & Montalvo, 2016). Policymakers, industry practitioners, and the academic play a fundamental role in creating the foundation for skills transfer and knowledge acquisition to be motivated to start early in preschools, primary schools, and secondary schools to prepare for a quick adaptation of knowledge sharing and acquisition in the workplace.

Summary of the Study Findings

Strategies for building ICT employee competencies outlined for each of the themes form the basis of the findings of this study. The findings of this study corroborated the specific business problem that some ICT service provider managers require strategies to build employee competencies to address ICT infrastructure performance deficiencies. The findings of this study include the need for ICT service provider managers in consultation with policymakers, ICT industry practitioners, learning institutions, and stakeholders foster and orchestrate the development of strategies for

- building employee competencies to address ICT infrastructure performance deficiencies,
- developing a comprehensive budget for funding government employees' academic and professional training and development,
- developing a professional lifelong learning of ICT trainers, instructors, and teachers at vocational institutions and university,
- developing a professional ICT qualifications through formal education and informal training,
- establishing agile ICT enterprise with dynamic capabilities and business innovation, and
- motivating knowledge acquisition and technology skills transfer.

Applications to Professional Practice

To determine the degree to which individuals, businesses, and government apply the findings of this study in professional business, I grounded the strategic fit of the findings to the problem of the study, which underpins the declining ICT NRI with respect the Botswana's economic growth and social development. As I indicated in Fig. 3, the ICT NRI comprises environmental, readiness, usage, and impact subindexes. The environmental subindex constitutes pillars of political and regulatory environments, and business and innovation environment. The readiness subindex constitutes pillars of infrastructure, affordability, and skills. The usage subindex constitutes pillars of individual usage, business usage, and government usage. Lastly, the impact subindex constitutes pillars of economic and social impacts.

As shown in Fig. 3, during the period 2012 to 2015, the ranking of Botswana's ICT readiness subindex and impact subindex performed lower than the environmental and usage subindexes and thus influenced the decline in the Botswana's overall ICT NRI index. The Botswana's NRI for the year 2016, however, showed a slight improvement of three points from position 104 in 2015 to 101 in 2016 (Duta, Baller, & Lanvin, 2016). The decline in these pillars corroborates the themes emerged in this study. The first theme is a lack of employees' skills for ICT network design optimization to achieve high-speed bandwidth. The second theme is a lack of employees' ability to restore network outages to achieve service availability at 99.95%. The third theme is training and professional development limitations, and a lack of employees' technology knowledge and skills transfer.

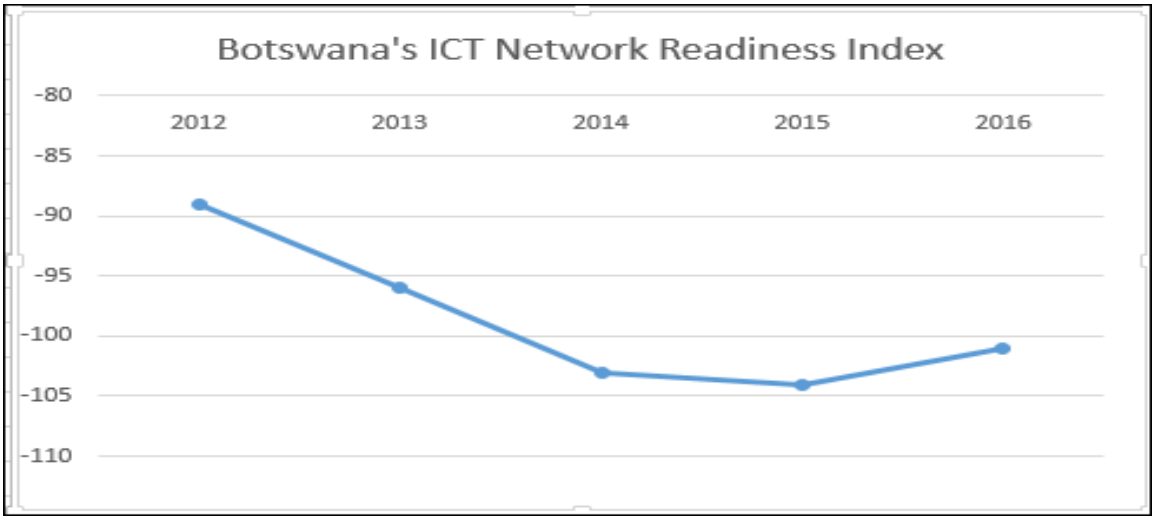

Figure 3. Botswana's ICT networked readiness index decline between 2012 and 2015

ICT as an Engine of Economic Growth and Social Worth

While researchers (Liao, Wang, Li, & Weyman-Jones, 2016; Jorgenson & Vu, 2016) amplify the increasing importance of ICT as a driver of productivity and economic growth, Botswana's ICT NRI underperformed in pillars of environmental, readiness, usage, and impact subindexes. Singapore, Finland, and Sweden's ICT NRI performance remained the three most consistent best benchmarks in all aspects of the 10 pillars of the ICT NRI. The outstanding ICT NRI performance of these three countries stems from their governments' investment efforts in highly skilled personnel in the ICT sector. According to Hughes, Bohl, Irfan, Margolese-Malin, & Solórzano (2017) governments may realize the economic benefit of ICT through direct or indirect contribution to growth from (a) diversified ICT producing sector growth and security, (b) enhanced production and productivity in the economy, and (c) improved resource capacity.

Developing ICT Dynamic Capabilities to build Employee Competencies

Capability building involves concerted effort to foster new knowledge, skills, and abilities taking into account the importance of individuals and the organizations becoming technologically capable in knowledge intensive environments (Kruss, McGrath, Petersen, & Gastrow, 2015). As part of ICT development, the ICT master plan developed for the Parliament of Botswana, for example, is intended to foster systematic use of ICT, to enhance ICT capabilities among members of parliament (MPs), and to strengthen the parliamentary information system policy (Masupe, 2012). The Parliament of Botswana's ICT master plan contributed positively to the enactment of legislation related to the development of information society in Botswana (Masupe, 2012).

Strengthening the ICT infrastructure development in Botswana would aid effective implementation of relevant ICT for development (ICT4D) programmes and contribute positively to socioeconomic development and growth.

Building ICT skills require linkages between knowledge value chain and research organizations (Kruss, McGrath, Petersen, & Gastrow, 2015). For the economy and societies to benefit from ICT dynamic capabilities, business managers need to build managerial and technical expertise to deploy high-speed quality ICT broadband implementations at affordable prices. ICT dynamic capabilities must pivot on the United Nations Conference on Trade and Development's (2014) policy framework. The framework, which also supports the 10 pillars of nations' ICT NRI, encompass: (a) ICT connectivity and access, (b) ICT usage, (c) ICT legal and regulatory framework, (d) ICT production and trade, (e) ICT skills and human resources, (f) cybersecurity, and (g) new ICT applications.

ICT broadband bandwidth and accessibility. The researchers acknowledge broadband infrastructure has a positive effect on economic growth and social development as it creates opportunities for jobs and stimulate business innovation (OECD, 2015). The ICT infrastructure, broadband access involves broadband connectivity, mobile phone coverage, and quality competition among ICT products and services (UNCTAD, 2014). When designing high-speed national broadband infrastructure, policymakers must consider (a) stimulating demand by increasing broadband awareness and digital literacy, (b) accelerating usage and the uptake of high-speed broadband, (c) increasing relevant local content and applications for education,

government services and economic productivity, and (d) encouraging infrastructure-based competition among wholesalers, retailers, and service providers (El-Darwiche, Macpherson, Makki, Ucar, & El Mir, 2016).

In developing the national broadband strategy for Botswana, BOCRA (2013) identified the need for increasing local content and applications related to the demand and supply, increasing broadband awareness and digital literacy, and encouraging infrastructure-based competition, but the execution of these good intentions have not come to fruition. Individuals, businesses, and government institutions remain unknowledgeable about broadband awareness and digital literacy as stated in the broadband policy. To reduce the digital divide gap, awareness initiatives, which have not come out clearly in the Botswana national broadband strategy, must include intensifying digital literacy through formal and informal education programs at all levels. The education must include coordinated digital literacy programs through the media, community access centers, and aggressively addressing privacy and security concerns to foster consumer trust. Ostensibly, BORCA (2013) also focused less on accelerating the uptake of high-speed broadband, which plays a vital role in boosting the economic growth and social development. The objectives of the Botswana national broadband strategy are seemingly too broad and rigid compared to the goals of some developed countries like Turkey. For example, the Turkey's broadband goal states, “the acceleration of the high-speed broadband market by 25% is attainable within eight years with the right mechanism” (El-Darwiche et al., 2016, p. 7). The Turkey’s objective is specific,

measurable, realistic, and time-bound (SMART), hence achievable within the set budget and timeframe.

ICT infrastructure usage. ICT usage is a measure of use by individuals, business, and the government (UNCTAD, 2014). Esselaar and Sebusang (2013) found, despite the Botswana government's significant investment in ICT infrastructure, broadband Internet penetration remained low. Esselaar and Sebusang (2013) cited issues of affordability affecting 35.5% of users, no Internet connectivity affecting 12.2% of users, and no knowledge of the use of Internet affecting 23.5% of the people in Botswana. Esselaar and Sebusang argued the fixed line penetration remained stagnant at 8%, while mobile phone penetration grew to over 150% in 2012. Esselaar and Sebusang indicated 89% of users had substituted the use of fixed line with that of mobile phones because 49% cannot afford a fixed line subscription and 14% do not have fixed line available where they live. The digital divide affecting access to and use of ICT services and application by households, individuals, businesses, and government institutions in Botswana would widen if policymakers and industry professionals do not look beyond just physical access to ICT to bridge the gap (Chikati, Mpofu, Muchuchuti, & Sidume, 2013).

ICT legal and regulatory framework. The ICT legal and regulatory framework provides an oversight of telecommunications regulation, spectrum frequency allocation, e-commerce laws (digital signatures, intellectual property laws, e-payments), cybersecurity laws and regulations, ICT tariffs and regulations, access to data and cross-border data transfer, and investment regulation (UNCTAD, 2014). The Botswana

government mandated BOCRA to lead the (a) efficient management and use of the radio frequency spectrum, (b) licensing and monitoring of service providers, and (c) development and promotion of appropriate strategies and policies that encourage ICT infrastructure development and use of ICT services. BOCRA's core business areas include (a) universal access and service, (b) network efficiency and effectiveness, (c) affordable ICT services, (d) a knowledge society, (e) organizational efficiency, and (f) global competitive communication sector. BOCRA is yet to realize these core business goals to improve Botswana's ICT NRI performance.

ICT production and trade. The ICT production and trade focuses on ICT-enabled services and ICT content provision, SMEs in ICT sector (i.e., Financing, investment, and capacity building), e-marketplaces, innovation and R&D in ICT sector, and industrial parks/zones/villages for ICT sector development (UNCTAD, 2014). According to Nicholson (2016), 28 European Union (EU) member states collectively export US$1.00 trillion and import US$935.00 billion in ICT-enabled services to EU countries and countries outside the EU including Botswana and other African states. Nicholson (2016) cited UK, Germany, France, and the Netherlands as EU member states with the largest estimated export value of ICT-enabled services (e.g., UK-US$159. 00 billion, Germany-US$149. 20 billion, France-US$128. 00 billion, and the Netherlands-US$115. 30 billion). Fredriksson (2016) proposed the current OECD definition of ICT-enabled services must not only state "service activities that are intended to enable and fulfill the function of information processing and communication" (p. 6). Fredriksson argued the definition must also include telecommunication services, computer services,

and licenses to reproduce/distribute computer software, and exclude information services to define the ICT service delivery methods.

Developing ICT Expertise to Build Employee Competencies

An educated workforce in academic and professional training in the deployment and management of different ICT technologies remains a mainstay for the economic growth and social development (Minges, 2016). The ICT professional development involves teachers' knowledge, skills, and abilities in imparting knowledge beginning with the early stages of learning (Kaindio & Wagithunu, 2014). The new Swedish education and research reforms centered on the Education Act of 2011, the new curriculum of 2011, the new grading system of 2012, and teacher certification for pre-schools of 2013 enabled the Swedish government to realize their millennium goal of achieving a highly qualified ICT workforce (Rahman & Sam, 2014). The Sweden's top ICT NRI ranking in the past 5 years is a testimony of the Swedish government's demand for highly qualified ICT practitioners that resulted in Sweden commanding the highest share of 6.2% of ICT professionals in the workforce (Empirica, 2014). Sweden's ICT NRI ranked position one (Score: 5.94) in 2012 (Duta & Bilbao-Osorio, 2012). The country ranked position three (Score: 5.8) in 2015 (Duta et al., 2015), and position three (Score: 5.8) in 2016 (Duta, Baller, & Lanvin, 2016).

When developing ICT broadband infrastructure industry practitioners, managers, policymakers, and shareholders may benchmark from Finland, Singapore, and Sweden to see how the countries managed to lead 143 countries in maintaining their ICT industry's NRI performance at the top. The digital agenda for Sweden, for example, has since 2011

been very explicit about the need for ICT practitioners and e-leadership skills to increase the proportion of young people to enroll to study ICT related subjects in higher education (Empirica, 2014). The business and public sectors in Sweden demand different forms of ICT expertise such as systems engineers, programmers, electronic engineers, multimedia engineers, and cybersecurity specialists, as well as some excellent skills and professional's practical experiences in project management and governance (Empirica, 2014). The government of Finland launched new ICT solutions to support digital learning at rudimentary levels to build pupils' ICT capabilities and interest at early stages.

Understanding Dimensions of Organizational Justice

In addition to the three dimensions of organizational justice: distributive justice, procedural justice, and interactional justice, which have traditionally been known to affect people's attitude, behavior, and performance (Yeşil, & Dereli, 2013); Akram, Lei, Haider, Hussain, and Puig (2016) analyzed the effects of temporal justice, and spatial justice on knowledge sharing to determine factors that hinder knowledge sharing. Usmani and Jamal (2013) first introduced temporal and spatial justice in literature when they examined the relationship between organizational justice and job satisfaction in the Pakistani banking environment. Organizational justice refers to the extent to which employees perceive the workplace procedure, interactions, or organizational decisions to be fair in nature (Akram, Lei, Haider, Hussain, & Puig, 2016; Yeşil & Dereli, 2013). I reviewed the five dimensions to understand the effects of organizational justice of

knowledge sharing ICT business managers may use to promote knowledge sharing in the workplace.

Distributive justice. Yeşil and Dereli (2013) found employees with positive distributive justice perceptions not only reflect trust, commitment, and cooperation relationships, but are also akin to the knowledge-sharing attitude. Treating employees fairly have deep implications for job performance and leads to organizational effectiveness and productivity (Akram et al., 2016). Based on acceptable treatment of employees, business managers may promote employees' emotional attachment to the organization to embrace affective commitment and their moral obligation (normative commitment) to remain with the organization and share knowledge (Muneer et al., 2014).

Procedural justice. Procedural justice refers to unbiased, consistent, accurate, representative, correctable, indiscrimination, and ethical organizational procedures (Akram et al., 2016). Procedural justice perception refers to the employees' perceived fairness of the means used to determine the procedure (Usmani & Jamal, 2013). Adopting appropriate procedural justice in the workplace may improve performance and productivity.

Interactional justice. Interactional justice refers to the employees' perception about the fairness of the interpersonal treatment from decision makers in the organization (Akram et al., 2016; Usmani & Jamal, 2013). Usmani and Jamal (2013) observed interactional justice involves the employee's acknowledgement of the supervisor's attention to his or her concerns and showing empathy for his or her predicaments. Researchers (Akram et al., 2016; Usmani & Jamal, 2013) judge interactional justice as

two separate components: interpersonal justice and informational justice. According to Usmani and Jamal (2013) perceptions of respect, politeness, dignity, in one's treatment form the basis of interpersonal justice, while the supervisor's ability to explain the importance of timeliness and truthfulness presents informational justice.

Temporal justice. Temporal justice is concerned with the fair distribution of time across employees in the organization (Usmani & Jamal, 2013). Business managers must allocate time for self-study and professional learning equally to all employees irrespective of their geographic locations. Managers must drive initiatives for professional learning suitable for improving performance in the workplace and hence allocate time for those recommended for professional learning on merit.

Spatial justice. Spatial justice involves a fair distribution in space of socially valued resources and opportunities (Usmani & Jamal, 2013). Managers must fairly distribute facilities or services to employees irrespective of their geographical locations or distance from head office. Business managers must distribute equitably decisions to allocate budget to all departments and divisions and not relying on the geographic locations of such departments and divisions.

Implications for Social Change

The implications for positive social change involve improvements to individuals, institutions, organizations, and cultures or communities in Botswana. Employing lifelong learning strategies would assist employees attain professional qualifications and competencies required by the ICT sector in Botswana. Gourova (2003) stated the concept of lifelong learning implies a continuous updating of KSAs for employees to

adapt new challenges. Developing competencies for ICT engineers and new graduates as an intervention to improve efficiency and effectiveness in the workplace would improve performance and contribute positively to the economic growth. Failing to invest in human capital through professional development to enhance employees' knowledge of specific technical areas is failing to realize the benefits of competitive advantage that ICT can bring to the economy. Communities would benefit from quality ICT services to improve their lives for the greater good.

Improvements to Individuals

Developing core ICT employee competencies through 21st century in-service training programs capable of sustaining the economic competitiveness would aid policymakers, industry practitioners, public and private sector workers, and citizens of Botswana triumph in the global skills race. A strategy for building core ICT competencies with emphasis on improving personal effectiveness, academic, and workplace competencies in critical thinking and problem-solving skills, interpersonal skills, cognitive skills, creative and entrepreneurial thinking, is essential to ensure employees build a mastery of techniques and use modern ICT tools to improve performance in the workplace. Access to high-speed broadband Internet would aid individuals to access online application forms for various services.

Improvements to Institutions of Learning and Skills Development

Institutions like the Tertiary Education Council (TEC), Human Resource Development Council (HRDC), the Botswana Qualifications Authority (BQA), Ministry of Higher Education and Skills Development, Ministry of Transport and Communication

(MTC), Botswana International University of Science and Technology (BIUST), University of Botswana, technical colleges, and research institutes must work together to develop an ICT industry driven curricula for lifelong learning. A shift from the traditional theory-based curriculum must motivate a practice-based curriculum putting emphasis on the current and future 21st century learning agenda to develop professional lifelong learning through formal education and informal training. Salleh et al. (2015) argued education programs relevant to the increasing technology demands must embrace a shift of mindset away from the conventional theory-based approach and focus more on work-based education programs. Concentrations must focus on ICT literacy, information literacy, media literacy, communication and collaborative skills, software development and programming skills, database engineering skills, data communication skills, telecommunications skills, and cybersecurity.

Improvements to Organizations

With government organizations and institutions developing agile ICT capabilities and business innovation skills, the Botswana government would be in a better position to improve its global competitiveness regarding the improved ICT networked readiness index, hence contribute positively to the economic growth and social development. Public and private organizations have implemented ICT solutions and high capacity ERPs to improve the strategic and operational efficiency and effectiveness. The ministry of finance and development planning (MFDP) implemented a centralized government accounting and budgeting system (GABS) through which the payroll for payments of government employees and packages for pensioners are processed. The implementation

of the GABS business suite evolves emerging user requirements such as money transfer capability. The effectiveness of the system, however, depends chiefly on the reliability and availability of the underlying ICT infrastructure broadband network. Other ERP systems the government has implemented to improve the service delivery include, but are not limited to, the national identification system (NIS) for citizen registration, births and deaths registration system (BDRS), passport and border control system (PBCS), immigration control system (ICS) for processing of visas, work, and residence permits and many others. With an effective and efficient ICT infrastructure, ministries and departments in Botswana would be able to transact online to achieve quality service delivery and improved social and economic change.

Improvements to Communities and Societies

Community stakeholders who should hear about this research study include the leaders and managers heading government ministries and departments, especially the ministries of education and skills development, and department of information technology. Leaders and managers of parastatal organizations, including HRDC, BQA, universities and colleges of higher learning, Botswana Institute for Technology Research and Innovation (BITRI), and fixed and mobile telecommunications operators would benefit from knowing about this study.

The government of Botswana has contracted ICT2 to extend FTTx high-speed Internet to primary and secondary schools and other communities, including the tourism and hospitality centers in urban and rural areas. Secondary school students are already benefiting from online tutoring education programs through classrooms on television,

community centers, and access to various services on government portals. Communities in urban and suburban areas can now access online services such as payments of water and electricity bills, access to a variety of service application forms through ministerial websites, and health services through xDSL, WiMAX, 3G/4G wired and wireless networks. Communities in the agriculture sector (e.g., commercial farmers) benefit substantially from high-speed Internet as they transact with agricultural merchandise in the neighborhood. Hodge et al. (2017) suggested for communities in rural areas to access essential services including healthcare, finance, e-commerce, education, and other social services, ICT service providers need to deploy WiMAX and WiFi technologies to in place of xDSL and FTTx technologies. On December 22, 2016, Vice President Mr. Markets Masisi announced in a public gathering he would facilitate the issuance of ICT devices such as mobile phones and iPads to public officers to improve service delivery in the public service.

Recommendations for Action

Recommendations for action in this study emanated from lack of strategies for developing professional lifelong learning skills, knowledge of specific technical areas, knowledge of technology management, and lack of managerial technological competencies to enable subordinates address ICT infrastructure performance deficiencies. There is a need for ICT service provider managers to plan and build practical skills necessary for an ICT workforce to adapt to technological changes. To achieve the quality of services customers expect, business managers need to implement appropriate plans and strategies to develop a skilled and professional workforce. In this section, I discuss the

main activities I recommend for ICT managers to consider for addressing current and future challenges affecting ICT infrastructure performance. Business managers need to make a precise determination of how to build essential core and dynamic employee capabilities. The recommended actions support the research question, research problem, conceptual framework, and participants' response to interview questions. In the following subsections, I discuss the importance of (a) planning for skilled ICT workforce, (b) building productive ICT capacity and capabilities, (c) motivating knowledge acquisition and technology skills transfer, and (d) plans for disseminating the study results.

Planning for Skilled ICT Workforce

The ICT service provider managers must develop proper plans and strategies for the whole-of-government skilled ICT workforce. According to Queensland government enterprise architecture (2013), ICT workforce planning methodology embraces (a) workforce planning and analysis, (b) forecasting training needs, (c) analyzing gaps, (d) developing and implementing strategies, and (e) monitoring and evaluation. To undertake workforce profiling and analysis, ICT service provider managers must develop a good understanding of the key drivers that affect the current and future supply and demand for skilled ICT workforce. Building synergy and collaboration among policymakers, academia, and industry practitioners is essential for developing comprehensive syllabi appropriate for producing graduates suitable for placement in the industry including government. Thus, ICT service provider managers must work

together in identifying and assigning a dedicated task team to build and secure skilled ICT workforce for the 21st century industry and government.

Plans for building a skilled workforce. Respondents indicated managers of ICT1 are currently engaged in adopting the skills framework for the information age (SFIA) to address the current skills gaps and engage in planning for future demands. The SFIA Version 6 adopted by ICT1 underscores six development processes. The processes are: (a) strategy and architecture, (b) change and transformation, (c) development and implementation, (d) delivery and operation, and (e) skills, qualifications, relationships, and engagement. The processes would not work without the involvement of other key stakeholders such as the industry practitioners and policymakers. The action recommended for business managers is to work with decision makers, industry professionals, and the academia to identify transformation and reform priority areas essential for building the skilled and professional workforce in particular technology specializations.

Scanning the environment, analyzing gaps and forecasting training needs. Different countries use different approaches for examining the environment, analyzing skills gaps, and forecasting specific training requirements. The most popular methods include employer skills survey, Delphi analysis (asking experts), in-depth sectoral case study, scenario development, observations, and focus groups (Wilson, 2008). Employer skills survey assists in obtaining managers' opinions regarding the current skills shortages and future skills need to be commensurate with strategy, and technology development plans (Wilson, 2008). In this study, I examined the skills gaps using the

employer skills interviews to understand employees' skills gaps challenges facing the country.

The 2016 Johannesburg Center for Software Engineering (JCSE), ICT skills survey, identified six priorities for managers of ICTs. The priorities were (a) information security, (b) network infrastructure, (c) software-as-a-service, (d) cloud computing, (e) database development, and (f) application development (Schofield, 2016). Business managers could benchmark from this study and replicate the study findings in the Botswana context. Schofield (2016) also identified scare skills in the retail and banking sectors encompassing digital designers, systems engineers (i.e., process engineers, system architectures, IT system developers, forensic/fraud specialists, business analysts, digital forensics analysts and investigators, mobile and digital experts, and systems integrators or systems architectures. Managers of ICTs should develop a habit of reading reports such as the "Johannesburg Center for Software Engineering, ICT Skills Survey" because business managers could replicate the outcome of this study in the Botswana context.

Building Dynamic ICT Capacity and Capability.

While a shortage of skilled systems engineers, network architectures, database specialists, application developers, digital forensics analysts exists, the existing enterprise ERP systems and other mission-critical data sources remain critical for leadership decision support. Thus, ICT managers must redefine and renew employee and managerial competencies to catch up with the changing business environment and address employee intrapersonal and interpersonal skills for effective work performance (Asumeng, 2014). Researchers (Feiler & Teece, 2014; Jared, Oloko, & Orwa, 2015)

defined dynamic capabilities as the ability to renew competencies to achieve congruence with the changing business environment by integrating, and reconfiguring internal and external skills, resources, and functional competencies. Building productive ICT capacity and capabilities entail developing lifelong learning schemes to assist engineers to specialize in specific technical areas to keep up with the pace of technological change. Building effective ICT skills involve a combination of individual learning, organizational learning, and collaborative learning to establish adequate knowledge for enterprise learning.

Developing and Implementing Strategies

Strategies identified in the SFIA framework (i.e., information strategy, business, and technical strategy) form the basis of the strategic foundations for building ICT capacity and capability to support Botswana government institutions. In developing the information strategy, ICT service provider managers would be able to improve IT governance, IT strategy and planning, information management, information systems coordination, information security, information assurance, analytics, and information content publishing, all of which are currently non-existent. Effective change and transformation initiatives would allow for a shift in mindset across government institutions. The implementation of business change management would facilitate the development of business analysis skills, requirements definition skills, effective use of business processes, effective implementation of change management practices, and sustainability assessment.

Motivating Knowledge Acquisition and Technology Skills Transfer

While no universally accepted definition of knowledge management exists, there are two kinds of knowledge: tacit knowledge is hard to articulate and explicit knowledge is easy to express, communicate, and share in words, numbers, and in its hard form. In government departments in Botswana, however, I found no evidence of articulating, communicating, or sharing the explicit knowledge between systems suppliers who are supposed to be the knowledge providers, or among peers themselves, some of whom do possess the relevant skills and experience. Employees in the ICT sector need to be motivated to share knowledge for them to be successful in their day-to-day job performance.

Disseminating the Study Results

Disseminating this study would include sharing the study outcome with the executive directors of the two research sites. I also plan to share the results of this doctoral study with permanent secretaries and administrators heading various ministries and departments in Botswana. I intend to publish a summary of this study in the Walden University ScholarWorks database and at the University of Botswana Research, Innovation, and Scholarship archive. To ensure a wider coverage, I also intend to publish this study in International Journal of Computer and Information Technology. I also plan to disseminate the research results through conferences with higher learning institutions as well as conducting presentations to government and private institutions in Botswana.

Recommendations for Further Research

The findings of this study corroborated the specific business problem that some ICT service provider managers require strategies to build employee competencies to address ICT infrastructure performance deficiencies. Evidence gathered through face-to-face interviews and review of documents showed workers lack skills to address ICT infrastructure performance gaps. The 15 participants interviewed and 12 documents reviewed, sufficiently represented the target population; hence the study results are transferable in other contexts. The themes that emerged from interviews and reviewed documents provided evidence of nonperformance in the ICT service sector in Botswana. Participants' knowledge of the research topic during interviews, however, might have been a limitation of the collected data and the study findings, hence the need for a recommendation for further research to ensure the findings are transferable in other contexts. Although two members were not knowledgeable about the research topic and could not provide sufficient answers in response to interview questions, 13 respondents adequately represented the target population by providing their honest understanding of the phenomenon investigated. Throughout data collection and analysis, I prevented bias from occurring by observing the principles of ethical research as outlined in the Belmont Report. Having confined the research study to two research sites in Botswana, however, might have been a limitation for future researchers to transfer the study findings in other countries.

I recommended for further research three critical areas to improve business practice. First, researchers, industry practitioners, policymakers, and the academia need

to motivate research for developing a unified curriculum capable of addressing ICT employability skills gaps in Botswana. The research should target developing effective ICT engineering skills in (a) information security, (b) computer forensics, (c) database development, (d) cloud computing, (e) applications development, and (e) data center design and optimization. Second, researchers and industry practitioners need to implement strategies for managing complex ICT projects to improve efficiency and effectiveness in the workplace to achieve success. Third, developing employees' intrapersonal and interpersonal skills requires researchers and ICT industry practitioners to investigate factors that impede or promote knowledge sharing in the workplace in the context of Botswana ICT industry.

Reflections

My doctoral journey has not only transformed the way I appreciate the worldwide, but has enabled me to balance professional endeavors with my personal and social life. For more than five years, I had an opportunity to interact and share scholarly ideas with peers and Walden University faculty members. The scholarly engagement widened the scope of my worldview and capacity to address personal, academic, and business problems with an open mind and willingness to engage in more challenging endeavors. I developed self-drive, determination, dedication, perseverance, and contributed substantially to my peers during the study.

At the beginning of this doctoral journey, I did not know what I knew about the different research paradigms and knew fairly little about quantitative, qualitative, and mixed methods. Through intensive Walden University research coursework, I learned

how quantitative, qualitative, and mixed methods relate to a research conundrum based on positivist and constructivist philosophical worldviews. Through my student committee chair' close supervision and mentorship, I selected a qualitative method for addressing the research problem regarding strategies managers use to build employee competencies. Understanding the ontological and epistemological beliefs leading to the selection of an appropriate research design, I chose a qualitative multiple case study design over phenomenology; ethnography, grounded theory, and narrative design to explore strategies business managers use to build employee competencies. After trying several theories and models including the technology adoption model (TAM), systems theory, and service quality models, which did not match my research question, I found competency models pioneered by David McClelland in 1973. Reading more about competency models led to the unearthing of the IT competency model developed by the U.S. Department of Labor, Employment, and Training in 2014 to assist business practitioners develop effective strategies for building professional skills in the workplace. The IT competency model aligned perfectly well with my research question, the general business problem, and the specific business problem. I used the IT competency model as the conceptual framework for shaping and guiding this study.

Having benefitted from learning with Walden University, I strongly feel I should contribute positively to the improvement of the lives of individuals, especially in the ICT industry through a coordinated learning process. I have developed a business plan to deliver professional training courses for post-tertiary graduates to prepare them for the industry. I am more concerned about developing effective ICT engineering skills in (a)

information security, (b) computer forensics, (c) database development, (d) cloud computing, (e) application development, and (e) and networking. I also plan to engage a consultancy work to assist organizations to become competitive in a turbulent business environment.

Conclusion

Limitation in ICT service provider managers' strategies to build employee competencies has not only downgraded employee performance in the workplace but also led to a modest ICT sector contribution of 0.8% to Botswana's economic growth and social development due to a decline in ICT NRI (Shemi & Procter, 2013; World Bank, 2014a). Shemi and Procter (2013) associated the decline in Botswana's ICT networked readiness (NRI) to a lack of skilled ICT personnel. In addressing the study research question, I used IT competency model to assess the extent ICT service provider managers developed personal effectiveness competencies, academic competencies, workplace competencies, industry-wide technical competencies, industry-sector professional competencies, and specific occupational competencies for their subordinates.

Following the IRB approval #09-28-16-0301994 notification dated September 28, 2016, I recruited 15 participants from the two organizations to partake in a face-to-face interview and document review. Six themes emerged from the analysis and interpretation of the collected data. Respondents indicated a lack of employees' requisite skills to address ICT infrastructure performance deficiencies that characterize service unavailability, poor quality of service, and a lack of technology knowledge transfer. Employees in the ICT sector need motivation to share knowledge and achieve success in

service delivery. Sixty percent of participants cited budget limitation in government departments as the primary source of managers' inability to develop strategies for building employee competencies. Policymakers, industry practitioners, leaders of learning institutions, and stakeholders need to ensure ICT industry specific expertise is commensurate with unified ICT industry-specific skills framework developed to address ICT employability skills gaps. To achieve competitive edge in the design, implementation, operation, and securing the ICT infrastructure from any form of attack including cybercrime, ICT industry players need to motivate a unified industry-driven curriculum to develop expertise for systems engineers, network design architectures, database specialists and administrators, web-based application developers, digital forensics analysts, project managers, and cybercrime investigators and specialists.

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Appendix A: Research Permissions ICT1 and ICT2

REF: [redacted] 1/17/6

[redacted]
Thulaganyo Rabogadi
PO Box 4116
Gaborone

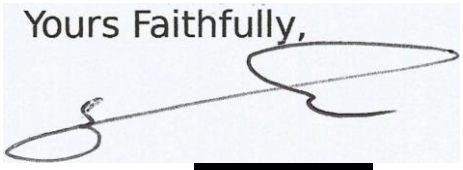
September 15, 2016

RESEARCH PERMIT

Reference is made to your letter dated September 15, 2016 in which you requested for permission to conduct a research study in the [redacted].

You are hereby notified that permission has been granted as per your request. You are therefore requested to ensure that the confidentiality agreement and Data Use Agreement documents are signed before the commencement of the research

Thank you.



[redacted]

DIRECTOR

20'" September 2016
[redacted]
[redacted]
Gaborone

RE: REQUEST FOR COOPERATION TO CONDUCT A RESEARCH STUDY WITH [redacted]

Reference is made to this subject and your recent communication to us verbally and by email.

We wish to renew our commitment to assist with your research. You are reminded that the information that will be availed to you or that you will come across during your interactions with [redacted] is confidential and shall not under any circumstances be shared with anyone except for purposes of your research. You will be expected to sign confidentiality agreement with the organisation upon your commencement. Your contact person will be Mr Aldrin Sivako.

Yours sincerely,

[redacted]

Human Resource Manager

Appendix B: Confidentiality Agreements

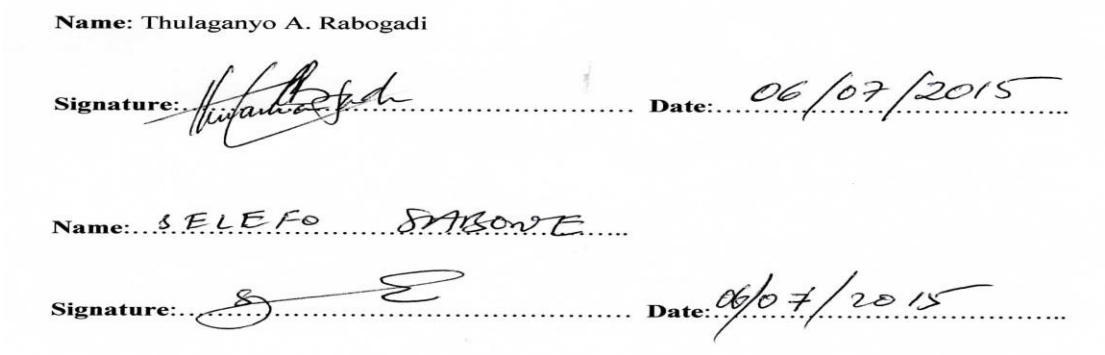
Name of Signer: [redacted]

During the course of collecting data for this research: "Exploring Strategies ICT Service Provider Managers Use to Build Employee Competencies", I will have access to confidential information. I acknowledge the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant and the organization. In this study, I will not use external transcribers or translators. I will ensure during a member checking process, participants will not view data that contains identifiers.

By signing this Confidentiality Agreement, I acknowledge and agree:

- I will not disclose or discuss any confidential information with others, including friends or family.
- I will not divulge copy, release, sell, and loan, alter or destroy any confidential information except as properly authorized.
- I will not discuss confidential information where others can overhear the conversation. I understand it is not acceptable to discuss confidential information even if the participant's name is not used.
- I will not make any unauthorized transmissions, inquiries, modification, or purging of confidential information.
- I agree my obligations under this agreement will continue after termination of the job I will perform.
- I will only access or use systems or devices authorized to access, and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.
- I understand that violation of this agreement will have legal implications.

Signing this document, I acknowledge I have read the agreement and I agree to comply with all the terms and conditions stated above.


Name: Thulaganyo A. Rabogadi

Signature: ..... Date: 06/07/2015

Name: S.E.L.E.F.O S.A.B.O.N.E

Signature: ..... Date: 06/07/2015

Name of Signer: [redacted]

During the course of collecting data for this research: "Exploring Strategies ICT Service Provider Managers Use to Build Employee Competencies", I will have access to confidential information. I acknowledge the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant and the organization. In this study, I will not use external transcribers or translators. I will ensure during a member checking process, participants will not view data that contains identifiers.

By signing this Confidentiality Agreement, I acknowledge and agree:

- I will not disclose or discuss any confidential information with others, including friends or family.
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- I agree my obligations under this agreement will continue after termination of the job I will perform.
- I will only access or use systems or devices authorized to access, and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.
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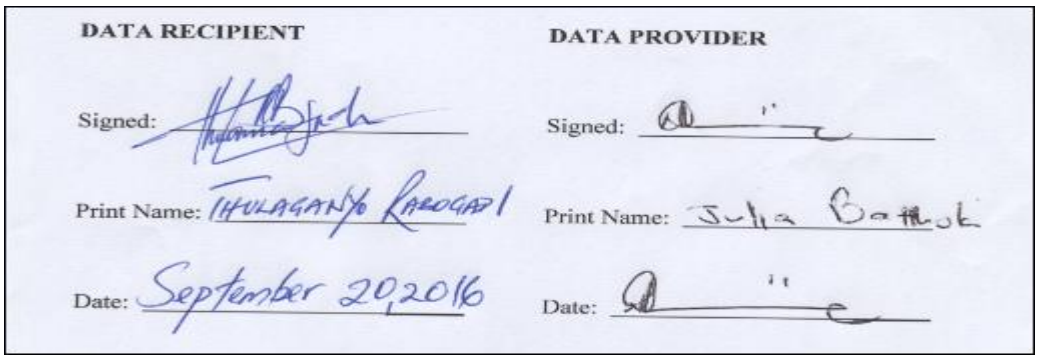
Signing this document, I acknowledge I have read the agreement and I agree to comply with all the terms and conditions stated above.



DATA RECIPIENT	DATA PROVIDER
Signed:	Signed:
Print Name: THULAGANYO KAROGADI	Print Name: Julia Bartok
Date: September 20, 2016	Date:

Appendix C: Data Use Agreements

This Data Use Agreement ("Agreement"), effective as of September 29, 2016 ("Effective Date"), is entered into by and between Thulaganyo Rabogadi (Data Recipient) and [redacted] ("Data Provider"). The purpose of this Agreement is to provide Data Recipient with access to a Limited Data Set ("LDS") for use in research **in accord with laws and regulations of the governing bodies associated with Data Provider, Data Recipient, and Data Recipient's educational program**. In the case of a discrepancy among laws, the agreement shall follow whichever law is more strict.

1. Definitions. Due to the study's affiliation with laureate, a USA=based company, unless otherwise specified in this Agreement, all capitalized terms used in this Agreement not otherwise defined have the meaning established for purposes of the USA "HIPAA Regulations" and/or FERPA Regulations" codified in United States Code of Federal Regulations, as amended from time to time.
2. Preparation of the LDS. Data Provider shall prepare and furnish to Data Recipient an LDS in accord with any applicable laws and regulations of the governing bodies associated with Data Provider, Data Recipient, and Data Recipient's educational program
3. Data Fields in the LDS. **No direct identifiers such as names may be included in the Limited Data Set (LDS).** In preparing the LDS, Data Provider shall include the **data fields specified as follows**, which are the minimum necessary to accomplish the research:
    a. HR development strategy:
    b. Training and development strategy
    c. Capacity and competency building strategy
    d. Knowledge and skills transfer strategy
    e. Knowledge and skills audit report
    f. Capability and competency measurement metrics
    g. Recruitment and selection policy
    h. Retention strategy
    i. Incentives and reward system
    j. Performance management

1. Responsibilities of Data Recipient. Data Recipient agrees to:
    a. Use or disclose the LDS only as permitted by this Agreement or as required by law. Use appropriate safeguards to prevent use or disclosure of the LDS other than as permitted by this Agreement or required by law;
    b. Use appropriate safeguards to prevent use or disclosure of LDS other than as permitted by this Agreement or required by law;
    c. Report to Data Provider any use or disclosure of the LDS of which it becomes aware is not permitted by this Agreement or required by law;

d. Require any of its subcontractors or agents to receive or have access to the LDS to agree to the same restrictions and conditions on the use and/or disclosure of the LDS applicable to Data Recipient under this Agreement; and
e. Not use the information on the LDS to identify or contact the individuals who are data subjects.

2. Term and Termination.
   a) Term. The term of this Agreement shall commence as of the Effective Date and shall continue for so long as Data Recipient retains the LDS, unless sooner terminated as set forth in this Agreement.
   b) Termination by Data Recipient. Data Recipient may terminate this agreement at any time by notifying the Data Provider and returning or destroying the LDS.
   c) Termination by Data Provider. Data Provider may terminate this agreement at any time by providing thirty (30) days prior written notice to Data Recipient.
   d) For Breach. Data Provider shall provide written notice to Data Recipient within ten (10) days of any determination that the Data Recipient has breached a material term of this Agreement. Data Provider shall afford Data Recipient an opportunity to cure said alleged material breach upon mutually agreed terms. Failure to agree on mutually agreeable terms for cure within thirty (30) days shall be grounds for the immediate termination of this Agreement by Data Provider.
   e) Effect of Termination. Sections 1, 4, 5, 6 I and 7 of this Agreement shall survive any termination of this Agreement under subsections c or d.

3. Miscellaneous.
   a) Change in Law. The parties agree to negotiate in good faith to amend this Agreement to comport with changes in federal law that materially alter either or both parties' obligations under this Agreement. Provided, however, that if the parties are unable to agree to mutually acceptable amendment(s) by the compliance date of the change in applicable law or regulations, either Party may terminate this Agreement as provided in section 6.
   b) Construction of Terms. The terms of this Agreement shall be construed to give effect to applicable federal interpretative guidance regarding the HIPAA Regulations.
   c) No Third Party Beneficiaries. Nothing in this Agreement shall confer upon any person other than the parties and their respective successors or assigns, any rights, remedies, obligations, or liabilities whatsoever.
   d) Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

e) Headings. The headings and other captions in this Agreement are for convenience and reference only and shall not be used in interpreting, construing or enforcing any of the provisions of this Agreement.

IN WITNESS WHEREOF, each of the undersigned has caused this Agreement to be duly executed in its name and on its behalf.

DATA PROVIDER	DATA RECIPIENT
Signed:	Signed:
Print Name: SELEFO SABONE	Print Name: THULAGANYO RABOGADI
Print Title: DIRECTOR	Print Title: DIRECTOR

This Data Use Agreement ("Agreement"), effective as of September 29, 2016 ("Effective Date"), is entered into by and between Thulaganyo Rabogadi (Data Recipient) and [redacted] ("Data Provider"). The purpose of this Agreement is to provide Data Recipient with access to a Limited Data Set ("LDS") for use in research **in accord with laws and regulations of the governing bodies associated with Data Provider, Data Recipient, and Data Recipient's educational program**. In the case of a discrepancy among laws, the agreement shall follow whichever law is more strict.

1. Definitions. Due to the study's affiliation with laureate, a USA=based company, unless otherwise specified in this Agreement, all capitalized terms used in this Agreement not otherwise defined have the meaning established for purposes of the USA "HIPAA Regulations" and/or FERPA Regulations" codified in United States Code of Federal Regulations, as amended from time to time.
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3. Data Fields in the LDS. **No direct identifiers such as names may be included in the Limited Data Set (LDS).** In preparing the LDS, Data Provider shall include the **data fields specified as follows**, which are the minimum necessary to accomplish the research:
    a. HR development strategy:
    b. Training and development strategy
    c. Capacity and competency building strategy
    d. Knowledge and skills transfer strategy
    e. Knowledge and skills audit report
    f. Capability and competency measurement metrics
    g. Recruitment and selection policy
    h. Retention strategy
    i. Incentives and reward system
    j. Performance management

4. Responsibilities of Data Recipient. Data Recipient agrees to:
    f. Use or disclose the LDS only as permitted by this Agreement or as required by law. Use appropriate safeguards to prevent use or disclosure of the LDS other than as permitted by this Agreement or required by law;
    g. Use appropriate safeguards to prevent use or disclosure of LDS other than as permitted by this Agreement or required by law;
    h. Report to Data Provider any use or disclosure of the LDS of which it becomes aware is not permitted by this Agreement or required by law;
    i. Require any of its subcontractors or agents to receive or have access to the LDS to agree to the same restrictions and conditions on the use and/or disclosure of the LDS applicable to Data Recipient under this Agreement; and
    j. Not use the information on the LDS to identify or contact the individuals who are data subjects.

5. Term and Termination.
    f) Term. The term of this Agreement shall commence as of the Effective Date and shall continue for so long as Data Recipient retains the LDS, unless sooner terminated as set forth in this Agreement.
    g) Termination by Data Recipient. Data Recipient may terminate this agreement at any time by notifying the Data Provider and returning or destroying the LDS.
    h) Termination by Data Provider. Data Provider may terminate this agreement at any time by providing thirty (30) days prior written notice to Data Recipient.
    i) For Breach. Data Provider shall provide written notice to Data Recipient within ten (10) days of any determination that the Data Recipient has breached a material term of this Agreement. Data Provider shall afford Data Recipient an opportunity to cure said alleged material breach upon mutually agreed terms. Failure to agree on mutually agreeable terms for

cure within thirty (30) days shall be grounds for the immediate termination of this Agreement by Data Provider.

j) Effect of Termination. Sections 1, 4, 5, 6 I and 7 of this Agreement shall survive any termination of this Agreement under subsections c or d.

6. Miscellaneous.

f) Change in Law. The parties agree to negotiate in good faith to amend this Agreement to comport with changes in federal law that materially alter either or both parties' obligations under this Agreement. Provided, however, that if the parties are unable to agree to mutually acceptable amendment(s) by the compliance date of the change in applicable law or regulations, either Party may terminate this Agreement as provided in section 6.

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i) Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

j) Headings. The headings and other captions in this Agreement are for convenience and reference only and shall not be used in interpreting, construing or enforcing any of the provisions of this Agreement.

IN WITNESS WHEREOF, each of the undersigned has caused this Agreement to be duly executed in its name and on its behalf.

DATA PROVIDER

Signed: _____

Print Name: ALDRIN SIVAKO

Print Title: TECHNICAL EXECUTIVE

DATA RECIPIENT

Signed: _____

Print Name: [illegible]

Print Title: [illegible]

Appendix D: Research Question and Interview Questions

Research Question

What strategies do ICT service provider managers use to build employee competencies to address ICT infrastructure deficiencies?

Interview Questions

1. What performance deficiencies do you experience from the ICT infrastructure?
2. What industry-specific technological competencies have you developed to improve the skills of your subordinates?
3. What knowledge, skills, and abilities have your employees acquired to address ICT infrastructure deficiencies?
4. What occupational-specific technical competencies have you developed or are planning to develop for your employees?
5. What occupational-specific requirements do your employees need to become efficient and effective at service delivery?
6. What academic ICT engineering qualifications and experiences have your employees attended to improve competencies in the provision of quality services and performance?
7. To what extent are your employees willing to engage in ICT professional development and lifelong learning to improve their competencies?
8. What managerial competencies do you possess to enable you to develop skills of your subordinates?

9. What other additional information would you like to share about strategies you use to develop the competencies of employees?

End of Interview

Thank you very much for spending your valued time answering the interview questions. I sincerely appreciate your assistance and contribution in making this data collection a success. Once again, the information you have provided will be used solely for the purpose of this study and will not be divulged to anybody other than for the purpose of contributing to conclusions drawn from the study findings, and hence will be treated as highly confidential.

For further clarification, please feel free to contact the researcher on: Tel: +267 3673399 (w) +267 3161963 (h), Mobile: +267 71333202, E-mail: trabogadi@sid.org.bw, or trabogadi@gmail.com, or thulaganyo.rabogadi@waldenu.edu

Appendix E: The Interview Protocol

Preparation for interview. I obtained the signed permits from your executive directors to gain access to and conduct a research study with managers in this organization. Managers met the selection criteria of managerial position. I also obtained participants' initial contact details from the executive directors. I contacted the participants by telephone to appoint with each one of them for the initial one-on-one meeting at their workplace.

Introduction to interview. First, greeted the interviewee by name and thanked him or her for coming to the interview. Second, I introduced myself by name and as a researcher at Walden University conducting a research study to understand strategies ICT service provider managers use to build competencies of their subordinates. Third, I explained in detail the purpose of the study, my interest, and who is involved in the study. Fourth, I explained their contribution in the study was important in collecting the information I need. Fifth, I explained what would happen with the collected data and how the society would benefit from the study findings.

Sharing confidentiality documents. After completing the introduction, I discussed and shared with the interviewee the confidentiality documents I signed with the executive directors. The documents were a letter of cooperation, confidentiality agreement, data use agreement, and the informed consent form. I explained the purpose of the informed consent form emphasizing that participation in the study was voluntary; hence, after a careful consideration of the informed consent and other documents, he or she might agree or not agree to participate. I then gave the interviewees five days to read

the documents, especially the informed consent form before deciding to participate or not to participate in the study. Lastly, I sent another email to remind potential participants of the interview date, but flexible to adjust the date in line with what the interviewee desired.

Informed consent and agreement documents. Thank you for considering participating in this research study by signing the informed consent form. Once again, as part of the "informed consent" process, I am pleased to remind you that the purpose of the study is to have an in-depth understanding of strategies ICT service provider managers use to build competencies of their subordinates to address ICT infrastructure performance deficiencies. My name is Thulaganyo Arnold Rabogadi and I am a researcher at Walden University in the United States of America. You may already know that I am an employee of the Directorate of Intelligence and Security under the Office of the President, as a Director of Science and Technology. I would like to declare that this study is completely separate from this role and has nothing to do with the Directorate. Are there any questions about what I have explained?

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Conduct the interview. At the interview, I took the following steps. First, I greeted the interviewee by hand and thanked him or her for coming to this interview. Second, I presented to the interviewee the interview protocol (Appendix E) and explained the purpose of the interview protocol. Third, I once again explained the purpose of the study, its duration, and that participation in the study is voluntary and participants may withdraw from participating in the study at any time. Fourth, I explained and informed participant about any foreseeable risks and potential benefits of participation, as well as whether there would be incentives for participating. Fifth, I asked the interviewee whether he or she agreed to partake in the study, and ensured the participant signed the consent form when he or she agreed. Sixth, I then informed the interviewee that I would record the interview using a software application installed in my laptop for transcribing the interview at a later stage. Lastly, I informed the interviewee that he or she would have an opportunity to review the interpretations of data collected to confirm the accuracy of the findings.

Asking open-ended questions. Once the interviewee understood and agreed to sign the informed consent form, I started the interview by asking the interviewee the open-ended questions as they appeared on the interview protocol and recorded the responses. I asked every question in the order given in the interview protocol. While it was important to capture all the important comments, I ensured taking notes did not disrupt the flow of the conversation. The interview took up to one hour. The use of this interview protocol guided the collection of the information about interviewees prior to them responding to the interview questions. Castillo-Montoya (2016) suggested an

interview protocol is a script of valuable information the interviewer shares with participants at the beginning and conclusion of the interview. The advantage of using an interview protocol is the interviewer and interviewees come to understand one another better.

Asking probing questions and recording responses. When the interviewee gave a brief cursory answer to a question, I elicited a more thoughtful and thorough response by encouraging him or her to elaborate and clarify his or her response to the question. I listened carefully for recurring and new opinions or experience, and at the same time identifying themes. Immediately after each interview, I reviewed the notes and the tape recording and added important comments made.

As interviewees are often uncomfortable when they know the researcher is recording their responses, I informed the interviewee that I would record the interview using a non-obstructive audacity software installed in my laptop if the interviewee agrees. Audio recording the interview was important so that I do not miss any of the interviewee's discussion and insights. Interviews were comfortable with the recording of the interview.

Interviewee details. I would like to thank you for making time for this interview. My name is Thulaganyo Rabogadi, and my role in this study includes protecting the rights of participants, preparing interviews, conducting, transcribing, coding, and documenting interviews. I focus on understanding strategies you use in your organization to develop and build competencies of your subordinates with respect to the

ICT infrastructure performance. Prior to the interview, I would like to note some background information about yourself, as follows:

Interviewee Code Name:……..……...

Gender: ☐ Male ☐ Female

Date of Birth: ……..Place of Birth …...……

Tel/Mobile:……. Email address:……...

Employer:……

Designation:……

Direct reports: ☐ 1 to 10 ☐ 11 to 20 ☐ 21 to 30 ☐ more than 30 subordinates

Indirect reports: ☐ 1 to 10 ☐ 11 to 20 ☐ 21 to 30 ☐ more than 30 subordinates

Experience: ☐ less than 2 years ☐ between 2 to 5 years ☐ more than 5 years

Qualification: ☐ College Certificate ☐ College or University Diploma ☐ University degree ☐ other, please specify……

1. What performance deficiencies do you experience from the ICT infrastructure?

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2. What industry-specific technological competencies has your organization developed to improve the competencies of your subordinates?

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3. What knowledge, skills, and abilities have your employees acquired to address ICT infrastructure deficiencies?

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4. What occupational-specific technical competencies have you built or are planning to build for your employees?

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5. What occupational-specific requirements do your employees need to become efficient and effective at service delivery?

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6. What academic ICT engineering qualifications and experiences have your employees attended to improve competencies in the delivery of quality services and performance?

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7. To what extent are your employees willing to engage in ICT professional development and lifelong learning to improve their competencies?

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8. What strategies have you developed to build the competencies of employees to address broadband infrastructure deficiencies?

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9. What other additional information would you like to share about strategies your organization uses to develop the competencies of employees?

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Concluding the interview. In concluding the interview, participants had the opportunity to share any additional information or comments. I asked interviewees to provide recommendations or solutions in addressing the problem.

Recommendations by interviewee

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Before thanking the interviewees for their significant contribution to the study, I summarized the major comments I obtained throughout the interview and asked participants if they had any questions or comments. After completing the interview, I sent by e-mail a follow-up thank you note to the interviewees.

Interviewee's signature ……..

Interviewer's signature ……

Date Interview Conducted…….

Time Interview Starts…… Time Interview Ends…….

Interviewee Code Number……

End of Interview Protocol

Thank you very much for spending your valued time answering the questions. I sincerely appreciate your assistance and contributions in making this interview a success. Once again, the information you have provided would be used solely for the purpose of this study and will not be divulged to anybody, other than for the purpose of contributing to conclusions drawn from the study findings, and hence would be treated as highly confidential. For further clarification, please feel free to contract the researcher on: Tel:

+267 3673399 (w) +267 3161963 (h), Mobile: +267 71333202, E-mail:

trabogadi@sid.org.bw, or trabogadi@gmail.com, or thulaganyo.rabogadi@waldenu.edu

Appendix F: Interview Transcription Procedure

Step	*Procedure*	*Expected Outcome*
1.	Transcription a) Transcribe all tapes word-for-word b) Show nonverbal or background sounds in parenthesis (including laughter, coughs, or clapping) c) Transcribe mispronounced words exactly as the interviewer or participant pronounced them d) Mark brief pauses with periods or ellipses (…) and pauses longer than 3 seconds by typing (long pause) e) Replace sensitive information in the transcript with generic descriptive phrases enclosed in brackets	Interview transcriptions bearing proper filenames
2.	Bracketing and phenomenological reduction f) Read the recorded interview and transcription with openness to emerging meanings g) Suspend as much as possible your meaning and interpretation of what the interviewee says and what you expect the interviewee to say h) Reflect and list propositions, perceptions, feelings, and views that you are consciously aware of and discuss these with research committee	List of researcher prepositions for discussion with research members
3.	Listen to the interview for a sense of the whole a) Listen to the entire tape and read the transcription several times and note nonverbal and para-linguistic communication (intonations, emphases, pauses, etc.) b) Maintain a journal to note general impressions	Journal of general impressions
4.	Delineating units of general meaning a) Go over every word, phrase, sentence, paragraph and note significant nonverbal communication in the transcript to elicit meanings	Record of coded units of general meaning Record of redundant statements

	b) Record the meaning of what the participant has said in the margin on the right of the transcript and journal c) Record any uncertainty of whether statements do not constitute a discrete unit of the general meaning d) Record redundancies observed in the redundancy notes e) Develop a table units of general meaning with appropriate coding	
5.	Delineating units of meaning relevant to the research question a) Address the research question to the units of general meaning developed to determine whether what the participant has said responds to and illuminates the research question b) Develop a table of units of relevant meaning to the research question and record statements that are irrelevant to the phenomenon being studied c) Train impartial panel of judges to validate or modify the units of relevant meaning elicited d) Develop a table of units of relevant meaning to the research question	Record of relevant meaning to the research question
6.	Verifying the units of relevant meaning a) Engage participants to verify study findings b) A significant agreement between the researcher and participants confirms bracketing of propositions by the researcher c) A significant difference in researcher's and participants' finding would require the researcher to consult the research committee to evaluate how the problem could be resolved	Details of independent judges
7.	Eliminating redundancies a) Eliminate redundancies from units of relevant meaning b) As you are eliminating redundancies based on content, pay attention to the number of times the meaning was	List of redundant statements

	mentioned, because this might indicate significance you may want to observe c) Pay attention to chronology of events that have significant meaning to what participants said	
8.	Clustering units of relevant meaning a) Review the effort to bracket one's presupposition and once again try to stay as true as possible b) Determine if units of relevant meaning naturally cluster together c) Produce a list of non-redundant units of relevant meanings d) Determine if units of relevant meanings naturally cluster together e) Rigorously examine each unit of relevant meaning to elicit the essence and establish common and emerging themes and patterns that unites discrete units of relevant meaning	Cluster of units of relevant meaning List of non-redundant units of relevant meaning List of common and emerging themes and patterns
9.	Determining themes from clusters of meaning a) Interrogate all clusters of meaning to establish central themes that express the essence of the clusters	Central theme
10.	Writing a summary for each individual interview a) Revise the interview transcription and write a summary of the interview incorporating the themes elicited from data b) The summary must give a sense of the whole including emerging themes	Interview Transcription Summary

Appendix G: Sequential Data Analysis Process

Phase 1: Compile Database

1. Conduct face-to-face interviews using the interview protocol developed in Appendix F
2. Transcribe each interview using an interview transcription procedure developed in appendix F
3. Conduct a document review on documents the executive directors of research sites provided for the review subject to adherence of confidentiality agreement (Appendix C) and data use agreement (Appendix D)
4. Record transcriptions responses per interview questions in and Excel worksheet developed in Appendix F1 and Appendix F2 for a preliminary manual coding
5. Record document review notes and other material such as PDFs or photos in and Excel worksheet for a preliminary manual coding

Phase 2: Disassemble Data

6. Organize specific data obtained from the face-to-face interviews by interviewee codenames and document review by subject
7. Identify salient themes, recurring ideas, and patterns in the data collected and organize them per interviewee transcript and document review subject for manual coding

8. Apply manual coding to interviewee transcripts and document review subjects and record emerging themes, recurring ideas and phrases.
9. Open a project on NVivo10 and create folders and label them (a) Interview_Data and (b) Document_Review_Data
10. Import interview transcripts using Excel spreadsheets developed in Appendix F1 and Appendix F2 onto an Interview_Data folder
11. Import document review data using Excel spreadsheets onto a Document_Review_Data folders

Phase 3: Reassemble Data

1. Organize data into smaller segments, discover, and sort themes and subthemes
2. Determine patterns and themes from the collected data, and remove redundancies
3. Build code blocks and correlate themes with the literature review and the IT competency model as a conceptual frame of the study
4. Make sure data analyzed is accurate and consistent with the research question.
5. Code and arrange data into manageable themes and build overarching themes
6. Compare and contrast the overarching themes to uncover cases that appear similar but are a mismatch
7. Search for alternative explanations on themes emerging from data
8. Take precautions to ensure the emerging themes are not vulnerable to researcher bias, sampling bias, or procedural bias
9. Compile the results of the reassembling phase for interpretation

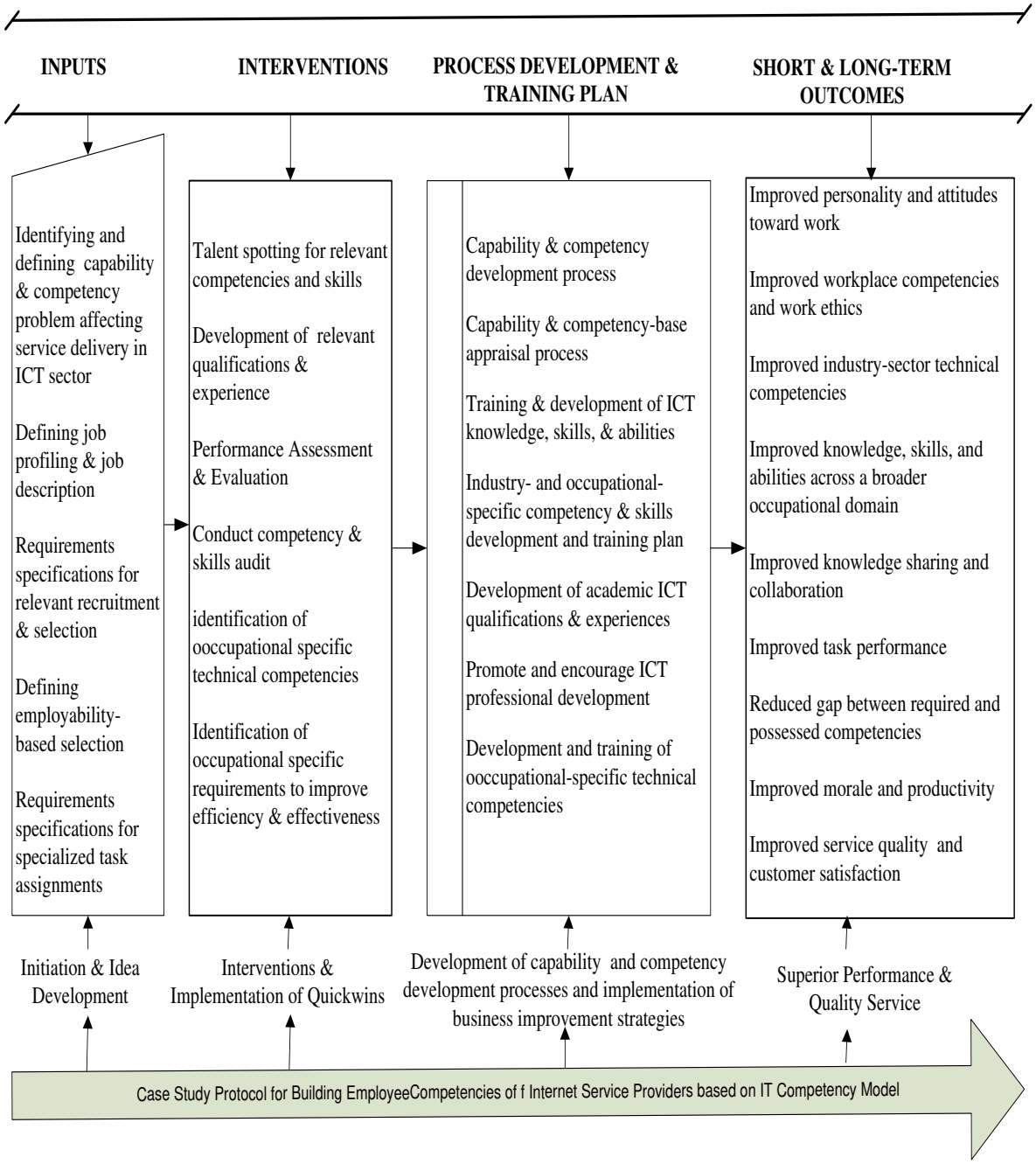
Phase 4: Interpret Data

12. Compare the results of interview and document to the goals of the study
13. Contrast conflicting views among the emerging themes and categorize and put together themes with similar patterns
14. Confirm whether the interpretations justify the findings
15. Make recommendations regarding building of employee competencies to improve performance
16. Record conclusions and recommendations to confirm whether the interpretation justify the conclusions

Phase 5: Conclude Data Analysis

10. Documents and discuss the key findings of the study
11. Collate the findings to the research questions and literature review through method triangulation
12. State the implications of the study outcomes to social change
13. Restate how the outcomes of the study will significantly contribute to the business practice.
14. Recommend the actions ICT managers must take to develop the competencies of their subordinates to improve performance.
15. Make recommendations for future research

Appendix H: Case Study Design Protocol



Appendix I: NIH Certificate

Certificate of Completion

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

Date of completion: 09/15/2012

Certification Number: 994571

Appendix J: Document Review Protocol

The purpose of this protocol is to provide guidance to the collection of secondary data using document review. I used the document review protocol to inform the executive directors about the types of documents I intended to review including HR strategy, training and development strategy, knowledge and skills audit report, knowledge and skills transfer strategy, capability and competency measurements matrices, recruitment and selection policy, retention strategy, incentives and reward system, and performance management reports. Some interviewees provided the documents for review during data collection. Indicators and attributes developed for each criterion assisted in determining the extent to which ICT service provider managers used strategies to build competencies of their subordinates.

Document Review Protocol Checklist

Criteria	Document Required	Review Notes and Emerging Themes
Strategic foundations and structure	Documented overall structure of the organization, specifying ☐ Vision and Missions ☐ Corporate goals ☐ Roles and responsibility	
HR strategy	Documented HR strategies and implementation plans identifying ☐ Talent acquisition plans ☐ Talent engagement plans ☐ Growth and development plans ☐ Performance management plans ☐ Workforce planning ☐ Employee reward and recognition ☐ Communication and employee relations	
Recruitment, induction, and	Documented policies and procedures for recruitment,	

deployment	induction, and deployment, employees, specifying clear ☐ Recruitment and selection criteria ☐ Induction and deployment criteria ☐ Job descriptions ☐ Roles and responsibilities
Training and development	Documented training and development policy, specifying the ☐ Identification of capability and competency needs assessment ☐ Development of technological competencies ☐ Development skills and abilities ☐ Employee training and development
Capacity building	Documented strategies for building capacity and competencies
Performance appraisals	Documented policies and procedures for managing and monitoring customer service, specifying ☐ Methods of evaluation and review of service delivery ☐ Measurements of service quality ☐ Measurements of customer satisfaction ☐ Methods of evaluation and review of performance ☐ Periodic employee performance appraisals ☐ Regular maintenance of equipment used for service delivery ☐ Knowledge sharing and transfer
Allocation of resources	Documented plans for prudent allocation of resources, specifying ☐ Financial resources ☐ Skilled manpower ☐ Prudent budgeting and accounting practice

Appendix K: Initial Contact Details Form

Title	First Name	Surname	Company	Position	Telephone No.	Mobile No.	E-mail Address