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African Public Leadership on Technology Readiness and Diffusing the Circular Economy in Sub-Saharan Africa

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Abstract

African Public Leadership on Technology Readiness and Diffusing

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by

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MA, London Metropolitan University, 2011

BS, London Metropolitan University, 2009

Dissertation Submitted in Partial Fulfilment

of the Requirements for the Degree of

Doctor of Philosophy

Management

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Abstract

Sub-Saharan Africa is not yet ready to embrace the digital and the fourth industrial revolution, and there remains a literature gap about technology readiness and effective technology diffusion to support a circular economy transition in West and East African countries. The purpose of this qualitative, multiple case study was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. A multiple case study design was used to collect data from a purposeful sample of 14 African public leadership experts. Semistructured interviews, archival data, and reflective field notes supported study findings through data triangulation. This study is framed by two key concepts: Rogers's concept of diffusion of innovations and Grafström and Aasma's concept of the circular economy. Twelve themes emerged from the data analysis with six coding categories grounded in the conceptual framework: (a) African public leaders' technology readiness, (b) African public leaders enabling technology readiness for a circular economy transition, (c) African public leaders' adoption of technology, (d) African public leaders enabling technology diffusion for a circular economy transition, (e) African public leaders' professional preparation for a circular economy transition, and (f) African public leaders' willingness to adopt a circular economy transition. This study's results may drive positive social change by informing African public leaders on the knowledge needed to enact policies on technology diffusion to support a circular economy transition and their nation's sustainable development.

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Dedication

To my dearly departed friend, Philip Joel Mandewa-Cole [PJ], salute my deceased father in heaven. Also, as a symbol of optimism, to the dynamic and growing demographic of the African youth, the potential of African integration promotes climate-smart solutions that create new important market prospects for the continent.

This study was inspired, influenced, and derived from my interaction with PJ before his pre-wedding dinner at Browns West End London on February 5, 2022. PJ was distinguished in his outlook, noble in his personality, excellent in his work ethic, and principled in his conduct. Over the years, his imaginative qualities have challenged my thought processes to be a better father, friend, son, brother, and leader. His passionate dedication to his country and broader sub-Saharan Africa molded and influenced the conceptual direction of this study.

Our positionality was that while external assistance for research and innovation in Africa has been significant and necessary, sustainability should be included in such support through improved coordination and alignment with regional integration that enables local development goals. Essential to local leadership, governance of innovation in Africa, social entrepreneurial advancement, and clean energy access is an African public leadership that orchestrates and delivers continuous circular economy investment, enabling smart-integrative infrastructure, environment protection, and productivity. It is intended that policymakers, academics, students, entrepreneurs, philanthropists, investors, the private sector, and everyone interested in international development will find the findings of this study appealing.

PJ's premature demise served as the most potent possible wake-up call yet to the aspiring new generation of African leaders able to manage these innovations that we must do everything we can now.

Acknowledgments

It would not have been possible to complete my dissertation without the guidance and support of Dr. Daphne Halkias, my respectful and renowned dissertation chair, who has given so much of herself to me over the past year. In addition to the exhaustive reading of my chapters and drafts, you consistently demonstrated a genuine interest in my work and helped me develop it. Your constructive criticisms helped shape my views and every part of this piece, and I am grateful for all the academic and career support you have provided over the past few years. I salute you.

To Dr. Stephanie Hoon, the second member of my dissertation committee, I would like to thank you for your active participation in my PhD journey and for aiding Dr. Halkias in guiding me to this tremendous academic success. Dr. Kenneth Levitt, the university research reviewer (URR) faculty member, especially deserves my complete gratitude for his consistent support and genuine interest in my work. Their exceptional teamwork offered me insightful advice and counsel through comments and discussion points that brought clarity and generated depth. For their efforts, I will always be grateful.

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Chapter 1: Introduction to the Study

Sub-Saharan Africa's public leadership has acknowledged the need to develop a circular economy (CE) model, an integral part of the United Nation's 2050 sustainability agenda, across its continent due to its potential to strengthen economic development and social and environmental sustainability (Bouchene et al., 2021; Dosso, Meite et al., 2021). More than half of the world's population, or 43% of the total population, lacks access to modern energy; 590 million of these people reside in sub-Saharan Africa, and with 36% of the continent's population living in severe poverty, a lack of sustainability and circularity adoption is anticipated to worsen the continent's critical development needs (International Energy Agency (IEA), 2022). Sub-Saharan Africa is presently battling fundamental sustainable development challenges such as widespread poverty, hunger, food and nutrition insecurity, and limited access to education and healthcare, all exacerbated by climate change impacts (Jayaram et al., 2021). Shortages in terms of infrastructure for mobility, stable electricity supply and distribution, secure Internet, and water management affect the daily livelihood of African populations (Sima et al., 2021).

Scholars have consistently documented how the circular economy achieves sustainable economic and environmental goals (Buecker et al., 2022; Geissdoerfer, Savaget et al., 2017). Transitioning to net-zero via a circular economy model by 2050 will likely secure the livelihoods of sub-Saharan Africans in the long term (Signé, 2020). While authors have recently noted that systemic circular economy transition efforts require engagements with multiple stakeholders (Salvioni & Almici, 2020), there is little practitioner knowledge or theoretical research on how African public leaders may diffuse

the needed technology for a transition to a circular economy within sub-Saharan African countries (Zoogah, 2022). The outcome of such a study may drive positive social change in sub-Saharan Africa by informing African public leaders on the knowledge needed to enact policies on technology diffusion needed to support a circular economy transition to support their nation's sustainable development.

This chapter presents an introduction and background of the study, the problem statement, the purpose of the study, the research question, the conceptual framework, and the study's nature. The chapter also includes the definitions, assumptions, scope and delimitations, limitations, significance, and the summary.

Background of the Study

Geissdoerfer, Savaget et al. (2017) addressed the gap between the blurring outlines of circular economy and sustainability principles to increase the efficacy of employing the methods in research and practice. The authors did a comprehensive assessment of the literature, using bibliometric analysis and snowballing approaches to ascertain the state of the art in the area and synthesize the parallels, differences, and correlations between the two concepts. Circular economy transformations are brought about by the dynamic interplay between civil society and business (Ho et al., 2021). With a lack of national frameworks that assure circularity among initiatives, including the diversity of socio-economic circumstances, and resolve to address it directly (Andriamahefazafy & Failler, 2021).

Researchers have analyzed current literature on Africa's energy transition specifically whether it is facilitated and steered by circular economy concepts (Mutezo &

Mulopo, 2021). Due to industrialization and population expansion, Africa's energy consumption will likely expand dramatically over the next decade. A circular economy strategy could facilitate more renewable energy adoption and transition. Technological readiness and knowledge are needed in West African nations to execute policies on technology diffusion to enable a circular economy transition. As an example from another African nation, Boon and Anuga (2020) investigated the circular economy model's importance and relevance to sub-Saharan Africa (SSA), specifically Ghana, where implementing the circular economy model in Ghana's agricultural sector, the country's food and nutrition security and efficiency in resource exploitation would improve, as would yields and quality of agricultural goods (Boon & Anuga, 2020).

Bai et al. (2022) investigated how new and disruptive Industry 4.0 (I4.0) technologies (i.e., the fourth industrial revolution technology innovation on the social dimension of sustainable development) and circular economy transition could help to achieve the United Nations' sustainable development goals (SDGs). Bai et al. found that I4.0 technologies contributed to social sustainability through CE practices and argued that circular economy has a supportive linkage between I4.0 and social sustainability. African policymakers can address how regional financial institutions and government agencies promote scalable technologies and adopt deliberate regulations guided by circular principles and a just transition (Nwaka, 2021). Collaborative engagement may be more likely to lead to elevated levels of circular economy innovation and socioeconomic change, encouraging other players (e.g., government, institutions, or public leadership) to explore new circular economy solutions that create an alignment of economic, modern

technology, and social elements to expedite the transition to a circular economy (Andriamahefazafy & Failler, 2021).

Uçar et al. (2020) addressed a knowledge gap in the circular economy and the roles of digital technologies (DTs) in promoting the circular economy. The authors conducted an empirical investigation of the roles and functionalities of DTs in the circular economy using three different case studies from secondary sources. Uçar et al. found that DTs serve two primary functions, enabler and trigger, with the primary features supporting these roles being data collecting, data interchange, data storage, and data analysis. If successfully adopted by policymakers, participatory approaches to technological adoption might result in more experientially embedded information and communication technology poverty reduction across several aspects of the poverty line, including diffusion of innovations (Santos & Halkias, 2021).

Problem Statement

While the concept of circular economy has received wide recognition as a feasible accelerator of sustainable development globally, achieving a circular economy in Africa to meet the UN's sustainability agenda by 2050 is impossible without the necessary technology readiness and broader technology diffusion (Mutezo & Mulopo, 2021). Some reasons sub-Saharan African nations remain unprepared to launch a broader diffusion of digital and emerging technologies needed to support their transitions from a linear to a circular economy model include low preparedness of human capital, a lack of digital policymaking research, weak financial markets, slow decision-making among public leaders, and infrastructural deficiencies (Circera & Maloney, 2017; Kambou et al., 2021;

Kern et al., 2019). The social problem is that public leaders in sub-Saharan African nations may lack the technology readiness and knowledge needed to enact policies on technology diffusion to support a circular economy transition (Boon & Anuga, 2020; Nwaka, 2021).

The transition to a circular economy requires technology readiness and the diffusion of integrative software that includes additive manufacturing, big data and analytics, blockchain technology, cloud computing, cyber-physical systems, Internet of things (IoT), robotics, simulation, and virtual reality (Bai et al., 2022; Grafström & Aasma, 2021). While authors have recently noted that systemic circular economy transition efforts require engagements with multiple stakeholders (Salvioni & Almici, 2020; Velter et al., 2020), empirical research on how public leaders diffuse the needed technology for a transition to a circular economy within sub-Saharan African countries remains scarce (Zoogah, 2022). Sub-Saharan Africa is not yet ready to embrace the digital and the Fourth Industrial Revolution (Dosso, Nwankwo & Travaly, 2021), and there remains a literature gap about technology readiness and effective technology diffusion to support a circular economy transition in West and East African countries, now overwhelmed with sustainability problems (Chunguang & Quayson, 2022; Jayaram et al., 2021). The specific management problem is that little is known about how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy (Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021).

Purpose of the Study

The purpose of this qualitative, multiple case study was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. With a multiple case study design (see Yin, 2017), I collected data from a purposeful sample of African public leadership experts to meet the study's purpose and be consistent with the qualitative paradigm. The open nature of expert interviews allowed data collection from experts' breadth of knowledge and experience in research fields that still need exploring (Littig & Pöchhacker, 2014). Semistructured expert interviews (Yin, 2017), archival data, and reflective field notes (Merriam & Tisdell, 2015) were used to enhance the trustworthiness of the multiple case study findings through data triangulation (see Farquar et al., 2020; Halkias & Neubert, 2020).

Research Question

How do African public leadership experts describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?

Conceptual Framework

I framed this study with two key concepts that focus on African leaders' capabilities to enable technology readiness and the technology diffusion needed for a successful transition to a circular economy: (a) Rogers's (1995) concept of *diffusion of innovations* and (b) Grafström and Aasma's (2021) concept of *the circular economy*.

Rogers's (1995) definition of innovation explains it as an idea, a practice, or an object that an individual or other adopter perceives as new; it considers the processes of innovation-development and innovation-decision, the attributes of innovations as well as their rates of adoption, the various categories of adopters, and topics related to leadership and change agents and innovation in firms. Innovation is recognized to play an increasingly significant role in developing countries of Africa since it can link a new invention and its widespread adoption across all income groups, including individuals living in impoverished regions (Chunguang & Quayson, 2022). Rogers grounded his scholarly work on DOI in Schumpeter's economic development theory, where development is a distinct phenomenon that forever alters and displaces the existing equilibrium state and regards knowledge and technology as public goods that develop independently of the economic system (Schumpeter, 1934).

Grafström and Aasma (2021) defined a general economic theory that relied on Hayek's free market and Schumpeter's innovative entrepreneurship theory, including the drivers of and barriers to a circular economy transition. For sub-Saharan African leaders to enable the technology readiness and diffusion necessary for a successful transition to a circular economy to take root and be compelling, it should be adopted at all levels of the economy (micro, meso, and macro) and every stage of the value chain (Grafström et al., 2021); otherwise, it risks delegitimization (Panwar & Niesten, 2022). Further elaboration on the logical connections among critical elements of the framework to the study's purpose and its relation to the study approach, research questions, and research method is further explained in Chapter 2.

Nature of the Study

To ensure that the method aligned with the purpose of this research and provides adequate data for the research question, the nature of this study is qualitative. I used a qualitative approach because it is suitable for the "naturalistic perspective and interpretive understanding" of human experience and expectations (see Denzin & Lincoln, 2013, p. 10). Given that the purpose of the study requires an in-depth description of African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy, a novel and underresearched topic, an exploratory multiple case study (Yin, 2017) was applied to meet the goal of this research.

Qualitative research aligns with a worldview through the lens of the constructivist paradigm, and it can be used to explore people's individual experiences in a specific social and cultural setting (Cooper & White, 2012). Conversely, the quantitative research method was not relevant to this study because the exploratory multiple-case study does not investigate any statistical relationship and does not seek to manipulate any experimental variables (see Harkiolakis, 2017). Rich data can be understood as detailed, nuanced, and multilayered information with qualitative depth (Fusch & Ness, 2015).

According to Yin (2017), a multiple case study investigation allows the researcher to investigate phenomena through a replication strategy (Halkias et al., 2022). Yin also noted that the multiple case study design investigating a social phenomenon could entail an individual within a specific context as a separate unit of study. This study's central phenomenon is the individual, and the unit of analysis is the African public leadership

expert. In developing a study of individuals living within a community and not the whole of the community itself, the optimum qualitative design with the goal of theory extension is an exploratory, multiple-case study design (see Eisenhardt & Graebner, 2007; Halkias & Neubert, 2020). I recruited participants for this multiple case study using purposeful criterion and network sampling strategies (see Tracy, 2019).

Expert interviews are considered a standard research method in the qualitative paradigm (Bogner et al., 2018; Littig & Pöchhacker, 2014) in a poorly understood field (Bogner et al., 2018). Interviewing experts allowed me to collect rich data that helped quickly achieve data saturation (see Fusch & Ness, 2015). I recruited 14 subjects who met the following inclusion criteria: (a) adults over the age of 18 who have authored at least five peer-reviewed scientific papers or policy reports on the issue of African public leadership, technology diffusion, the green economy in Africa and diffusing the circular economy model in Africa; (b) have a minimum of 10 years of public leadership experience in a sub-Saharan African nation; (c) a terminal degree from an accredited institution; and (d) possess in-depth expert knowledge regarding the central topic of study (see Merriam & Tisdell, 2015).

The participation selection inclusion criteria ensured that the participants I recruited and interviewed possessed special knowledge as experts for the study's topic of interest and have relevant information to help meet the research purpose (see Bogner, 2018). Schram (2006) recommended a range of five to 10 participants for a qualitative study, stating that a larger sample size could be a barrier to an in-depth, qualitative investigation. Using the multiple case study design, I implemented the cross-case

synthesis method for data analysis to generate themes representing the convergence and divergence of participants' experiences within and between cases (see Yin, 2017). I triangulated interview data themes with data from reflective field notes and archival data in the form of current business, technology, and government reports relating to my study topic, to enhance the trustworthiness of the findings and make suggestions for further research (see Farquhar et al., 2020; Halkias et al., 2022).

Definitions

Circular economy: This term refers to an economic system that is restorative or regenerative by design, addressing global challenges (climate change, pollution, biodiversity loss, and waste) to prevent resource depletion, closing energy and material loops, and facilitating innovative and sustainable transitions (Ellen MacArthur Foundation, 2021).

Circularity principles: This term refers to a strategy to rethink current development methods, reroute the development path, and establish positive commitments that are directed by market systems and networks defined by intrinsic values and patterns of collaboration that are dependent on the interaction between institutional and material conditions, future technologies, and spatial economic transformation (Henrysson & Nuur, 2021).

Digital divide: The term refers to the disparity between individuals, households, businesses, and geographic areas at various socioeconomic levels regarding access to information and communication technologies (ICTs) and their use of the Internet for several purposes (Sanders & Scalon, 2021).

Inclusive growth: The term refers to economic growth dispersed equally across society and generates opportunity for all people (Hay et al., 2019).

Institutional drivers and barriers: This term refers to the multilevel regulatory structures of high-level directives and region-specific institutional environments that may support or hinder the transition to a circular economy model (Ranta et al., 2018).

Linear economy model: This term refers to the inefficient use of finite resources, which results in increased hazardous emissions and waste across the whole value chain, including resource extraction, manufacture, transportation, and consumption (Ezeudu & Ezeudu, 2019).

Public leadership expert: This term refers to persons who are characterized as having the knowledge and occupying a public office and serving and guiding the community as a whole to promote, influence, and deliver improved public value as evidenced by sustained social, environmental, and economic well-being in a complex and changing environment (Döringer, 2021; Vogel & Hesmert, 2021).

Status quo bias: This term refers to when individuals prefer to keep things the same by doing nothing or by adhering to a previous decision (Grafström & Aasma, 2021).

Sub-Saharan Africa: A region that consists of 46 out of the 54 countries in the African continent lying south of the Sahara Desert (Boon & Anuga, 2020).

Societal embedding: This term refers to co-creating socio-technical systems through the co-development of new technology that must be incorporated into enterprises

and markets, acceptable under applicable norms and standards, and accepted by a broad society, all of which involve collective articulation action (Magnusson et al., 2022).

Technology readiness: The term refers to people's willingness to accept and use new technology in their personal and professional lives, determined by a gestalt of mental facilitators and inhibitors that affect their proclivity to use new technology (Bakırtaş, 2017).

Technology diffusion: The term refers to the concept that the diffusion of information about a new technology innovation takes place within an ecosystem of stakeholders, institutions, and networks, as a co-evolving and multidimensional process that is influenced by both the social structure of the adopters and their degree of assortativity (Gruenhagen et al., 2021; Guerzoni et al., 2018; Magnusson et al., 2022).

Assumptions

Assumptions are those things taken for granted, and some aspects of the research are understood to be true (Merriam & Tisdell, 2015). This study was based on four assumptions. My first assumption was that the research would have the rigor to appease common concerns about the trustworthiness of the study's results in case study designs (see Anney, 2014). I created a detailed audit trail to further strengthen the trustworthiness of the study's results. Interview responses, historical literature, and reflective field notes were triangulated to answer the research question (see Guion et al., 2011).

The second assumption was that the recruited participants engaged actively, answered the questions during the interview truthfully, and knew the research topic. The latter was managed using inclusion criteria to screen participants' qualifications (see

Merriam & Tisdell, 2015). A detailed interview protocol and data triangulation further strengthened the trustworthiness of the study results (Yin, 2017).

The third assumption of this study pertains to using expert interviews in the data collection process. Due to their knowledge level, experts might frame the issue in a particular way and influence the understanding of the less knowledgeable researcher (Bogner et al., 2018). Therefore, the third assumption was that experts present their special knowledge comprehensively and coherently. The fourth and final assumption was that my own reflexivity was carefully managed throughout the research due to being an aspiring African leader looking to further develop sustainability strategies in my country. I attempted to mitigate my bias by interviewing subject-matter experts who brought many perspectives to my study's central topic (Eisenhardt & Graebner, 2007).

Scope and Delimitations

Rapid digital transformation redefines the global economy, changing how people study, work, trade, socialize, and access public and private services and information (World Bank Group, 2019). Nevertheless, today's leaders must navigate their organizations into the future global economy while providing innovative and sustainable solutions in both developed and emerging economies (Halkias & Neubert, 2020). However, extreme poverty in some regions of the world, particularly in Africa, and pervasive social challenges continue to impact global conversation (Ugwoji, 2022). Thus, unless significant efforts are made to promote circularity principles, most communities in sub-Saharan Africa will continue to struggle. Socioeconomic restrictions, inadequate

expert knowledge, and a lack of data have impeded its applicability and implementation in low- and middle-income countries (Ezeudu & Ezeudu, 2019).

Due to these shortcomings, current sustainability arguments urge a shift from linear to circular economy models, hence the need for the circularity idea. Recent research suggests that circular economy models may adopt places based on political, economic, social, demographic, and even sociological characteristics (Ezeudu et al., 2022). According to Ezeudu et al. (2022), the circular economy may revert the existing unsustainable development model and produce long-term wealth. Consequently, adopting circular economic models can assist sub-Saharan African nations in meeting their climate action and sustainable development commitments.

The scope of the study provides basic information about the project's depth and breadth (Mirza et al., 2013). The current study scope describes how African public leadership experts view how sub-Saharan African leaders may support technological readiness and the technology diffusion needed for a successful circular economy transition. The study's delimitation was about African public leadership experts' decision-making transformation from a linear to a circular economy defined within the study's scope. The case is the expert group's decision-making process and the factors influencing the shift from a linear to a circular economy.

It is critical to identify the case, where it culminates, and when replication logic rather than sampling logic must be applied in a case study (Yin, 2017). Thus, the replication process occurs when the unit of analysis, the African public leadership expert, was selected. By examining the interpretive component of expert knowledge, I hoped to

understand better how experts shape processes in various regional public organizations and are recognized as subject-matter experts in this area (see Döringer, 2021). In this study, a subject-matter expert possessed the specific knowledge that assisted me in achieving the study's purpose (see Bogner et al., 2018; Littig & Pöchhacker, 2014).

Rarely studied was how sub-Saharan African public leadership might embrace the digital and fourth industrial revolution (Dosso, Nwankwo & Travaly, 2021). A literature gap remains in the leadership and sustainability literature about how to successfully impact technology diffusion to promote a circular economy transition in sub-Saharan Africa (Chunguang & Quayson, 2022; Jayaram et al., 2021). The results of this study may help sub-Saharan African public leaders better understand how they can effectively implement policies on technology diffusion to support a circular economy transition and meet the UN's sustainability agenda by 2050 by supporting their readiness and gaining practical knowledge needed (Boon & Anyga, 2020; Dosso, Nwankwo & Travaly, 2021).

In this research study, the experts were recruited via network sampling and purposeful sampling and were defined with the following inclusion criteria: (a) adults over the age of 18 who have authored at least five peer-reviewed scientific papers or policy reports on the issue of African public leadership, technology diffusion, the green economy in Africa and diffusing the circular economy model in Africa; (b) have a minimum of 10 years public leadership experience in a sub-Saharan African nation; (c) a terminal degree from an accredited institution; and (d) possess in-depth expert knowledge regarding the central topic of study (see Merriam & Tisdell, 2015)

Limitations

Yin (2017) postulated that a research limitation is an aspect of the study process that the researcher has no control over yet, which affects the findings' interpretation. According to Ross and Zaidi (2019), a research study's quality and rigor are mainly defined by its limitations, especially how its interpretation accommodates such limitations. One of the study's limitations is that the selection of participants is tailored to specific inclusion criteria to narrow the study's scope, which may limit to whom the findings can be generalized, representing a systematic bias. Morse (2010), on the other hand, argued that the sort of sample chosen by a researcher should flow from and assist their inquiry into the questions posed. I employed purposeful sampling to get the most comprehensive information possible following the inquiry's purpose and fundamental questions and develop an interview guide based on the literature review and the study's purpose. Additionally, by cross-referencing the research goals and interview questions, researchers may bolster the research and ensure that the data obtained is credible and valid for the study's purpose.

Another limitation of this study is that a qualitative study's limited sample size may not reflect the entire population. However, according to Mason (2020), qualitative research is concerned with context rather than generating broad hypothesis assertions; the sample size in most qualitative studies should typically follow the concept of saturation when more data collection does not shed additional light on the topic under investigation. Participant observation or documentary analysis as part of in-depth interviewing research, according to Rubin and Rubin (2012), enhances the quality of interviews in various ways.

This study recruited 14 subjects, and a complete audit trail was developed and triangulated the interview responses, historical literature, and field notes to collect correct data that allowed to answer the research question. As a sort of triangulation, this combination of approaches may reveal additional contextual information, better interrater reliability, and transferability, which may mitigate the study's limitations.

The third limitation was data gathering, interview bias, and positionality bias. Interview or positionality bias arises when information is canvassed, documented, or evaluated via suggestive probes. This bias may be reduced by using a standard interview protocol (Jacob & Furgerson, 2012) to ensure consistency in the interviewer's engagement with the participants, thereby increasing the reliability of the findings and requiring oneself to be held accountable. Further, besides semistructured interviews, the study employed systemic reflexivity. Triangulation enables data validation by comparing results from multiple sources (Stahl & King, 2020). Combining the participant responses with reflexive notes aided in triangulating interview data with reflective field notes and archival data about the study topic, thereby enhancing the trustworthiness of findings and suggesting areas for further research (see Farquhar et al., 2020; Halkias et al., 2022).

I used a multiple case approach for this study that allowed for a more in-depth understanding of the research question and ensured its trustworthiness, mitigating the qualitative research limitation and ensuring that the research findings are credible, transferable, dependable, and confirmable (Stahl & King, 2020).

Significance of the Study

Significance to Practice

While authors have recently noted that systemic circular economy transition efforts require engagements with multiple stakeholders, empirical research on how public leaders diffuse the needed technology for a transition to a circular economy within sub-Saharan African countries remains scarce (Velter et al., 2020; Zoogah, 2022). Exploring how public leaders in sub-Saharan nations may effectively enact policies on technology diffusion needed to support a circular economy transition may help African nations to meet the UN's sustainability agenda by 2050 and secure the long-term livelihoods of sub-Saharan Africans (Signé, 2020). The results of this multiple case study and its implications for professional practice may help inform African public leaders to support their readiness and gain the practical knowledge needed to enact policies to drive the circular economy transition (see Boon & Anyga, 2020; Dosso, Nwankwo & Travaly, 2021).

Significance to Theory

There is a dearth of studies in the scholarly literature on how sub-Saharan African public leadership can embrace the digital and fourth industrial revolution (Dosso, Nwankwo & Travaly, 2021). A literature gap remains in the leadership and sustainability literature about how to successfully affect technology diffusion to support a circular economy transition in sub-Saharan Africa countries overwhelmed with fundamental sustainable development challenges (Chunguang & Quayson, 2022; Jayaram et al., 2021). This study may be significant to theory extension by contributing original, qualitative

data to the literature on how sub-Saharan African leaders can enable the technology diffusion needed for a successful transition to a circular economy (see Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021).

Significance to Social Change

The gap among multiple streams of research and policy is founded on the lack of research on how sub-Saharan Africa's public leadership can successfully launch, diffuse, and maintain a circular economy model within their nation to strengthen economic development and social and environmental sustainability (Grafström & Aasma, 2021; Dosso, Nwankwo & Travaly, 2021). Today, 600 million Africans live daily without energy access, and 36% of the continent's population is living with challenges to daily livelihoods affected by widespread poverty, hunger, food insecurity, limited access to education and healthcare, and often devastating climate change impacts such as long-term droughts and poor water management (Sima et al., 2021). While the concept of circular economy has received wide recognition as a feasible global accelerator of sustainable development, achieving a circular economy in Africa to meet the UN's sustainability agenda by 2050 is impossible without the necessary broader technology diffusion (Mutezo & Mulopo, 2021). This study's results may drive positive social change in sub-Saharan Africa by informing African public leaders on the knowledge needed to enact policies on technology diffusion needed to support a circular economy transition to support their nation's sustainable development.

Summary and Transition

Chapter 1 provided an overview and background for the study, the problem statement, the purpose, the research question, the conceptual framework, and the study's nature. The chapter includes definitions, assumptions, the scope and delimitations, limitations, significance, and a summary. This qualitative multiple case study aims to describe the perspectives of African public leadership experts on how sub-Saharan African leaders may foster the technology readiness and dissemination necessary for a successful transition to a circular economy. The findings of this study may assist sub-Saharan African public leaders in better understanding how to implement policies on technology diffusion effectively to support the transition to a circular economy and meet the UN's sustainability agenda by 2050 by enhancing their readiness and acquiring necessary practical knowledge.

Chapter 2, I present the literature review, strategy, and the two concepts adopted to frame and align this study's purpose. The literature review includes the technological readiness and expertise required to adopt policies to enable a circular economy transition that will assist African nations in meeting the UN's sustainability goals and securing the long-term livelihoods of sub-Saharan Africans.

Chapter 2: Literature Review

The specific management problem was that little is known about how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy (see Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021). While authors have recently noted that systemic circular economy transition efforts require engagements with multiple stakeholders (Salvioni & Almici, 2020; Velter et al., 2020), empirical research on how public leaders diffuse the needed technology for a transition to a circular economy within sub-Saharan African countries remains scarce (Zoogah, 2022). Sub-Saharan Africa is not yet ready to embrace the digital and the fourth industrial revolution (Dosso, Nwankwo & Travaly, 2021).

There remains a literature gap about technology readiness and effective technology diffusion to support a circular economy transition in West and East African countries, now overwhelmed with sustainability problems (Chunguang & Quayson, 2022; Jayaram et al., 2021). While authors have recently noted that systemic circular economy transition efforts require engagements with multiple stakeholders, empirical research on how public leaders diffuse the needed technology for a transition to a circular economy within sub-Saharan African countries remains scarce (Velter et al., 2020; Zoogah, 2022).In this qualitative, multiple case study I aimed to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. The literature review of this chapter includes a synthesis of knowledge and

scholarly work regarding the following topics: introduction to technology innovation and circular economy readiness in Africa, transition to a circular economy within sub-Saharan African countries, green economic change and circular innovation in Africa, and the role of African public leadership and the transition to a circular economy.

Literature Search Strategy

A literature review is a suitable method for gathering and integrating prior research results to provide evidence on a contextual and identify areas requiring further study. Regardless of the subject, it is the foundation of all academic research to expand and relate to current knowledge (Snyder, 2019). As a result, the literature search technique section discusses the library databases and search engines used to locate the materials for the literature review. The materials highlighted are peer-reviewed publications, industry research, e-books, and Ph.D. dissertations. The following covers the method of doing a literature search and the outcomes.

I conducted the literature review using the Walden University Library and Google Scholar databases. Emerald Insight, ABI/INFORM, ACM, ProQuest, Business Source Complete, IEEE Xplore, Science Direct, and Sage Premier were used to conduct literary searches on journal papers, seminal publications, books, dissertations, and archival material for methodology. Most of the resources reviewed in this study were published between 2017 and 2022. A total of 200 materials were chosen for this study, and 173 (87%) were included in the literature review. Between 2017 and 2022, 99% of the literature review materials are recent articles (less than 6 years).

Table 1 below highlights the number of resources analyzed in this study, categorizing them according to age and type, and Table 2 below highlights the number of resources by subjects and shows 68% of peer-reviewed papers.

Table 1

Numbers of Resources by Type and Age of Reference

Age of References	2017-2022	2009-2016	2003-2008	1934-2002
Peer-Reviewed articles	108	14	5	2
Conference Papers	5	0	0	0
Industry's Reports	10	0	0	0
Magazines / Blogs	1	0	0	1
Ph.D. Dissertation	3		0	0
Books	8	10	2	4
Total	135	24	7	7

Table 2

Numbers of Resources by Topic

Topics	Peer-reviewed articles	Conference papers	Books	Ph.D. Dissertation	Industry's reports	Magazines and blogs
Technology readiness and diffusing the circular economy in sub-Saharan Africa	100	4	4	3	10	2
Methodology	20	1	19	0	0	0
Theory	9	0	1	0	0	0
Total	129	5	24	3	10	2

Numerous scholars have demonstrated a significant divide between knowledge and policy action regarding the circular economy and the role of DTs in supporting the CE. Nonetheless, the views of African public leadership experts on how sub-Saharan African leaders might foster the technological readiness and diffusion necessary for a successful transition to a circular economy have been virtually neglected.

The keywords and databases searched included: *sub-Saharan Africa and circular economy, sustainability in Africa, sustainable development goals, challenges of technology diffusion in Africa, digital divide, Inclusive growth, public leadership, diffusion of innovations (DoI), rapid technology diffusion in Africa, circular economy transition, technological innovation, digital policymaking research, broad diffusion of 4IR technologies, technology readiness,* and *digital readiness*. The above keywords were combined to develop an integrative review (see Torraco, 2016). Specialized journals on the topic of sustainable development, circular economy transition, and technological innovation in Africa were used.

Search terms I used to enhance the study's methodology and conceptual framework included the following: *circular economy, circular economy business model, sustainability in Africa, technology diffusion in Africa,* and *transition from a linear economy to a circular economy*. The search terms guided the discovery of relevant scholar publications in several sources across many disciplines of literature to locate peer-reviewed works on the subject and validate the necessity for this study's rationalization in various search engines and databases. The keywords were used separately and conjunction with Walden University's online library and Google scholar to

locate peer-reviewed papers. Research on technology readiness and technology diffusion in sub-Saharan African literature is vital now because an effective and well-conducted review is a crucial component of research that might help advance knowledge, facilitate theory creation, and establish conceptual models and frameworks for the development of new theories and concepts (Snyder, 2019).

Conceptual Framework

For a more in-depth understanding of policy complexities in current regional innovation debates on the diffusion of the circular economy in sub-Saharan Africa by this study, I developed a conceptual framework that accounts for factors of economic geography in the diffusion of the innovation process within the countries of East and West Africa regions. This study was framed by two key concepts that focus on the African leaders' capabilities to enable technology readiness and the technology diffusion needed for a successful transition to a circular economy: (a) Rogers's (1995) concept of diffusion of innovations, and (b) Grafström and Aasma's (2021) concept of the circular economy.

Rogers's (1995) definition of innovation explains it as an idea, a practice, or an object that an individual or other adopter perceives as new; it considers the processes of innovation-development and innovation-decision, the attributes of innovations as well as their rates of adoption, the various categories of adopters, and topics related to leadership and change agents and innovation in firms. Innovation is recognized to play an increasingly important role in developing countries of Africa since it can link a new invention and its widespread adoption across all income groups, including individuals

living in impoverished regions (Chunguang & Quayson, 2022). Scholars argue that developing African countries still register a gap in the relationship between general technology diffusion and innovation (Santos & Halkias, 2021).

Rogers (1995) grounded his scholarly work on DOI in Schumpeter's (1934) economic development theory, where development is a distinct phenomenon that forever alters and displaces the existing equilibrium state and regards knowledge and technology as public goods that develop independently of the economic system. In Schumpeter's theoretical description, he searched for how innovation is driven within an economic system, which he famously defined as 'new combinations' which disrupt the equilibrium of a steady state (Becker et al., 2012). The pervasive impact of diffusing the circular economy as innovation to create a more sustainable environment in sub-Saharan Africa must first follow radical innovation in technology diffusion and disrupt business models across the continent's developing economies (Andersen & Lema, 2022).

Grafström and Aasma (2021) defined the circular economy as a dynamic, integrative economic system representing a paradigm shift toward a regenerative and restorative economic system. The circular economy business model maximizes resource utilization and waste reduction while simultaneously enabling the opportunity for innovative value creation and promoting sustainable development. Grafström and Aasma used a general economic theory that relied on Hayek's free market and Schumpeter's innovating entrepreneurship theory, including the drivers of and barriers to a circular economy transition.

Drivers and barriers to a circular economy transition were first developed into a framework by de Jesus and Mendonça (2018) to establish a theoretical foundation for comprehending the broad concept of a circular economy. As a result, the authors argued that the barriers are prone to depend on and inter-connect, as any of these four categories of barriers is possibly sufficient to prevent the development of a circular economy system. For sub-Saharan African leaders to enable the technology readiness and diffusion necessary for a successful transition to a circular economy to take root and be compelling, it should be adopted at all levels of the economy (micro, meso, and macro) and every stage of the value chain (Grafström et al., 2021); otherwise, it risks delegitimization (Panwar & Niesten, 2022).

As a result of a thorough understanding of significant trends in practice, the drivers and barriers to such transformative reform from a linear economy to a viable circular economy are of policy interest (de Jesus & Mendonça, 2018). Scholars contended that a more nuanced theoretical understanding of the specific environmentally friendly innovation pathway and business models required for a transformative and widespread circular economy transition that eliminates specific traditional institutional systems is needed (Panwar & Niesten, 2022). In this context, learning from other nations and recognizing the diversity of issues encountered by different sectors is critical for successfully implementing a circular economy at the national level while minimizing barriers to sustainability (Grafström et al., 2021; Masi et al., 2018).

Literature Review

Introduction to Technology Innovation and Circular Economy Readiness in Africa

The circular economy principles may support and be supported by new enabling technological innovation while also contributing to organizational and societal sustainability through various new business models for frugal innovation and the circular economy model (Vaska et al., 2021). With global concern growing about how to mitigate the effects of climate change, an increasing number of governmental, public, and private sector organizations are incorporating the circular economy concept into their organizational processes (Mutezo & Mulopo, 2021). These circular economy principles can effectively support the United Nations' broader SDGs, which need concurrent economic growth, environmental conservation, and societal well-being in underdeveloped nations by deploying digital technologies (Bai et al., 2022). Because digital technologies have the propensity to disrupt the status quo and may be used to drive technological progress, they provide the potential to integrate goods and services across functional, organizational, and geographic boundaries, as well as enhance the pace of change and lead to significant transformation in a variety of sectors (Vaska et al., 2021).

Technological advancements have altered how industries work in developing and developed nations (Bakrtaş, 2017). This is because new digital technology increases organizations' efficiency and effectiveness and is considered a solution for implementing the circular economy (Uçar et al., 2020). Digital technologies have also transformed the way organizations function globally, ushering in the notion of I4.0 (fourth industrial

revolution technology innovation) into organizations' ecosystems (Vaska et al., 2021). Bai et al. (2022) explored how innovative and disruptive Industry I4.0 technologies and the circular economy transition may assist in meeting the UN's SDGs. The study findings suggested that I4.0 technologies positively impact the sustainability paradigm when implemented with circular economy standards.

Similarly, Agrawal, Wankhede, Kumar, Luthra & Huisingh (2021) and Agrawal, Wankhede, Kumar, Upadhyay & Garza-Reyes (2022) postulated a shift from a linear to a circular economy by examining the relevance of I4.0 and circular economy in the logistics and supply chain arena based on several parameters of digital technology strategies and principles. In a second study, the authors investigated the directions in the nexus of circular economy and sustainable business performance (SBP) in digitalization. In both studies, the authors found that the development of I4.0 technologies contributes to sustainable development and creates a truly sustainable, equitable society by increasing the efficacy and efficiency of SDGs solutions to accelerate the transition to circular economy and digitalization. As a result, circular economy practices confirm the crucial role in integrating digital technology and the SDGs by reducing, recycling, and enhancing the reuse of production materials and prolonging their life cycle and value (Bai et al., 2022).

Furthermore, experts noted that when blockchain-enabled circular supply chain mechanisms were combined with the circular economy principle in an organization's supply chain model, it enabled the new potential for improving sustainable development initiatives in supply chain operations (Orji et al., 2022). In addition, Orji et al. (2022)

suggested that blockchains are considered the technology that connects complex

networks and databases and allows automation where needed, including when circularity

concepts are used. There are a lot of I4.0 technologies that will become increasingly

reliant on internet access in the future, so investing in physical and digital infrastructure

in Africa is important, resolving other significant difficulties confronting Africa's

economies, individuals, and governments in the post-Covid- 19 era. Consequently,

Africa's technological innovation and broadband internet connectivity requirements are

critical in the circular economy transition (Signé, 2020).

Bakrtaş (2017) defined *technology readiness* as a combination of positive and

negative feelings about an individual's proclivity to embrace and use new technological

products and services to accomplish goals in both personal and professional life. The

author's study adapted the Technology Readiness Index scale to measure four factors

(optimism, innovativeness, discomfort, and insecurity) to test people's tendency to

embrace and use new technologies and found that people's beliefs and attitudes toward

new technology dimensions affect organizations. However, the digital economy

proliferates in developed nations, while emerging countries only receive a small portion

of this increase (Nwaka, 2021). Digital technology is expected to be a significant driver

of productivity, with developed economies requiring more digitally skilled workers than

in the past (World Bank Group, 2019).

Most societies, including sub-Saharan Africa, confront varying economic,

political, and environmental challenges (Ugwoji, 2022). Nonetheless, Africa is expected

to accelerate its advancement into revolutionary technological frontiers that create the

enabling environment, including digital technologies and socio-economic development shaped by the 2030 SDGs required (Infrastructure Consortium for Africa (ICA), 2017; Ugwoji, 2022). Magnusson et al. (2022) stated that transitioning to the circular economy depends on systems built on enabling technologies. As a result, technological innovation can be a crucial enabler of the transition to a circular economy by improving the sustainability paradigm (Opene, 2021). Moreover, there is no location on the planet where the issues these new technologies can tackle are more extensive than on the African continent (Nwaka, 2021).

For its part, Africa does not have to duplicate the technological errors made by other regions when creating new infrastructure, which has necessitated massive global efforts and collaboration to establish suitable solutions (ICA, 2017). Instead, Africa has the potential to stimulate growth by instituting fundamental changes through the use of new and developing approaches based on integrative infrastructure using cutting-edge technologies, materials, and processes to help the continent advance national development, protect the environment, foster circularity, and promote sustainable development (Ugwoji, 2022; Vaska et al., 2021). Several extant and new technologies present an opportunity for the African continent's transformation. The African continent is eager to leverage these technologies to advance its socio-economic development programs and establish itself as an essential actor in the knowledge economy (Nwaka, 2021).

Consequently, to remain competitive, the legal and regulatory frameworks necessary to promote circularity are still in their infancy in most African nations since

mechanisms for achieving the transition to green economies are frequently absent (Desmond & Asamba, 2019). The challenge is whether the continent's leadership will make the necessary investments to maximize emerging technology's benefits and proactively manage possible risks (Nwaka, 2021). According to the World Bank Group (2019), rapid digital transformation redefines the global economy, touching every industry and facet of everyday life, transforming how we study, work, trade, socialize and access public and private services and information. In other words, emerging nations, notably sub-Sahara Africa, could proactively invest in the critical components of their digital economies' transformation. According to the World Economic Forum, traditional African organizations are slowly adopting digital technology and circularity platforms to enhance productivity and sales in today's digital startups, with 46% of work activities in sub-Sahara Africa susceptible to automation (World Bank Group, 2019).

However, the relative diffusion patterns may vary in how the surrounding socio-economic systems shape the diffusion designs (Magnusson et al., 2022). Understanding the technological dualism between different socio-economic statuses is critical to developing effective strategies for the successful diffusion of technological innovations in impoverished sub-Saharan African countries (Santos & Halkias, 2021). Digitalization is being held back by a lack of digital literacy and digital skills in the workforce. Also, inadequate legislative and regulatory frameworks hinder Africa's digital economy in data protection, cyber security, and competitiveness (World Bank Group, 2019). Many academics and practitioners postulated that the circular economy model is a

practical way for organizations to practice the much-debated conception of sustainable development (Kirchherr et al., 2017).

As a novel economic system, the "Circular Economy" intends to reduce resource depletion, eliminate energy waste, increase resource efficiency, extend lifespan, promote sustainable growth, and close the loop by integrating economic actors in symbiosis at the micro (enterprises and consumers), meso (eco-industrial parks), and macro (cities, regions, and national governments) levels (Kirchherr et al., 2017; Mishra et al., 2019; Tan et al., 2022), to accomplish sustainable development goals (SDGs). SDGs benefit present and future generations by preserving and improving the environment, increasing economic prosperity, and ensuring social equity (Geissdoerfer, Pieroni et al., 2020; Geng et al., 2019). The macroeconomic potential of a CE has been predicted to reach over $600 billion per year globally by 2025 (0.71 percent of global GDP), owing to various factors, including net material and energy cost savings and enhanced volatility and supply mitigation (Grafström & Aasma, 2021).

According to Hindocha et al. (2021), the capacity to provide new and innovative solutions for underserved consumers, generally in low- and middle-income cultures, can help create a more sustainable and inclusive world by fostering a more circular economy. Additionally, researchers have recommended that organizations seeking resource efficiency should cultivate a frugal culture inside their domain, which means rebuilding their value chain to work in circularity and establishing critical ecosystem infrastructures through the adoption of digital technology and circular economy paradigms (Ezeudu et al., 2022; Tan et al., 2022). If used efficiently, digital technology like big data, artificial

intelligence (AI), blockchain, the Internet of things (IoT), Industry 4.0, cloud computing, and digital fabrication (DF) may allow organizations to migrate away from a linear economics approach to circular economy by potentially speeding up the adoption of end-of-life strategy implementations (Chauhan, 2022; Khan et al., 2022; Vaska et al., 2021).

Information technology (IT) systems become more critical as the economy transitions from a product-focused economy to one based on services and less reliant on natural resources (de Jesus & Mendonca, 2018; Grafström & Aasma, 2021). Panwar and Niesten (2022) suggested that fostering the circular economy required a three-pronged approach focused on jump-starting, diffusing, and sustaining it. circular economy enormous momentum shows that it may be capable of going beyond existing sustainable development initiatives. However, to have an impact, circular economy should be considered a fundamental systemic shift, not a modest tweak to the status quo (Kirchherr et al., 2017). Further, recent research has shown that circular economy models may be employed flexibly to identify the suitability of adopting areas based on their political, economic, social, demographic, and sociological features and even building knowledge-sharing routines and ecocentric dynamic capacities (Ezeudu et al., 2022; Köhler, Sönnichsen & Beske-Jansen, 2022).

It is critical for emerging economies, like advanced economies, particularly sub-Saharan African countries, to transition progressively away from current linear development models, which are frequently referred to as the 'take-make-dispose' development model (Ellen MacArthur Foundation, 2021), and toward circular economy business models by focusing on new dynamics specific to developing countries (Boon &

Anuga, 2020; Mishra et al., 2019). Transitioning to circular economy is vital because it has the potential to help sub-Saharan Africa meet some of its climate action and sustainable development responsibilities while also promoting innovation, sustained growth, and job creation, all of which improve people's quality of life (Androniceanu et al., 2021; Folarin, 2022). Simultaneously, the Fourth Industrial Revolution (4IR) and the pervasiveness of technologies 14.0 compelled or encouraged the adoption of new policy and regulatory measures (Dosso, Nwankwo & Travaly, 2021), expanding social and economic potential in Africa (Ugwoji, 2022).

Transition to a Circular Economy within Sub-Saharan African Countries

African societies could thrive through sustainability by avoiding depraved behavior, such as resource destruction that could jeopardize future generations or ecological pollution, and advancing preservation practices in nature's potentialities and resources can help African societies to develop (Zoogah, 2022). New and developing technologies, materials, and technology-enhanced processes and systems provide many opportunities for agricultural and industrial modernization in Sub-Saharan Africa (Dosso, Nwankwo & Travaly, 2021). According to Omeiza-Michael (2021), an increasing number of governments in developing and emerging economies, including Sub-Sahara Africa, recognize the circular economy model as a powerful tool for sustainable development and long-term job creation, reduced greenhouse gas emissions, and increased climate change adaptability.

While the number of organizations adopting circular economy principles has expanded significantly, industrial revolutions have yet to materialize, despite the circular

economy's widespread acclaim (Panwar & Niesten, 2022). These challenges suggest that the potential for sustainable development in a circular economy remains untapped since the transition to a circular economy has not been adequately promoted or implemented (Omeiza-Michael, 2021). Additionally, scholars argued that most African nations lack the necessary support of formal institutions and legal and regulatory frameworks essential to enable circularity, owing to the slow or non-existent implementation of mechanisms for transitioning to circular economy (Ezeudu et al., 2022; Grafström & Aasma, 2021; Panwar & Niesten, 2022). Grafström and Aasma (2021) argued that achieving this circular model will need cyclical and regenerative environmental advancements in society's regulation, manufacturing, and consumption.

The circular economy literature has tended to place a greater emphasis on the availability of technology enablers. Despite numerous critical technology advances, multiple studies have found that those who utilize these solutions lack in-depth knowledge and expertise to appropriately transform their organization for participation in the circular economy (de Jesus & Mendonça, 2018; Tan et al., 2022; Tura et al., 2019). For instance, in Sub-Saharan Africa, circular economy technology may be built on specialized technologies outside the organization's domain of expertise (Grafström & Aasma, 2021). However, the African continent is at the beginning of the Fourth Industrial Revolution (4IR) (Dosso, Nwankwo & Travaly, 2021). This profoundly transformational global process is already reshaping the trajectories of our societies, economies, and cultures at the convergence of digital, physical, and biological systems.

The 4IR (digital infrastructure and ecosystem) is already disrupting our education, labor, production, business, and innovation systems in unique ways to the digital transition in African economies (Bai et al., 2022). Technological innovation is perhaps the most significant factor driving globalization and global growth, and socio-economic and ecological challenges in Africa need creating and diffusing new technologies. Bai et al. (2022) contended that the circular economy might be an effective strategy for integrating 4IR technology into practices and businesses to boost circularity toward sustainability. Compared to developed nations, most African nations have a poorer capability for 4IR than advanced economies (Signé, 2020). This deficit will be the case unless sufficient infrastructural, financial, and skilled human capital are trained in the short and long term (Dosso, Nwankwo & Travaly, 2021)

Global trade flows, including exports from developing countries, are increasing because of the emergence of contemporary actors ushered in by digital technology breakthroughs that advance the circular economy concept and provide an alternate path toward sustainable development (Orji et al., 2022; UNCTAD, 2021). Digital transformation is disrupting governments' social and environmental objectives. However, it is viewed as the best process to reach sustainable development goals (SDGs) by adopting circular economy practices, which are the most promising means of achieving economic and environmental sustainability in different countries (Geissdoerfer, Pieroni et al., 2020; Roy et al., 2022), particularly in emerging economies (Orji et al., 2022).

Conversely, disruptive 4IR technologies such as AI, big data, the Internet of Things (IoT), and cloud computing are causing a seismic shift on the African continent

(Bai et al., 2022; Grafström & Aasma, 2021). Orji et al. (2022) indicated that despite the multiple benefits of incorporating circular economy principles, developing economies, mainly African emerging markets, have been reticent to adopt circularity for predicted performance gains. Additionally, Orji et al. argued that this might be due to the pressing need to achieve sustainable development goals in such nations, characterized by a lack of efficient technology and materials for operations.

A comprehensive national strategy on the 4IR is critical for diffusing technological innovation that can affect the economy, society, and the environment and positively enhance circular economy performance by achieving sustainable development outcomes, considered an African Union vision-action plan (Bag, Gupta, & Kumar, 2021). Consequently, digital technologies such as blockchain or AI have the potential to solve many global issues, including those related to circular economy transformation, which replaces the 'end-of-life' approach with the principles of reducing, reusing, recycling, and recovering (Chauhan, 2022). Thus, digital technology can significantly impact business and society, bringing about profound changes through the growing circular and sharing economies (Vaska et al., 2021). As a result of globalization, sub-Saharan African nations may take advantage of the opportunity to acquire foundational solid and digital skills to unlock the prospects of the digital economy (Zeufack et al., 2021). At the same time, Africa's circular economy "readiness" should be seen from a sustainable development perspective, which includes global concerns (poverty alleviation, climate change, sustainable natural resource management, and biodiversity protection) (Agrawal, Wankhede, Kumar, Upadhyay & Garza-Reyes, 2022).

Sustainable development, which outlined 17 goals for sustainable development for all countries by 2030, is viewed as a benchmark for achieving long-term sustainability, reducing poverty, and fostering social progress in all areas of life and society (Omeiza-Michael, 2021; Ugwoji, 2022), and advancing a more circular economy (Ezeudu et al., 2022). It is possible to create sustainable development by tackling these corrective concerns by expanding social and economic possibilities within African nations and local communities (Ugwoji, 2022). Conversely, it is vital to invest in technological infrastructures and businesses to bolster Africa's resilience and circular economy readiness, particularly in broader digital infrastructures, ICT technologies, tech ecosystems, or startups (Signé, 2020), because significant social and economic vulnerabilities are associated with failing to capitalize on new technology innovations (Nwaka, 2021).

For Uçar et al. (2020), digital technology performs two key roles: enabler and trigger, in the transition from a linear economy to a circular economy, with the primary aspects supporting these roles being data collection, data exchange, and data storage and analysis. This linear economy model has resulted in an economy heavily reliant on energy and other scarce resources to generate and transport goods and services, resulting in environmental deterioration (Androniceanu et al., 2021). Mutezo and Mulopo (2021) reviewed the literature and assessed whether Africa's energy transition is enabled and steered by circular economy principles. The findings indicated that industrialization and population growth would drive Africa's energy demand, which is expected to accelerate significantly over the next decade. Mutezo and Mulopo (2021) noted that incorporating

and contextualizing circular economy business models might aid African nations in adopting renewable energy and transitioning to a more sustainable energy system.

Given the importance of the circular economy and digital technology, practitioners and academics advocated the role of the necessity of reforms that address digital infrastructure gaps, concentrating on the creation of more inexpensive but also skill-building solutions for all sectors of society to improve digital technology adoption and create skills base readiness to utilize internet prospects for more and better opportunities in Sub-Saharan Africa (Zeufack et al., 2021). Furthermore, researchers noted that digital technology and the need to develop and diffuse it are now integral aspects of several policy agendas on the African continent, including more comprehensive public policy efforts entrenched in today's global poverty alleviation measures and improved design of product-service systems, such as the integration of circular economy and Industry 4.0 (14.0) concepts and approaches, can assist the African continent in progressing toward sustainable societies and overcoming developmental challenges (Agrawal, Wankhede, Kumar, Upadhyay & Garza-Reyes, 2022; Bag, Gupta, & Kumar, 2021; Ndemo & Weiss, 2017)

Green Economic Change and Circular Innovation in Africa

The principles of circular economy and green economy have the same underlying premise as they integrate or transition the present linear economy model based on the legend "take, make, and dispose of" into a circular economy model that is more environmentally sustainable (Santeramo, 2022). The circular economy is a reaction to the aim for sustainable development and so is recuperative or reformative in intent and

method by integrating three key characteristics of industrial waste management: reduce, reuse, and recycle into the process of production and consumption, to minimize resource depletion (Bag, Yadav, et al., 2022). Ostentively, many green economy principles can be found in circular economy, such as reducing material and energy inputs in the production process and recycling and reusing materials, making supply chains greener, or sharing ownership (D'Amato & Korhonen, 2021). However, technology solutions play a significant role in achieving the green economic change required to support such circularity to assure economic growth for African nations (D'Amato & Korhonen, 2021; Obobisa et al., 2022; Santeramo, 2022).

Aligning environmental challenges with economic growth has been an effective business strategy and policy aim globally, particularly in the last 10–15 years (Andersen et al., 2021), to achieve the objective of sustainable green economic development (Jin et al., 2022). Recent policy approaches by African governments to achieve sustainable development objectives focus on achieving and enhancing energy efficiency in green economic transformation (Andersen et al., 2021; Tachega et al., 2021). Globalization and unprecedented economic developments in Sub-Saharan Africa have been empirically connected to a heavy dependency on nonrenewable energy sources for commercializing products and services in Africa (Ibrahim et al., 2021; Obobisa et al., 2022).

In emerging countries, economic growth usually comes at the expense of natural resources and the ecological environment, resulting in environmental deterioration and resource depletion that affects human wellbeing and the planet (Liu & Dong, 2021). Consequently, the consumption of conventional energy sources such as petroleum, coal,

and natural gas, prevalent in sub-Saharan Africa, contributes to environmental deterioration in the region (Ibrahim et al., 2021; Sakai et al., 2022). Nonetheless, Africa is endowed with an abundance of renewable energy sources that may assist in satisfying the continent's demand for electricity to promote economic growth and achieve global objectives for greenhouse gas emissions, the principal causes of climate change and global warming (AbouSeada & Hatem, 2022; Obobisa et al., 2022).

Conversely, for instance, African nations focus on economic policies and initiatives designed to enhance economic growth. This drive for economic advancement is associated with energy consumption threatening environmental quality (Obobisa et al., 2022). Specifically, the quality of life is at risk, and the prospects for future success in aligning environmental challenges with economic growth and circular innovation in Africa may be weakened (Andersen et al., 2021; Ibrahim et al., 2021). Nonetheless, most emerging nations, such as sub-Sahara Africa, have prioritized sustainable economic growth (Egbetokun et al., 2020). According to Ali et al. (2021), fossil fuels and industrial activities emitted 65 percent of global greenhouse gas emissions in 2010. Consequently, limiting carbon emissions has become a significant priority for many nations worldwide, and the development of green technology innovation has become crucial in fostering the transition of global economic development (Obobisa et al., 2022). As a result, worldwide agreement on green and sustainable development is essential if economic growth coexists with environmental protection (Ma & Zhu, 2022).

In addition to increasing recognition among international organizations and governments, the green economy has also garnered considerable scholarly interest,

particularly in the recent decade (Ali et al., 2021). Diverse research suggests that green growth promotes economic development through environmental protection and employment creation (Jin et al., 2022) for most developing nations, especially in sub-Saharan Africa (Nandy et al., 2022). Sakai et al. (2022) analyzed ways to introduce a green economy into the sustainable palm oil industry so that it may coexist with biodiversity and environmental protection to pursue sustainable development goals (SDGs) for human wellbeing. Ali et al. (2021) used the SWOT analysis technique to examine Ghana's readiness to transition to a green economy. The researchers found that Ghana has much to achieve from its rising interest in environmental preservation, cross-border cooperation, worldwide attention to climate change, and business interests in driving the development and transfer of green technology, poverty reduction, and efforts to reduce illiteracy.

Egbetokun et al. (2020) utilized Nigeria as a case study to analyze the impact of environmental pollution, climate change, and institutional quality on global economic development between 1970 and 2017 and found that Nigeria's green growth may be achieved. Ma and Zhu (2022) analyzed the effects of the digital economy on high-quality green development and green technology innovation, which might serve as decision-making resources for policymakers and professionals seeking to boost green development in developing economies. Lin and Sai (2022) studied the performance of Africa's energy generation and its potential for emission reduction and advocated the importance of financial deepening in achieving a more sustainable environment in developing countries. Obobisa et al. (2022) used a panel time-series data from 2000–to 2018 to analyze the

influence of green technology innovation and institutional quality on CO2 emissions for 25 African nations. Based on their study results, the authors recommended that African governments enhance investment in green technology and renewable energy initiatives. The significance of increasing government spending on research and development and the educational sector is to sustain the momentum of the dual advancement of technology and human resource exploitation, leading to green economic development in emerging countries (Jin et al., 2022).

Adopting disruptive digital technology symbolizes an emerging high-quality green development industrial revolution (Liu & Dong, 2021; Ma & Zhu, 2022). Africa has some of the most abundant renewable energy resources (Obobisa et al., 2022). Despite this, there are considerable gaps in technology innovation, and most African countries are typically far from technological advances. Africa is plagued by precarious technological inefficiencies, resource depletion, inadequate infrastructure, and adverse externalities from changing climate. Moreover, as African economies expand, it is anticipated that deteriorating environmental circumstances will arise as the continent's energy demand continues to soar, affected by economic growth drivers, population increase, and end-users' energy consumption patterns (Tachega et al., 2021). Thus, any advancement in digital technology innovation and production process adjustments would aid in reducing environmental emissions in emerging markets, notably sub-Sahara Africa (Tachega et al., 2021; Wang, 2021; Wanke et al., 2021).

Consequently, digital technology innovation complements climate change and environmental sustainability, which could help reduce environmental emissions in

African countries. Also, renewable energy sources are needed to minimize carbon emissions and achieve carbon neutrality in Africa (Obobisa et al., 2022). A greener economy implies more innovative, inclusive, and sustainable growth. Green investments entail creating new technologies and expertise to improve efficiency and sustainability, ultimately leading to increased production (Ali et al., 2021). These narratives can be adequately achieved when new sustainable technology concepts are developed with skilled expertise.

Sustainable development in sub-Saharan Africa is achievable through a CE model that uses green economy technology that reuses as feasible as possible (Desmond & Asamba, 2019; Garca-Sánchez et al., 2021; Nandy et al., 2022). Product-service systems have also been recognized as an essential business model innovation for attaining digitalization-enabled circular economy (Chauhan et al., 2022). In addition to promoting the development of green economic change and technology advancement, quality institutions may also help promote environmental protection measures to minimize CO2 emissions and enhance the quality of the environment (Obobisa et al., 2022). However, the circular and green economy goal is promising for the future, and this agenda is predicted to have widespread implications in all aspects of the economy and advocates for strong institutions, paradigm shifts in circular innovation, and business models dynamics for greening in Africa (Andersen et al., 2021; Santeramo, 2022).

The Role of African Public Leadership and the Transition to a Circular Economy

Transitioning to a circular economy involves strategic infrastructure investments and policy consistency, coordination, and collaboration across sectors and governance

levels (Ddiba et al., 2020). The public sector is crucial to the circular economy transition

as a policymaker and a significant purchaser, consumer, and user of products and services

(Klein et al., 2020). Organizational leadership in public administration (Vogel &

Werkmeister, 2021), public authorities (M'hissen et al., 2020), or public sector

organizations' expert services by the government (McLennan & Krebs Schleemann,

2021) are all examples of public leadership phenomenon. These include general

government and public leaders (public administration entities at all levels of government,

regulatory agencies, and government entities that provide socio-economic services)

(Arundel et al., 2019). The capacity and drive to plan, implement, and encourage change

have been regarded as an increasingly crucial part of public sector leadership (Vogel &

Werkmeister, 2021).

These public organizations bring together experiences and opinions from many

sectors, foster reciprocal learning strategies, and establish networks among diverse

stakeholders. An agency's public leadership uses policies and procedures to give strategic

direction, ensure objectives are met, manage risks, and utilize resources efficiently and

professionally (Arundel et al., 2019; Köhler et al., 2019). Public sector institutions have a

social and fiduciary obligation to conserve natural resources and promote social welfare

and equity, as well as considerably higher duties for furthering the concept of sustainable

development than on the part of the private sector (Dagilien et al., 2021), as public

policies continue to be vital in moving nations towards more circular systems.

The transition towards circularity comprises a planned change that is not

constrained by a single socio-technical system (technologies, infrastructures, regulations,

industrial structures) (Köhler, Geels, et al., 2019). However, it entails a transformation of all production and consuming processes (Kern et al., 2020), guided by the participation of national policymakers or expert networks at local and regional scales, emphasizes the effect of public policy actors focused on homogeneity and standardization (Köhler, Geels, et al., 2019). Thus, complying with national legislation demands participation and commitment to readiness for technological evolution and consumer demand for green products while transitioning to a circular model (Bîrgovan et al., 2022). Circular economy has mainly influenced waste management and recycling methods, whereas techniques of reusing or remanufacturing materials and systematically reducing material consumption remain niche trends (Kern et al., 2020). In Africa, the essential parts of putting circular economy into action are functioning policies, effective institutions, the active participation of actors in the waste management value chains, good waste disposal practices, economic resources, cutting-edge urban infrastructure, and credible public authority (Ezeudu et al., 2021).

However, the existing system is tied to the linear perspective of industrial production (Orji et al., 2022). Environmental concerns include marine plastic pollution, recycling of electronic waste, promoting resource-efficient manufacturing and consumption systems, and municipal waste and plastic management, particularly in developing countries, necessitating specific procedures and applications of the circular economy (Schroder et al., 2020). Nonetheless, the high expense of new technology associated with scientific waste remediation tools and biological systems is a significant barrier to widespread implementation in African nations (Ezeudu et al., 2021). Schroder

et al. (2020) suggested that all these issues are incredibly under-researched in low- and middle-income countries, which need new innovative approaches to reduce pollution and waste, improve health and well-being, and contribute to new ways of boosting economic growth and creating decent jobs. Instead, most research has been focused on developed countries and consumer societies, with little attention paid to developing countries (Ddiba et al., 2020; Schroder et al., 2020).

Numerous African countries have created and executed a variety of economic policies and initiatives designed to deregulate the continent's economy, promote free trade, and boost economic progress (Dunmade, 2018). According to Dunmade (2018), most policies were not designed to promote the circularity of the economy, and the infrastructure in many African nations was not intended to support the circular economy. Linear economics notions dominated the debate when the current institutions were created and developed (Dagilienė et al., 2021). Cramer (2022) emphasized that national governments might improve circular economy undertakings using public and network governance, regulatory, financial-economic, and social policy tools in different socio-cultural and political contexts. Consequently, there is a need for policy modifications and infrastructure enhancements to promote the implementation of a circular economy in Africa (Dunmade, 2018). To properly diffuse the circular economy, however, strong public leadership, the active participation of stakeholders, and responsiveness to public sector management are essential to sustain circular economy ambitions (Cramer, 2022).

To manage this complex transition process, Ddiba et al. (2020) stressed the critical role of public sector leadership in co-developing innovative policies for

circularity and leveraging their mobilizing authority to foster cross-sectoral participation and interaction networks, particularly in sub-Saharan Africa and other low- and middle-income countries to achieve a sustainable circular economy. In other words, going beyond public administrative boundaries with the capacity and expertise necessary to support coordination and collaboration and overcoming barriers to adopting and diffusing the circular economy and having those strategies function as the foundation for a new economic system, particularly in sub-Saharan Africa. Moreover, in this context, it is stated that the circular economy supports the sustainability of an emerging economy (Orji et al., 2022), given the requisite public policy structures and leadership effectiveness required for this paradigm shift to contribute to current circular economy efforts (Schroder et al., 2020).

Even though there are minimal circular economy specific policies, the conventions, procedures, and policies are primarily geared toward mitigating climate change (Orji et al., 2022). These possible circularity factors might play an essential role in the socio-economic development to give new and varied job possibilities and economic activities into loops, act as a platform for the spawning of entrepreneurship, sharing economy, digitalization, the green economy (GE), and the substantial influence on ecosystems in a developing economy (Ezeudu et al., 2021). According to Cramer (2022), public and network governance are needed to deal with this complex transition process since the government's traditional function as the defender of the common good is no longer sufficient to deal with it. Concerning circular economy implementation, Dagilien et al. (2021) advocated for a variety of methodologies, including both top-down

(legislation and policy and support infrastructure and social awareness) and bottom-up (stakeholders' involvement) approaches.

Schroder et al. (2020) claimed that existing narratives about decoupling growth in the economy from resource demands are centered on the economic versus environmental linkages and do not address citizens' concerns such as access to economic activities, rights to land, and technological capabilities, healthcare, identity, education, skills, and labor practices. Including citizens' concerns about the lack of resources to fight poverty, critical needs for poverty eradication, social implications for developing nations, and the potential for collaboration between developed and developing countries. Circular economy frameworks do not consider their lack of social equity and opportunities in developing markets. Instead, circular economy frameworks in the updated sustainability literature emphasize economic growth and environmental impact, often seen as a "Western" way of looking at economics (Kirchherr et al., 2017). Advanced economies have full access to centralized sanitation and waste systems with high investment costs and a relatively well-established public sector while overlooking issues and priorities of developing nations (Ddiba et al., 2020; Schroder et al., 2020).

While many circular economy activities focus on Europe and China, other world regions are getting on board. Even though African public leadership might support varied circular economy narratives, these barriers and priorities should be considered to enable international collaboration with developed and emerging nations, notably sub-Sahara Africa, that could assist the global scaling up of circular economy for achieving socio-economic development goals (Dagilien et al., 2021; Ddiba et al., 2020; Hofstetter et al.,

2022). Several nations, including China, Japan, the United Kingdom, France, Finland, and the Netherlands, have incorporated circular economy into national strategies and policies, concentrating research attention on the role of the public sector in the circular economy transition on macro-level policies and the public sector as a regulator (Klein et al., 2020). Developing countries differ in public policies and consumer sentiments compared to developed nations (Orji et al., 2022). Without a grasp of the modern globalized political economy and socio-political institutions (Schroder et al., 2020), the shift to circular economy adoption in African developing markets may weaken a specific set of solutions (Orji et al., 2022).

According to a global assessment, the European Union, the United States, China, and Japan have created circular economy plans (Braz & Marotti de Mello, 2022). China has already adopted circular economy principles and is actively developing and executing domestic circular economy efforts as a national development strategy, leading to cleaner production standards for individual enterprises, eco-industrial parks, and ambitions to transform key metropolitan centers into eco-cities (Ezeudu et al., 2021; Kern et al., 2020). The European Union (EU) adopted the notion of a circular economy considerably later but is considered a leader because of its international circular economy promotion agenda (Kern et al., 2020). Nationally and regionally, EU and China policy packages have catalyzed circular economy initiatives (Ddiba et al., 2020). Most African nations and companies have poor environmental, social, and economic performance, although there is growing interest in economic growth and sustainability (Hofstetter et al., 2022).

The discourse on the prospects of circularity in Africa is only beginning, as are lessons learned from Europe, India, South America, and China (Desmond & Asamba, 2019). Critical considerations for African contexts have been presented to complement the circular principles and strategies, notably disseminating, and sharing the obtained information on circularity, expanding access to funding for circular transformation, and aligning with customized public governance (Marini & di Milano, 2021). Models from public sector leadership in other region sectors might serve this purpose in low- and middle-income nation contexts, where circular economy implementation is more difficult to achieve (Ddiba et al., 2020). Following this viewpoint, Ezeudu et al. (2021) argued that the circular economy model may be adapted to the needs of cultures and communities based on their cultural, socioeconomic, political, and demographic characteristics, particularly in African nations.

Consequently, unlike the European Union (EU), the Africa Union (AU) has no strategy or effort aimed at achieving a circular economy in Africa (Dunmade, 2018). Except for China, where circular economy was already adopted as a national development strategy in 2002, the most recent work on policy developments has come from European public actors and a few international development organizations. Recent work on circular economy policy developments has focused on the role the European Union (EU), the United Nations Environment Programme (UNEP), and especially the European Commission (EC), with the appointment of the new leadership of commissioners, has been playing in promoting the vision of the circular economy (see Kern et al., 2020; Köhler, Geels, et al., 2019, for recent extant review on the governance

of transitions and the role of experts of inter-and transnational organizations as a fundamental policy and public leadership mechanism).

In developing countries, in contrast to advanced nations, notably sub-Saharan Africa, there is scant literature on the role of African public leadership and the transition to a circular economy. Nevertheless, several studies have outlined the relevance of circular economy in Africa and, indirectly, what African public leaders might do to facilitate the continent's transition to circular economy. For example, Ezeudu et al. (2021) investigated solid waste management strategies in metropolitan markets in Nigeria to study the facilitators and barriers to circular economy adoption in the sector. Ezeudu et al. highlighted that multi-stakeholder collaboration is a significant antecedent to implementing circular economy in a developing world. Internal policies and structured and public leadership (institutions) that enforce the policies are also viewed as a strength toward circular economy adoption. Ddiba et al. (2020) performed a case study of Naivasha, Kenya, to investigate the elements that favor or inhibit the adoption of circular economy by the governing capacity. Their findings indicate a disparity between public knowledge of circular economy techniques and the urgency of action, particularly in the public sector. The authors' findings highlighted the significance of public sector leadership in co-developing creative strategies for circularity and utilizing their convening authority to foster cross-sector collaboration.

Brunet et al. (2022) conducted a comparative analysis based on a series of quantitative and qualitative observations and effect evaluations of PV on-grid solar power facilities in six African regions: Burkina Faso, Madagascar, Morocco, Rwanda, Senegal,

and South Africa. The analysis illustrated the contrast between a project whose

sustainability is primarily based on its local social acceptability and a project based on the

logic of a reaction to the energy transition caused by climate change. In this context, the

authors argued that the state's "public leadership" role is crucial in establishing adequate

governance (centralized yet inclusive) and regulation in an international community-

dominated framework. Antwi and Ley (2021) explored the relationship between politics,

the market, and community acceptability and how cultural differences, gender activity

roles, leadership positions, and community views may play a significant role in

implementing and sustainability of renewable energy in Africa. The authors discovered

that quality standards, effective policy communication, and a qualified labor force are

pervasive difficulties in the energy sector of many African nations that may be solved by

cooperative public education. Deme et al. (2022) analyzed Africa's policies, laws, and

regulations to prevent microplastic contamination. Deme et al. discovered that the

efficacy of the different legal and policy interventions undertaken or proposed in African

nations is little understood. Deme et al. recommended market-oriented options such as

private-public waste management to minimize plastic pollution.

As some scholars have suggested, public leadership can establish a clear roadmap

to expediting the transition. For instance, Cramer's (2022) research revealed that nations

further in their development have better public sector leadership in circular economy

concerns than those still in the predevelopment stage. The data also indicated that a

strong government leadership role is typically accompanied by more robust industry and

local government engagement in circular economy. Klein et al. (2020) emphasized that

cooperation and stakeholder involvements are vital characteristics and values to integrate into the public sector and implement circular economy correctly. Klein et al. recommend new methods employing circular economy principles to enable public services to contribute to more sustainable planning and innovation of the public sector by using the potential of big data to supply public services through the peer-to-peer rental of resources. Oyebode (2022) argued that the circular economy concept should be given appropriate attention, planning, and implementation by all public agencies.

Kern et al. (2020) investigated the role of the EU in defining and disseminating the emerging set of meta-rules during a probable second profound transition to a circular economy. The authors concluded that transnational and international organizations or Nation-states play a crucial role since they are responsible for formulating international norms and serving as international intermediates. Nyanjige and Reuben (2021) examined Tanzania's literature on the transition from linear to circular economies. The authors argued for the necessity of strong leadership in adopting a circular economy for Africa's economic growth and sustainability. Thus, it is vital to evaluate the distinctive qualities of public leadership and administration, which may have consequences for the efficient implementation of circular economy, since strong government leadership, active stakeholder participation, and sensitivity to network governance are fundamental to the phenomena of public leadership (Cramer, 2022; Klein et al., 2020; Vogel & Werkmeister, 2021).

However, the circular economy is somewhat new to developing nations (except China) (Ezeudu et al., 2021). Despite its rising significance, circular economy has

recently made its way into political and intellectual agendas (Braz & Marotti de Mello, 2022). The environment ministries of several African states are promoting a circular economy. Africa's public agency in driving sustainable development priorities (Ugwoji, 2022), particularly by presenting its development agenda and actions' aspirations, such as those included in the African Agenda 2063 (AA2063) and the introduction of the African Circular Economy Alliance (ACEA) during the UN Climate Change Conference 2017 in Bonn, Germany, which was founded by the governments of South Africa, Rwanda, and Nigeria in partnership with the World Economic Forum and the Global Environment Forum (Dunmade, 2018; Garfias Royo et al., 2022). The agenda represents the attempts of African leaders to reposition African nations within global institutional structures and refocus and reprioritize the continent's agenda toward inclusive social and economic prosperity (Garfias Royo et al., 2022; Marini & di Milano, 2021).

Desmond and Asamba (2019) postulated that African national and local government policies play a significant role. According to Köhler, Geels, et al. (2019), governance and policy experimentation for transitions may improve social learning, challenge prevailing values, attract new actors, and promote the accelerated diffusion of alternative solutions. With decision-makers of these governments' institutions/public sectors as facilitators, in low- and medium-income nations, particularly in sub-Saharan Africa (Marini & di Milano, 2021), expert knowledge supporting policy action and influencing public policy might play a significant role in determining the directionality of circular economy transitions through environmental laws, standards, tariffs, subsidies, and innovation policies (Kern et al., 2020; Köhler, Geels, et al., 2019). Researchers have

also pointed to the importance of public policy and public leadership as role models for the transition to circular economy sustainability (Dagilien et al., 2021; Klein et al., 2020). In other words, public sector institutions should serve as examples of how things should be done.

Transitioning to circular economy in African countries would involve various actors, sometimes in a coalition, but primarily public leadership in Africa, working with representatives at all tiers of government to promote a sustainable future for the continent, accentuating Africa's role in scaling innovative solutions to the world's most pressing challenges (Desmond & Asamba, 2019; Hofstetter et al., 2022). The transition may be accelerated by utilizing the vital parts of a country's administration and involving the most influential actors. Although implementing circular economy is technically viable in numerous contexts and areas of interest, socioeconomic, technological, and industry barriers frequently arise during the implementation phase (Bîrgovan et al., 2022; Dosso, Meite et al., 2021; Zoogah, 2022). However, experience has demonstrated that the focused engagement of public actors, notably the mobilization of pro-active drivers and stakeholders prepared to join forces, presents better prospects for advancing circular initiatives (Cramer, 2022).

Scholars noted that the government's engagement is institutionalized through expert networks and that public policies play a vital role in achieving excellent environmental protection, economic development, and job creation and meeting the Sustainable Development Goals (SDGs) in African countries (Ezeudu et al., 2021; M'hissen et al., 2020), reflecting strong public leadership traditions of regulation and

corporatism and active state involvement. As a result of the importance and potential of

the public sector in the implementation of circular economy, public leaders should

incorporate circular economy concepts into their management of resources at the

individual, organizational, and country levels (Cramer, 2022; Klein et al., 2020; Nyanjige

& Reuben, 2021). Knowledge from other nations could also determine why public

leaders seek or defer to expert knowledge and guidance. This expert information could

foreshadow the potential implications of a policy agenda needed to diffuse circular

economy principles.

A crucial step would be to enhance public sector leadership with appropriate risk

monitoring standards that permit safe local circular economy initiatives (Ddiba et al.,

2020). African public leadership is, thus, critical at this level to co-developing strategies

through goal-oriented network governance facilitated by transition brokers to promote the

transition to a circular economy (Cramer, 2022), sustaining socio-economic and

environmental progress (Nyanjige & Reuben, 2021), towards process improvements, new

technologies, and policy initiatives that may be embedded in the trend towards

industrialization in notably sub-Saharan Africa contexts.

Summary and Conclusions

Chapter 2 included synthesis and critical analysis of historical, seminal, and

updated literature surrounding sub-Saharan African nation's lack of readiness to launch a

broader diffusion of digital and emerging technologies needed to support their transitions

from a linear to a circular economy model, including low preparedness of human capital,

a lack of digital policymaking research, weak financial markets, slow decision-making

among public leaders, and infrastructural deficiencies (Circera & Maloney, 2017; Kambou et al., 2021; Kern et al., 2019). Opportunities to accelerate circular economy principles in Africa are growing, as are lessons learned from Europe, India, South America, and China (Desmond and Asamba, 2019). Transitioning to a circular economy requires technological readiness and integrative software (Bai et al., 2022; Grafstrom & Aasmo, 2021). At the same time, authors have emphasized that systemic circular economy transition initiatives involve multiple stakeholders (Salvioni & Almici, 2020; Velter et al., 2020). Empirical research on how public leaders in sub-Saharan African nations diffuse the necessary technologies to transition to a circular economy is limited (Zoogah, 2022).

Circular economy may enable sub-Saharan Africa to achieve climate action and sustainable development goals (SDGs) while also encouraging innovation, sustained growth, and job creation, enhancing the quality of life for the public (Androniceanu et al., 2021; Folarin, 2022). Circular economy transition may be accelerated by strong public leadership, active stakeholder involvement, and network governance responsiveness (Cramer, 2022). Due to the significance and potential of the public sector in implementing circular economy, researchers asserted that there is a lack of empirical research that is a crucial step toward enhancing public sector leadership with appropriate co-developing strategies to promote the transition to a circular economy (Cramer, 2022; Ddiba et al., 2020; Nyanjige & Reuben, 2021). As a result, the outcome of such a study may be significant to the theory extension and practical knowledge required to drive positive social change in sub-Saharan Africa by informing African public leaders on the

knowledge required to enact policies on technology diffusion needed to support a

transition to a circular economy to support their nation's sustainable development.

Chapter 3 provides a detailed presentation on the following: research

methodology and design rationale, the participant selection strategy, the researcher's role

in data collection and analysis processes and procedures, assumptions and limitations of

the study, ethical considerations, and trustworthiness issues.

Chapter 3: Research Method

The purpose of this qualitative, multiple case study was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. Sub-Saharan Africa is not yet ready to embrace the fourth industrial revolution and build a digital economy across its continent (Dosso, Nwankwo & Travaly, 2021). There remains a literature gap about technology readiness and effective technology diffusion to support a circular economy transition in African countries riddled with sustainability problems (Chunguang & Quayson, 2022). To meet the purpose of the study and address the documented literature gap and be consistent with the qualitative paradigm, I used a multiple case study design (see Yin, 2017) to collect data from a purposeful sample of African public leadership experts.

While authors have recently noted that systemic circular economy transition efforts require engagements with multiple stakeholders (Salvioni & Almici, 2020), there is little practitioner knowledge or theoretical research on how African public leaders may diffuse the needed technology for a transition to a circular economy within sub-Saharan African countries (Zoogah, 2022). This study may be significant to professional practice by informing African public leaders to develop their readiness and gain the practical knowledge needed to enact policies to drive the circular economy transition (see Boon & Anyga, 2020; Dosso, Nwankwo & Travaly, 2021). Even though the interview format was semistructured, the nature of exploratory expert interviews enhances generating rich data

from experts' knowledge and professional practitioner experience in an emerging field of research (see Littig & Pöchhacker, 2014).

Chapter 3 provides a detailed presentation on the following: research methodology and design rationale, the participant selection strategy, the researcher's role in data collection and analysis processes and procedures, assumptions and limitations of the study, ethical considerations, and trustworthiness issues.

Research Design and Rationale

To address the purpose of the study and drive the research strategy, Browne and Keeley (2014) wrote that a researcher has to ask the right questions. Consistent with the purpose of this study, the CRQ is as follows:

How do African public leadership experts describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?

African policymakers are called to address how regional financial institutions and government agencies can launch scalable technologies and adopt deliberate regulations guided by circular principles and a just transition (Nwaka, 2021). Collaborative engagement and private and public stakeholders may be more likely to lead to high levels of circular economy innovation and socioeconomic change, encouraging other players to work towards an alignment of economic goals, sustainable goals, modern technology, and social elements to support the transition to a circular economy (Andriamahefazafy & Failler, 2021). The critical problem and urgent need are that public leaders in sub-Saharan African nations may lack the technology readiness and knowledge needed to

enact policies on technology diffusion needed to support a circular economy transition (Boon & Anuga, 2020; Nwaka, 2021). Scholars in the leadership and sustainability literature recommend that empirical data be gathered to develop a practitioner protocol to successfully affect technology diffusion to support a circular economy transition in sub-Saharan Africa facing multiple sustainable development challenges (Chunguang & Quayson, 2022; Jayaram et al., 2021).

The nature of this study was qualitative to align with the purpose of the research and was consistent with the social constructivist and interpretivism paradigm (see Halkias et al., 2021). Another assumption of interpretivists is that the interpretations of a social phenomenon are meaningful connections from the perspectives of individuals based on their biographical, organizational, and social contexts (Tracy, 2019). For this study, I used an exploratory case study as the research design to address the purpose of the study for a greater understanding of African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. Expert interviews are now frequently considered a standard qualitative research method (Bogner et al., 2018). With qualitative sampling strategies, purposeful sampling is used to ensure an in-depth understanding of the data collection for the case studies (Robinson, 2014).

Other qualitative designs were evaluated (e.g., phenomenology and narrative inquiry) and considered ineffective in answering the research question due to the methodological limitations of uncritical personal storytelling during the selection of the case study research design (see Ritchie et al., 2013). With a recommendation from Yin

(2017), the case study design is an approach to describe the phenomenon or explain the reasons for the phenomenon to occur. An exploratory multiple case study (Yin, 2017) was used to understand better African public leadership experts' views on technology readiness and the technology diffusion needed for a successful transition to a circular economy in sub-Saharan Africa in the postimplementation stage.

The multiple case study was selected for this study rather than other research strategies (e.g., narrative, phenomenology, and ethnographic designs). The multiple case study approach explores present phenomena within real-world settings beyond the unit of analysis rather than other designs with a direct emphasis on the study (Eisenhardt et al., 2016). An ethnographic and narrative design was not chosen for this study since data collection is focused on narrative storytelling. Phenomenology was not chosen because it focuses exclusively on the meaning of lived experience (see Merriam & Tisdell, 2015). The design of a multiple case study is described by a comprehensive, holistic, within-case, and cross-case analysis for building a broad experience that makes it the best approach for this study (Merriam & Tisdell, 2015; Yin, 2017).

A multiple case study can involve individuals within a social context of the phenomenon as separate units of study (Stake, 2006; Yin, 2017). To address this study's problem, I categorized the multiple case study and the selection of the cases into two types of selection, namely *literal replication* and *theoretical replication*. In a multiple case study, the case may be a person, an event, an entity, or other units of analysis (Halkias & Neubert, 2020). Taking the example of a case as a person, a single case concerns one individual, whereas a multiple case study involves more than one person.

This process aims to replicate the same results across multiple cases by exploring the differences and similarities between and within cases (Yin, 2017).

A cross-case analysis of data begins in a multiple case study by synthesizing details for a general explanation of the phenomenon after the data collections from all cases are compared for similarities and differences (Eisenhardt & Graebner, 2007; Yin, 2017). Study results emerging from the cross-case analysis and the replication process are considered rigorous and trustworthy and may be used to extend theory from cases within the management domain (Halkias et al., 2021; Welch et al., 2020).

Role of the Researcher

As the primary instrument in this research study, I was responsible for conducting a systematic self-examination, systematically challenging myself throughout all phases of the research process and aligning with the research design (Ravitch & Carl, 2021) to mitigate personal bias during the entire research process. Research bias occurs when researchers seek to manipulate the outcomes of a study to achieve the desired outcome (O'Cathain et al., 2015). According to Shenton (2004), objectivity aims to analyze and examine how researcher positionality biases and stereotypes impact data perceptions and regulate those effects using coordinated reflexivity processes, triangulation tools, and audits.

Examining and upholding a code of ethics rigorously and addressing prejudice requires considering methodological and tactical issues and interpersonal, social, cultural, and political challenges (Ravitch & Carl, 2021). Accordingly, it is ethically obligatory for me to acknowledge my role as the primary tool in the study process, signifying that my

subjectivity, identity, and positionality shape the research procedure used in this study, thereby impacting the data and findings (see Rubin & Rubin, 2012). Recognizing this ethical commitment helped me, as the researcher, to practice reflexivity during the research, allowing me to critically examine and evaluate biases and their impact on the study design and analysis strategy.

A rigorous qualitative case study allows researchers to examine or explain phenomena in context using a range of data sources involving complex information, interactions, groups, or initiatives and enables the deconstruction and proceeding reconstruction of numerous dimensions of the phenomenon to be comprehended (Baxter & Jack, 2010). So, steering clear of bias in qualitative research is important because it solves the significant issue that the findings should reflect the actual case being studied as much as possible and not the researcher's views, personal theories, or biases. I kept detailed records verifying and rechecking the data to reduce bias in this study. I used an audit trail technique and member checks to ensure data confirmability, including referring to my memos and notes. According to Rubin and Rubin (2012), the obligations of a qualitative interviewer extend to developing relationships with an interviewee based on mutual trust, respect, and understanding in the interview process itself.

Consequently, my fundamental responsibility was to conduct myself ethically when interviewing participants. Put another way, there was no deception or coercion, and the interviewees were treated with respect before, during, and after the study. Ensuring that these criteria are adhered to inherently and continually probing the interviewee's responses to the research questions throughout the study was an ongoing and practical

method for ensuring the quality of the research question, purpose, and methodology is aligned, and participant fidelity is achieved. In addition to ensuring that triangulation methods are consistent and using memoranda and active participation as a means of dialogic engagement, various coding techniques and critical reflexivity practices were implemented.

Methodology

Lack of verified knowledge makes it difficult to determine whether and how emerging and disruptive technologies enable the circular economy transition in various world regions (Ho et al., 2021). Using purposeful sampling, conducting semistructured interviews with experts knowledgeable about various subject topics can yield rich answers to the central research question while also emphasizing the experts' perspectives that affect social practices in a field of action (Döringer, 2021). The open nature of the qualitative expert interviews I conducted to answer the research question allows for collecting data from experts' breadth of knowledge and experience in research fields that are just emerging in the theoretical literature (Littig & Pöchhacker, 2014).

I recruited 14 subject matter experts who met the following inclusion criteria: (a) adults over the age of 18 who have authored at least five peer-reviewed scientific papers or policy reports on the issue of African public leadership, technology diffusion, the green economy in Africa and diffusing the circular economy model in Africa; (b) have a minimum of 10 years public leadership experience in a sub-Saharan African nation; (c) a terminal degree from an accredited institution; and (d) possess in-depth expert knowledge regarding the central topic of study (see Merriam & Tisdell, 2015). The inclusion criteria

for participants in the study supported that the participants recruited and interviewed

possess the specialized expertise as subject matter experts for the study's topic of interest

and have pertinent information that contributes to the achievement of the research

purpose (see Bogner, 2018). For qualitative research, Schram (2006) proposed a sample

size of five to 10 people, arguing that a larger sample might impede a thorough inquiry.

To improve the study's credibility and quality, I used the triangulation technique,

which involves comparing and cross-checking data from numerous sources to balance the

pros and cons of each separate procedure (see Fraquar et al., 2020; Guion et al., 2011). In

addition to corroborating results and processes, triangulation is a strategy to expand the

study's scope, depth, and consistency in the methodology (Tracy, 2019). Multiple sources

of data in this study include open-ended interviews with subject matter experts. Archival

data were collected from current business, economic, and financial analyst reports on

sustainability, sustainable development, economic development, and management of the

transition to a circular economy business model in sub-Saharan Africa. Previously

published research articles, literature, case studies, and reflective journal notes were

triangulated to strengthen the study's results' trustworthiness, interview responses, and

answer the research question (see Guion et al., 2011).

A qualitative, multiple case study design was adopted since it permits an in-depth

examination of comprehensive and significant events of actual real-life occurrences (see

Yin, 2017). According to Yin (2017), researchers use the case study method to answer

explanatory questions, such as *why* and *"ow*, and to characterize a phenomenon confined

by time. Consequently, whenever the purpose of the research is to provide an original

contribution to a conceptual or theoretical framework, a multiple case study that contains more than one case might present a richer, more compelling insight into social interaction than a single case study (Eisenhardt et al., 2016; Welch et al., 2020). As an analytic procedure, cross-case synthesis is recommended when examining data in a multicase study to strengthen external validity and improve data trustworthiness for more robust research (Merriam & Tisdell, 2015; Yin, 2017).

Participant Selection Logic

Population

A study population is a subset of the target population from which the sample is actually selected (Harkiolakis, 2017). This multiple case study required more in-depth knowledge of the views of African public leadership experts on how sub-Saharan African leaders can enable the technology readiness and technology diffusion needed for a successful transition to a circular economy. Participants were recruited from experts who published at least five scientific papers or policy reports on African public leadership and the circular economy transition in Africa (via Google Scholar) during the past 10 years.

Expert participants could also have a minimum of 10 years of public leadership experience in a sub-Saharan African nation on technology diffusion, the green economy in Africa, or spreading the circular economy model in Africa. Upon searching Google Scholar under the keywords/phrase "African public leadership and the circular economy", there were approximately 17,500 results of scientific and practitioner papers and business reports published between 2013 and 2022. Projecting the numbers of the population group of African leaders involved in the transition to a circular economy, The

African Leadership University, in collaboration with the Ellen McArthur Foundation,

"aims to become Africa's leading circular economy university and will train three million

African leaders by 2035, equipping them with the knowledge and skills to build a

stronger, more resilient economy that also benefits society and the environment" (Ellen

MacArthur Foundation, 2022, para. 3).

A purposeful sampling of participants who possess the specialized expertise as

subject matter experts for the study's topic of interest and have pertinent information that

contributes to the achievement of the research purpose (see Bogner, 2018) was used to

ensure an in-depth understanding of the data (Robinson, 2014). This study's sample size

was 14 participants to fill the observed literature gap. Researchers suggested a qualitative

multiple case study with a small sample size since larger sample sizes might impede an

in-depth qualitative inquiry (Schram, 2006; Halkias & Neubert, 2020).

Sampling Strategy

According to Tracy (2019), selecting a sampling population in qualitative

research is contingent on the relevance and application of a suitable methodological

approach. This study's replication logic approach (Yin, 2017) helped identify and recruit

participants for this multiple case study research. Because a single observation may not

represent a pattern that can be observed again, scientists have viewed replication logic as

a crucial tool for generating reliable scientific discoveries (Bonett, 2012). The replication

logic notion in a multiple case study asserts that each case is handled as a separate

investigation and analyzed as a single unit of analysis (Eisenhardt & Graebner, 2007;

Flick, 2014).

The purpose of this study was to gain an exhaustive understanding of the views of African public leadership experts on how leaders in sub-Saharan Africa can enable technology readiness and the technology diffusion necessary for a successful transition to a circular economy. The multiple case study replication strategy can support this purpose because it does not rely on experimental controls and manipulation (see Halkias et al., 2022). Criterion and network sampling procedures aided the recruitment of participants for this case study. Should the need to expand the number of participants to achieve data saturation, the snowball sampling method was used to get recommendations of potential participants who match the inclusion criteria for this study from the original primary participants (Merriam & Tisdell, 2015).

Sampling Criteria

Expert interviews are now widely regarded as a distinctive technique for qualitative research (Bogner et al., 2018). Expert interviews are open-ended, so they can be used to collect data from experts' wide range of knowledge and experience in research domains that still need to be studied (Littig & Pochhacker, 2014). For this research, purposeful sampling was employed to ensure an in-depth comprehension of data-rich cases for the multiple case studies (Farrugia, 2019; Robinson, 2014). The recruited participants were a sample size of 14 circular economy subject matter experts (see Schram, 2006) who satisfied the following inclusion criteria: (a) adults over the age of 18 who have authored at least five peer-reviewed scientific papers or policy reports on the issue of African public leadership, technology diffusion, the green economy in Africa and diffusing the circular economy model in Africa; (b) have a minimum of 10 years public

leadership experience in a sub-Saharan African nation; (c) a terminal degree from an accredited institution; and (d) possess in-depth expert knowledge regarding the central topic of study (see Merriam & Tisdell, 2015). The inclusion criteria for study participants ensured that the individuals selected and interviewed were subject matter experts for the study's topic of interest and had relevant knowledge that helped the attainment of the purpose of the study (see Bogner, 2018).

Sampling Selection

Purposeful sampling is based on inclusion and exclusion criteria and allows the researcher to focus only on organizations and participants that suit the framework and contribute to the research purpose (Marriam & Tisdell, 2015). I used Google Scholar to search and identify African public leadership experts who can provide data to meet the purpose of my study. LinkedIn further identifies experts who meet the inclusion criteria and serve as a recruitment tool that creates the initial contact.

Maximum variation sampling or heterogeneity is the preferred qualitative sampling method in a constructivist investigation because it facilitates documenting the differences that result from the implementation of varied circumstances (Lincoln & Guba, 1985, p. 200; Guba & Lincoln, 1994). The case study researcher facilitates, screens, and selects participants, which in turn helps answer the study's central research question and achieves the study's overarching purpose of conducting an in-depth analysis of the phenomena under study (Tracy, 2019). When needed to reach data saturation, I used snowball sampling to ask qualified study participants for additional relevant contacts.

Each in-depth interview enabled each unit of study to give a wealth of information that linked the data to the underlying theoretical premise and built a comparative framework for the instances (Tsang, 2013; Yin, 2017). Researchers conducting a qualitative case study, as advocated by Stake (2005) and Eisenhardt and Graebner (2007), should recruit participants who either have a vested interest in the topic or were selected for other reasons directly relevant to the theory underpinning the study. In contrast to quantitative logic, criterion and network sampling aided in selecting participants who could provide in-depth data for the study's analysis and interpretation. In addition, the purpose of this multiple case study was to describe or recreate cases (Flick, 2014) rigorously.

Sample Size and Saturation

For sample size and to reach saturation to achieve the purpose of this research, participants for this multiple case study were a small sample of 14 participants. They were recruited using purposeful criteria and network sampling procedures (Tracy, 2019) to boost the study's trustworthiness efficiently. According to Fusch and Ness (2015), interviewing experts will give me a detailed description and gain context-specific knowledge, which will expedite data saturation. Schram (2006) suggested a range of five to 10 participants for a qualitative study, arguing that a larger sample size might impede a robust qualitative investigation.

To increase the dependability and credibility of the study's results, the participation selection inclusion criteria ensured that the participants recruited and interviewed possessed specialized knowledge as experts for the study's topic of interest

and pertinent information that helped meet the research purpose (see Bogner, 2018). It was also pertinent to establish rapport with the participants in the study, to further probe respondents within the framework of an approach that allows questions to be addressed until saturation has been achieved (Fusch & Ness, 2015; Merriam & Tisdell, 2015).

This research's logic for participant selection was derived from similar prior studies with respondents who could offer expertise and provide an in-depth understanding of the study issue (e.g., Agarwal et al., 2022; Mosca et al., 2021; Hong et al., 2022). Based on Yin's (2017) methods and interpretation of multiple case studies, the case may be an individual, and this approach is often applied in business management and leadership studies where five to 15 expert participants are recruited to ensure an in-depth investigation. Agarwal et al. (2022) applied a mixed-method design using a multiple case approach to align human resource practices and policies with Industry 4.0 and conducted semistructured interviews with 11 experts, academicians, and industry managers from India's developing economy. Mosca et al. (2021) collected data from a purposive sample of 10 talent management experts using criterion and snowball sampling. Hong et al. (2022) aimed to examine the role of leadership in charting the course in a crisis context by applying the multiple case study design of four target companies and conducting in-depth interviews with senior management experts.

Instrumentation

The goal of instrumentation in a multiple case study aims to collect data from multiple sources through an interview protocol and other data collection processes that support answering the study's research questions (Yin, 2017). Hence, gathering

appropriate instrumentation that aligns with the study's purpose can contribute original data to the conceptual framework and extend theory (Halkias & Neubert, 2020). Themes on African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy emerged through the study's data analysis procedures. The three sources of data collected for this study include (a) a semistructured interview protocol (Appendix B) with items that are grounded in the literature review and conceptual framework of this study and field-tested by a panel of three experts, (b) archival data in the form of current business, economic, and financial analyst reports and case studies on sustainability, sustainable development, economic development and management of the transition to a circular economy business model in sub-Saharan Africa (see Yin, 2017) and (c) reflective journal notes (see Merriam & Tisdell, 2015), that I kept throughout the data collection process.

The study results were founded on rigorously planned data collection procedures from the primary data gleaned from a semistructured interview. A standard data collection method in qualitative studies offered a tool to gain a deeper understanding of the expert participant's perspective. In this exploratory and inductive multiple case study, the interview protocol items produced reliable data results that answered the study's CRQ: *How do African public leadership experts describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?*

As previously mentioned, this research used multiple evidence sources to drive the data triangulation process when presenting the study's results (see Farquar e al, 2020). Data triangulation can help assure the credibility of results and improve the quality of multiple case study results (Halkias & Neubert, 2020). Triangulation of data sources was conducted to support the overall trustworthiness of the study's data analysis (Merriam & Grenier, 2019).

Semistructured Interview Protocol

The primary tool in this research is online semi-structured interviews with open-ended, focused questions asked of the participants (see Yin, 2017). The semi-structured interview (Appendix B) is centered on eight well-chosen questions grounded in the Conceptual Framework and the extant literature review presented in Chapter 2. Participants were asked to participate in the interview via a recruitment letter (Appendix A) informing interviewees of the research's essential nature and purpose. An informed consent form was provided to potential participants to explain the ethical and confidentiality procedures enacted during the study's design and processes. The participants' semi-structured questions were completed in approximately 30-40 minutes (see Yin, 2017).

Under the supervision of my Dissertation Chair, I conducted a preliminary field test and a quality audit to determine whether the study's interview questions would produce results to answer the central research questions (see Tracy, 2019). The field test auditors included the Dissertation Committee Chair and two subject matter experts to determine the interview guide's questions and procedures' credibility, dependability, and

applicability (see Golafshani, 2003). The three field test auditors — Dr. Daphne Halkias, the Dissertation Committee Chair; Dr. Paul Thurman, Professor and consultant on circular economy subject matters at Columbia University (USA); and Dr. Onyeka Uche Ofili, Professor at International School of Management Paris consultant on African Public Leadership, Technology Entrepreneur and Information Technology Adviser at Federal Ministry of Science and Technology, Nigeria. All members of the expert panels have published scholarly works on African leadership, project management, technology diffusion in Africa, and the circular economy (e.g., Alim et al., 2023; Ofili, 2015; Ofili, 2019; Santos & Halkias, 2021; Thurman & Halkias, 2023) and served as practioner/consultants within these topic areas. This field testing supports the trustworthiness and credibility of the study's qualitative findings (Guba & Lincoln, 1994).

In a qualitative study, the instrument's validity depends on the potential for transferability of the study's findings. Transferability is related to external validity; both concepts are associated with how much the audience can infer if study results apply to other contexts or situations (Merriam & Tisdell, 2015). For many qualitative studies, transferability is a challenge because the findings are bound to specific settings and individuals; therefore, it is reasonable that the results of this study may not apply to populations beyond the participation group (Stake, 2013).

Archival Data

Triangulation is an essential component of case study research and one of the various data sources utilized during a field investigation (Yin, 2017). Data triangulation

during qualitative research helps to increase the richness of the obtained data since it is a systematic method for validating or refuting interview data outcomes (Guion et al., 2011). Archival records were used to triangulate the findings of this multi-case research. Prominent media websites were utilized to obtain archival data from the practitioner-based circular economy, policy studies on African public leadership, technological diffusion, the green economy in Africa, and the diffusion of the circular economy model in Africa.

In addition, I reviewed several databases, including the views of African public leadership experts on how sub-Saharan African leaders can enable the technology readiness and technology diffusion needed for a successful transition to a circular economy. Triangulation was used with these archival data sources to answer the research question and support the trustworthiness of the study's findings.

Reflective Journal Notes

This study's third data-collection instrument was reflective journal notes derived from the observation throughout the semi-structured interview process. Reflexivity in field notes is represented in the model supporting qualitative research designs, which provides an unstructured observation through reflection for data gathering (Alvesson & Skoldberg, 2017). The researcher's reflexivity can be mitigated during an in-person (face-to-face) or online interview through Microsoft Teams, Zoom, or Skype. On the one hand, the in-person approach would permit the collection of factual data, trends, and other information gained from the respondent during the interaction, increasing the response rate and ensuring the robustness of the collected data (Patton, 2015).

In contrast, online interviewing facilitates the replication and maximum variation process by allowing the researcher to access participants in geographically dispersed locations and maintain an unbiased environment (Whiting & Pritchard, 2020; Yin, 2017). Because online platforms enable me to interview participants remotely, this technology may mitigate the researcher's reflexivity by preserving a predominantly objective environment (Gray et al., 2020). Also, interviews, self-observation, and interactivity could be incorporated into online data collecting because most data is stored and documented quickly (Kozinets, 2017; Merriam & Tisdell, 2015).

The observational field notes followed a review of the semistructured interview notes. With reflective journal notes, researchers can get additional information about how participants interpret their interactions while preserving a naturalistic research context. During the semistructured interviews, reflective journal notes were recorded by observing the participants' nonverbal indicators, such as their gestures, emotional reactions, and demeanor (Kozinets, 2017).

Triangulation of findings using netnographic field notes (Kozinets, 2017) ensures that my results are consistent with accepted research standards across various case study designs and methodologies (Halkias & Neubert, 2020). In this study, the instrument's trustworthiness was determined by its transferability or the extent to which its findings and conclusions can be extended to various settings and sample groups (Merriam & Tisdell, 2015). Stake (2013) noted that the benefit of transferability is that the findings of a study could serve as a foundation for future research and could be helpful to individuals other than those who participated in the study sample.

Procedures for Recruitment, Participation, and Data Collection

This multiple case study recruited 14 participants with the requisite level of specialized knowledge as subject matter experts for the study's topic of interest and have data that adds to the study's purposes (see Bogner, 2018 for more on sample sizes). To achieve data saturation, I recruited 14 subject matter experts for an in-depth face-to-face or virtual interview to gain a deeper understanding of the views of African public leadership experts on how leaders in sub-Saharan Africa can enable technology readiness and the technology diffusion necessary for a successful transition to a circular economy (Fusch & Ness, 2015; Merriam & Tisdell, 2015). Researchers stated that data saturation would be achieved when data acquisition during the investigation no longer yields new themes (Guest et al., 2020; Mason, 2010; Yin, 2017). According to Fusch and Ness (2015), conducting expert interviews will allow me to obtain a descriptive account and domain-specific expertise, which could also accelerate data saturation.

Using the inclusion criteria as a guide, I used Google Scholar and LinkedIn to look for and discover potential African public leadership experts who can contribute data relevant to my study's purpose. The selection of disparate subject matter experts who matches the inclusion criteria guarantees that the collected data is diverse. LinkedIn, an online professional social network platform, served as my tool to identify pertinent experts who satisfy the inclusion criteria and as a recruitment tool to establish the initial contact to reach the relevant population (Leighton, 2021). Once I had identified study participants who met the inclusion criteria, and after receiving approval from the Institutional Review Board (IRB) of Walden University, I contacted potential study

participants by sending a sequentially numbered recruiting letter. I required that they reply to my LinkedIn message or the specified email address to confirm their participation in the research. However, I also contacted potential participants through email to invite them to participate in the research.

The following were included in the information in the email consent form sent to participants: (a) a description of what the study is about, (b) the withdrawal option, (c) the process protocol, (d) any risks or discomfort that might come with taking part, (e) length of time, (f) a statement that participation is voluntary and there are no consequences for not taking part, (g) the right to privacy and confidentiality, and (h) what this study will do for African public leaders in terms of giving them the information they need to make policies on technology diffusion that will support a transition to a circular economy (Appendix A). Participants who accepted recruiting and provided their contact information (telephone number, email address, and Skype or Zoom ID) via responses to the recruitment letter (Appendix A) were invited to participate.

I worked with each participant to schedule an in-depth, semistructured face-to-face interview, depending on location proximity and if they were available to participate in person. The in-person approach allowed for capturing factual data, trends, and other information gained from the responder during the conversation, which increased the response rate and ensured the quality of the collected data (Patton, 2015). I also provided participants with reliable options; Microsoft Teams, Zoom, or Skype online interviews (Saarijärvi & Bratt, 2021). During the expert interview process, the online platforms enable the researcher to recruit participants in distance or remote locations and can

decrease the researcher's reflexivity by maintaining a relatively unbiased environment during an expert interview process (Bogner et al., 2018; Gray et al., 2020). Also, an online platform for interviewing participants produces an environment that is not biased toward the researcher, and participants can participate regardless of where they live. The use of preference-based interview approaches, in which the interviewee can choose from various mediums (face-to-face interviews or digital interviewing), may pave the way for previously inaccessible participants to join research projects that foster equity and diversity in academic inquiry (Saarijärvi & Bratt, 2021).

The interview questions were designed to assess each respondent's present and previous dispositions and the nonverbal cues and subtleties surrounding each conversation (Yin, 2017). In addition, Yin (2017) argued that expert interviews are preferable over observations and experimental quantitative research for data collection in exploratory studies. Qualitative expert interviews have been broadly applied by practitioners and researchers from diverse fields (Flick, 2018). They could provide an opportunity for participants to describe their views on how leaders in sub-Saharan Africa can enable the technology readiness and technology diffusion required for a successful transition to a circular economy. According to Littig and Pochhacker (2014), the non-controlled nature of a semistructured interview with an expert contributes to the data yield due to the expert's significant knowledge and research experiences in their respective disciplines.

The qualitative technique focuses on comprehensively grasping the participants' knowledge and experiences. The open-ended questions interviews with participants

emphasized the acquisition of pertinent data based on the participants' experiences with the topic under investigation. In-depth analysis of the responses is made possible by researchers who pose open-ended questions that are probing and encourage nuanced points of view (Kross & Giust, 2019). Suppose the recruiting procedure needs to yield more participants. In that case, I would have employed snowball sampling to ask eligible research participants for more relevant linkage in their network to meet the desired number of willing participants (Merriam & Tisdell, 2015). Snowball sampling is a well-known and practical way of recruiting study participants who are difficult to reach or unfamiliar to the researcher (Leighton, 2021).

The interview guide includes open-ended questions (Kross & Giust, 2019), and interview questions were presented in alignment with the study's topic. This guide enabled me to construct the expert interview protocol to obtain the experts' views on how the circular economy principles could impact African public leaders on the knowledge required to implement policies on technology diffusion needed to support a transition to a circular economy (Yin, 2017). Before beginning data collection, I obtained approval from Walden University's Institutional Review Board (IRB) which was crucial before conducting interviews with experts via in-person or online interviews.

During the data collection procedure, I conducted 14 interviews lasting around 30 to 40 minutes each, with data captured on a digital audio recorder and responses and reflective handwritten notes documented on an observer note sheet. However, approval from the interviewees was required to conduct an audio-recorded interview using a digital audio recorder. I used the notes to construct a reflexive journal to facilitate deeper

reflection (Stake, 2013). I used an Apple MacBook eXtra Voice Recorder and a transcriber program to record and transcribe the participants' responses and maintained a copy of the text conversation.

After each interview, the obtained data were recorded, documented, evaluated, and classified using Microsoft Excel. Tracy (2019) advised Microsoft Excel for storing, documenting, analyzing, and categorizing numerical data in research. After the individual interviews, I thanked the participants for their participation in the study and reminded them that I might contact them if extra clarity was required. Using a password-protected program, I securely stored the obtained data on my personal computer, vital flash drive, and OneDrive (Saarijärvi & Bratt, 2021). Each participant was provided a transcript copy after the interview to validate the gathered data. Validation by the participants enabled them to explain ambiguous comments or amend inaccuracies. When participants check the interview transcripts and confirm they are crucial responses, it prevents errors during data collection and ensures the quality of the study (Rubin &Rubin, 2012).

I assured the participants of the anonymity of their identities and the confidentiality of the data obtained. I informed participants that the materials linked with the research project are intended solely for research purposes, and the data acquired will be maintained separately from generic information (Yin, 2017). In addition to the transcribed evaluation and analysis, peer-reviewed, historical, and seminal articles on the study's central phenomena were compiled into a database to facilitate triangulation and assist future researchers seeking replication while performing similar studies (Yin, 2017). Considering the various factors that might affect the outcome of a research project and

the interviews themselves, using multiple methodologies simultaneously as a form of triangulation could result in more contextual increased inter-rater reliability that could provide trustworthy findings (Saarijärvi & Bratt, 2021) through the thick description, thereby expanding the scope of the study.

Data Analysis Plan

A multiple-case study design allows the researcher to draw connections between the research question and the result by replicating those conclusions across cases (Halkias & Neubert, 2020). Yin (2017) asserted that the multiple-case study design helps compare studies because it allows researchers to explore a complex social issue. Further, when studying a phenomenon, the case study approach is employed to answer the "why" and "how" questions that arise from the phenomenon (Yin, 2017). This approach allows the researcher to explore differences within and between cases in alignment with the study purpose and extend a theoretical proposition (Halkias & Neubert, 2020).

Jacob and Furgerson (2012) emphasized that researchers should determine the type and amount of data needed for a study, organize the interview procedure, and gather in-depth and meaningful data throughout the interview to ensure sample size alignment with topic data. Recognizing the researcher as the primary instrument of the study process indicates that the researcher's subjectivity, identity, and positionality shapes the research's method, procedures, and conclusions (Rubin & Rubin, 2012). Consequently, researchers play a crucial role in qualitative case studies. However, this will ensure that appropriate data in the qualitative study are obtained to explore the "how" and "why" of

the research phenomenon and how the study validates themes and patterns that emerge from among participants' responses supported by foundational literature (Yin, 2017).

Accordingly, this study employed a semi-structured question format for the interview process. The data obtained were sorted and categorized to determine the why and how questions. Interview data and participant observations are valuable sources for data triangulation (Halkias & Neubert, 2020). For the data analysis protocol, scholars recommended that the case study researcher can use data gained from participants' interviews, journaling notes, archival material, and even surveys to identify themes and categories, with content analysis as part of the data analysis process (Halkias et al., 2022; Merriam & Tisdell, 2015).

According to Halkias and Neubert (2020), a comprehensive narrative of the case may be constructed by integrating primary and secondary sources. This technique allows a deeper understanding of the events, when, where, and why. The obtained data may improve theoretical mechanisms and previous research contributions by comparing them to the existing literature (Halkias & Neubert, 2020). To analyze the information supplied by the respondents about how Public Leaders in sub-Saharan Africa can enable technology readiness and the technology diffusion necessary for a successful transition to a circular economy, I employed the appropriate data-collection methodologies to promote effective data collection and categorization of data beyond the participant responses and observations.

For this study, the primary unit(s) of analysis constitutes participants with the required degree of specialized expertise as subject matter experts who met the inclusion

criterion for an in-depth face-to-face or virtual interview to obtain a deeper understanding of the views of African public leadership experts who can provide data pertinent to the study's purpose. The cross-case analysis was the primary method for analyzing the process and content of the interviews and the documented data in this study (Yin, 2017). The analytical procedure incorporated both within-case and cross-case analysis to detect data trends (Halkias & Neubert, 2020). According to Merriam and Tisdell (2015), cross-case synthesis is recommended for data analysis to increase external validity, data credibility, and the rigor of multiple-case study research. Before beginning the analytic process, I arranged the data obtained for this study, including transcripts, observation notes, and journals.

The following phase involved learning about contextual variables through an individual within-case investigation of the selected cases. After examining the individual cases, the next stage was to analyze the cross-case data to identify similarities and differences across the themes and categories of a cross-case analysis (Yin, 2017). Field notes were organized in data segments, indexed with line numbers, and then put in line following the interview questions to highlight the code for the within-case analysis and to describe the emerging patterns (Halkias et al., 2022). To ensure that the data is transcribed accurately, the codes were written down on a Microsoft word excel spreadsheet, along with the assigned codes and the categorization of the reflective notes (Saldaña, 2016). This method was done through thematic analysis, which helped develop themes and models from the data by pointing out common relationships across multiple cases (Halkias et al., 2022; Patton, 2014). The application of systematic comparison in a

cross-case study emphasizes differences and similarities and the effect of these on the findings (Halkias & Neubert, 2020).

The focus was on archival data, interview transcripts, and participant observations (Flick, 2018; Mason, 2010). Individual case analyses were conducted to compare the identified patterns, followed by a summary of each case's data to strengthen the cross-case analysis and establish theoretical conclusions (Halkias & Neubert, 2020). As the researcher prepares memos, the purpose is to record the categories, patterns, and other subjects of reflection that emerge, along with categorizing codes by categories with shared meaning that will develop into themes (Halkias et al., 2022; Saldaña, 2016). This research's primary analytic method is descriptive coding, connecting symbolic meaning to data subsets and offering keyword phrases and categories for data indexing (Saldaña, 2016). Instead of counting or tallying items, the purpose of coding in qualitative data analysis is to "fracture" the data by reorganizing the textual descriptions of those items to demonstrate their relationships more clearly within the same category (Maxwell, 2012).

According to Maxwell (2012), the categories connect the dots, even though some words and phrases inside the data fragments and the allocated codes may have similar meanings. I chose descriptive coding to analyze this study's data after considering a variety of approaches to qualitative data analysis. Descriptive coding may identify key terms and phrases for further categorization and thematic analysis (Halkias et al., 2022). According to Halkias et al. (2022), descriptive coding analyzes the raw data obtained to provide meaning to each data segment. I used the within-case and cross-case synthesis approach, which involves comparing and contrasting the outcomes of the cross-case and

within-cases and detecting common patterns among them, as a critical component of the multiple case analysis (Yin, 2017).

Yin (2017) postulated that the cross-case analysis relies on replication logic and reveals the potential benefits of multiple-case study research. Using this technique, a researcher can increase the internal validity of the logic supporting emerging theoretical linkages. In addition, it contributes to developing a strong, accurate, and often succinct emerging theory with multiple variables and permutations but the most explanatory propensity (Halkias & Neubert, 2020). This measure posits that the topic is not viewed through a single lens but rather through multiple lenses, allowing diverse aspects of the phenomenon to be revealed and understood (Baxter & Jack, 2010). Furthermore, cross-case synthesis integrates and contrasts cases rather than examining distinct cases, making it more useful for doctoral research than content analysis (Halkias & Neubert, 2020).

I applied a "ground-up" strategy to analyze data (Yin, 2017) to aid in formulating vital concepts while conducting a critical analysis of the data (Halkias et al., 2022). According to Saldaña (2016), the ground-up paradigm is compatible with descriptive coding in case study data analysis. This method aligns the study's central research question with emerging data-analysis concepts (Yin, 2017). Before commencing the analysis process, I organized the data collected for this study, including interview transcripts, observation notes, archival data, and journal notes. The descriptive coding methodology necessitated meticulous interview transcriptions and participant anonymity. This crucial stage was achieved by transcribing the study participants' responses, giving codes to the participants' names, and preserving the confidentiality of the data.

After categorizing the interview data, I related the topics of the literature study to the conceptual framework's categorization. Merriam & Tisdell (2015) also recommended using field notes to seek clusters of relevant codes when gathering data. In this multiple case study, cross-case synthesis was employed as the analysis technique to help evaluate whether the cases are comparable by examining the magnitude to which data converges or diverges (Yin, 2017). According to Halkias and Neubert (2020), well-constructed multiple-case research can give a credible theory extension that is internally consistent, accurate, robust, and concise.

By collecting, summarizing, and analyzing the data to construct a coherent, evidence-based argument using a significant research design that incorporates system sequencing and triangulation techniques, I enhanced the trustworthiness of the research data and evaluated the logic that connects the data to the propositions using cross-case synthesis (Shenton 2004; Yin, 2017). Recognizing this ethical obligation encourages researchers to participate in systemic reflexivity, which enables them to critically assess and evaluate their biases and their effect and influence on study design (Ravitch & Carl, 2021). Consequently, each case in this research was predicated on describing the views of African public leadership experts on how leaders in sub-Saharan Africa can enable the technology readiness and technology diffusion necessary for a successful transition to a circular economy.

Issues of Trustworthiness

The trustworthiness of the researcher's conclusions is defined as the complete process of planning, conducting, and documenting the study to provide credible results

(Shenton, 2004), and data trustworthiness comprises four components: credibility, transferability, dependability, and confirmability (Morse, 2015). In qualitative analysis, researchers use audit trails and crucial journal data on the theoretical concepts, methodological approaches, and data analysis in a qualitative study's trustworthiness rather than depending solely on the results to support the argument that the findings are noteworthy (Skulmoski et al., 2007). Establishing credibility, dependability, transferability, and confirmability enhances the trustworthiness of qualitative investigations (Amankwaa, 2016).

Credibility

Guba (1985) proposed that preserving credibility is one of the most critical components in building trustworthiness. Merriam and Tisdell (2015) posited credibility as the study's fundamental validity on how the research results reflect reality and quantify its trustworthiness. Credibility in a qualitative study may be improved by methods including peer debriefing, member checking, prolonged engagement with the subject matter, in-depth familiarity with the issues, researcher reflexivity and competing explanations, triangulation, and referential adequacy, and a thorough examination of any cases that were not favorable to the researchers (Lincoln & Guba, 1985; Yin, 2017). For this reason, it was essential to have an in-depth look at my data, a solid match between the data and analysis, and a good fit between the data and the emerging analysis (Shenton, 2004).

As part of my research, I adopted a thorough literature analysis to get more knowledge about the issue and devise an interview protocol that allows for extensive data

collection to achieve data saturation. I used member check and share the individual interview transcripts with each participant of the study to verify and confirm their responses during the data collection and data analysis process, to ensure that participant words accurately reflected what they meant and that the data was consistent, to aid validity of the study's results (Birt et al., 2016; Mak-van der Vossen et al., 2019). Before I collected the data, I undertook field testing with the subject matter experts to verify that the interview questions were relevant to the study's central research question and valuable to participants.

Transferability

Transferability is the endeavor to generalize and adapt research results to other contexts and environments (Amankwaa, 2016). In qualitative research, generalization via transferability necessitates in-depth analysis and interpretation of the study group by the researcher using context-dependent knowledge (Carminati, 2018; Yin, 2017). Using detailed definitions, qualitative researchers should show that the findings of a sample can be applied to different situations, cases, and scenarios so that the audience can decide whether or not the findings can be applied to other contexts while also making sure that the participants' words are authentic and accurately represented (Birt et al., 2016; Connelly, 2016).

Purposive sampling was used in this study to locate experts on the study topic and followed by a careful selection of participants to form a small sample size for the study because the group's expertise supports rational arguments rather than biased assumptions for achieving sufficient data saturation for the research (Hasson & Keeney, 2011; Morse,

2015). I ensured that participants and readers had a sense of trustworthiness in the study's data-gathering procedure by providing them with relevant context knowledge. In order to retain the significance and implications of this study's findings, I employed thick descriptions, member checking, prolonged engagement, triangulation, audit trails, and reflexivity (Houghton et al., 2013).

Dependability

Dependability in qualitative research may be achieved by ensuring that the findings are consistent with the data gathered when there is a logical basis to the results, hence improving the likelihood of replication using diverse methodologies (Merriam & Tisdell, 2015). According to Connelly (2016), dependability is the extent to which previous research and its results may be replicated to maintain the reliability of the analysis. According to Shenton (2004), dependability is defined as the capacity of data to hold up over time and under a variety of settings, and it necessitates thorough analysis and a reason for how the data was gathered to answer the study's central research question, along with a significant research design that integrates system sequencing and triangulation approaches to clarify the research questions.

In addition, Morse (2015) recommended that researchers employ audit trail and overlapping methodologies, such as triangulation, thorough methodological description, and peer debriefing, to ensure dependability. Amankwaa (2016) highlighted that the trustworthiness protocol must match the research process, including the research gap, the problem statement, the research question, the methodology, and the research design, to solidify a study's scientific approach. In this project, I designed a methodological

technique, generating an audit trail to aid in documenting and describing decisions and activities done at the commencement of the research study and during data collection that ensures reliability. I also used the audit trails to track and show the research progress and upcoming actions. Finally, for the effective alignment of all phases of the research, I supported the evidence linking the findings to the study's central research question and the clear and concise writing of the results (Yin, 2017).

Confirmability

In qualitative research, the idea of confirmability addresses the critical problem that the results should be as close as possible to the actual case being studied, not the researcher's views, personal theories, or biases (Amankwaa, 2016), and that the researcher's subjectivity should be kept in check (Hasson & Keeney, 2011; Morse, 2015). Berger (2015) suggested that researchers use reflexivity and an audit trail to ensure that the data is objective and can be checked. To maintain the objectivity of this study, Morse (2015) asserted that researchers should be conscious of their subjectivities, utilize persuasive strategies to formulate neutral questions and be cognizant of their function as researchers and not as experts.

However, according to Berger (2015), the use of audit trails, triangulation, and researchers' participation in reflexivity through a research journal is necessary to keep participants' voices and perspectives alive and to retain researchers' awareness of their roles and associations (social and emotional) with participants. To mitigate bias in this study, I described the processes for reviewing and rechecking the data throughout the investigation. I also implemented an audit approach to prove confirmability by regularly

referencing my memos and reflective journal and conducting member checks throughout data collection.

Ethical Procedures

This study commenced with IRB approval, and its proposal included details on privacy and confidentiality, potential benefits and hazards, and IRB contact information, among others. Once I received IRB clearance, I contacted potential participants who are subject matter experts on the topic of African public leadership, technology diffusion, the green economy in Africa, and the diffused of the circular economy model in Africa via LinkedIn and sent them an email including the IRB approval number (10-03-22-1043761) to solicit their involvement in the study (Appendix B). Potential volunteers communicated their interest in participating in this study using the same LinkedIn platform or my contact details provided. I respected the privacy and confidentiality of potential participants and utilized the inclusion criteria to check that they met them. The potential participants who answered my request assented to the informed consent terms once I had completed this stage.

After obtaining their full informed consent, I continued planning and conducting in-person or online platform interviews. I asked the chosen individuals for their email addresses to facilitate contact during the study. I emailed each selected participant for interview preparation reasons to confirm the agreed-upon interview date and time. I reminded them that their participation was optional and that the study was based on the principles of confidentiality, anonymity, harm avoidance, and data protection. To avoid miscommunication, I used email to connect directly with participants and respond to or

resolve any questions or concerns. This study recruiting procedure and materials do not present any ethical concerns. The do-no-harm concept was implemented upon IRB approval of the study's proposal.

I understand that there were no ethical difficulties throughout the data-collection procedure. I informed the study participants that their subject-matter expertise was required, not their organizational affiliations or other personal information. The informed consent for this study highlights the participants' voluntary involvement and the fact that their participation in the study was based on their individual decision. Participants who changed their minds after obtaining informed consent and wished to withdraw from the study were guaranteed that they would not be treated unethically if they decided to withdraw. I established separate, distinct files with strong passwords and encrypted folders for each participant to store the interview transcripts and correspondence. Using robust passwords and encrypted folders enhances the concepts of privacy, anonymity, and confidentiality, as well as collecting data for its intended purpose (Owan & Bassey, 2019).

In addition, I saved all data and electronic files from the interview and data analysis procedures on my laptop, a dropbox account, and a USB flash drive. All data were protected with a strong password accessible to me as the researcher—appropriate data management strategies outlined in the informed consent. I will only share sensitive and confidential data with my dissertation chair and committee member, using secure passwords and encryption when moving sensitive and confidential data. As advised by the ethics committee and Owan and Bassey (2019), I shall destroy any interview files

related to this study from my laptop computer, my dropbox account, and my USB flash drive 5(five) years after their collection.

As the researcher, I am accountable for preserving ethical standards during the study, interacting with participants, and releasing data (Tracy, 2010). Throughout the many phases of this study, I engaged in ethical self-reflection to make the required modifications to the organization of multiple case designs and the engagement of subject matter experts. This study had no potential conflicts of interest since I collected the data anonymously and conducted the research independently of my professional and private settings.

Summary

The purpose of this qualitative multiple case study was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. This study's instrument is semi-structured interviews with open-ended questions, a method that allows participants to express their views. Archive material, business and industry reports, media pieces on the circular economy, and journal field notes were used to bolster the trustworthiness and veracity of the study's findings and conclusions.

The data analysis outcomes are presented in Chapter 4 in response to the study's central research question. The techniques used to collect and analyze data from 14 semi-structured interviews and the interview protocol are detailed and defined. The clarification focuses on unforeseen scenarios or occurrences throughout the data

collection and conditional evidence of trustworthiness (credibility, transferability, dependability, and confirmability).

Chapter 4: Results

The purpose of this qualitative, multiple case study was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. Sub-Saharan Africa is not yet ready to embrace the fourth industrial revolution and build a digital economy across its continent (Dosso, Nwankwo & Travaly, 2021). By providing answers to the research question, I gained a deeper understanding of theoretical insights and practitioner-based knowledge of how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy, which was previously unreported in the scholarly literature.

The research question that guided the development of this empirical study was as follows: How do African public leadership experts describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?

This study was framed by two key concepts that focus on the significance of stakeholders' views on rapid technology diffusion and its implication for labor market challenges within impoverished communities in sub-Saharan Africa: (a) Rogers's (1995) concept of diffusion of innovations; and (b) Grafström and Aasma's (2021) concept of the circular economy. This study may be significant to theory extension by contributing original, qualitative data to the literature on how sub-Saharan African leaders can enable

the technology diffusion needed for a successful transition to a circular economy (see

Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021).

In this chapter, I analyze the multiple case study results based on two approaches:

thematic analysis and cross-case analysis. As recommended by Yin (2017), the first

approach, thematic analysis, was used on the study's three sources of data collected for

this study include (a) a semistructured interview protocol (Appendix B) with items that

are grounded in the literature review and conceptual framework of this study and field-

tested by a panel of three experts, (b) archival data in the form of current business,

economic, and financial analyst reports and case studies on sustainability, sustainable

development, economic development and management of the transition to a circular

economy business model in sub-Saharan Africa (see Yin, 2017) and (c) reflective journal

notes (see Merriam & Tisdell, 2015) that I kept throughout the data collection process.

Using thematic analysis, the different approaches ensure the rigor of research design and

the trustworthiness of the results by comparing different codes, such as theory-driven

codes obtained from the researcher's codes or other existing theories and inductive codes,

and by applying a bottom-up strategy of reviewing data as prior research-driven code (see

Boyatzis, 1998; Yin, 2018).

In the second approach, I used cross-case analysis to analyze the data

recommended by Yin (2017). With this analysis, I synthesized the findings of the initial

thematic analysis to answer the research question. The primary goal in a multiple case

study design is to replicate the same findings across several cases by exploring the

differences and similarities between and within cases (Eisenhardt & Graebner, 2007).

The unit of analysis in this study was the African public leadership expert. Each unit of analysis becomes a case study by itself (Eisenhardt & Graebner, 2007; Yin, 2017). The reliability of multiple data collection methods ensures rigor and credible results for replication studies in the future (Yin, 2017). In Chapter 4, I describe the patterns and recurrent themes emerging from the analysis of the collected data, maintaining the participants' voices and perspectives. Categories of codes, themes, and a cross-case synthesis of themes are also presented below.

Research Setting

For this multiple case study, I collected data through semistructured interviews with 14 subject matter experts in the circular economy. The inclusion criteria for participation in the study were (a) authored at least five peer-reviewed scientific papers or policy reports on the issue of African public leadership, technology diffusion, the green economy in Africa, and diffusing the circular economy model in Africa; (b) have a minimum of 10 years public leadership experience in a sub-Saharan African nation; (c) have a terminal degree from an accredited institution; and (d) possess in-depth expert knowledge regarding the central topic of study (see Merriam & Tisdell, 2015).

The participants were recruited using network and criterion sampling from Google Scholar and the professional social media site LinkedIn. Following recruiting, I made the first contact with each participant through LinkedIn inbox, email, and WhatsApp text, according to their preferences. I also included the informed consent form with the contact method. I requested a date and time for the interview at the participant's convenience and within the schedule of the research study process once they responded "I

consent" to my inbox. The predetermined interview date guaranteed that the participant would schedule the interview at a time that worked best for them, free from interruptions that would slow down data collection. Each applicant for a virtual meeting received a Zoom meeting invitation, and each in-person face-to-face meeting received email or WhatsApp text correspondence to confirm the time and date to participate for an interview that will last between 30 and 40 minutes.

To guarantee that the respondent was at ease with the research topic, understood the research context, and had some key definitions in the study area, I developed the semistructured interview protocol (Appendix B) to use as a guideline. The interview protocol was disclosed in advance to give the candidates time to prepare for the questions and topic. As a result, participants provided in-depth responses regarding the topic, and rich data was obtained.

I identified 20 experts for the data collection using Google Scholar and LinkedIn platforms. Fourteen of the identified candidates consented to participate, which was a sample size that falls within the intended recruitment range. Due to issues with the internet connection and schedule constraints, one participant completed the interview via a WhatsApp video call. Two candidates opted for an in-person face-to-face interview option in a comfortable office environment in Lagos, Nigeria, and Accra, Ghana, supplied by the participants, while the other 11 candidates were interviewed virtually via the Zoom platform. Each virtual interview was conducted using the Zoom meeting platform, which also served as the venue for recording it. The TapMedia voice recorder app on my iPhone also recorded all 14 interviews.

Demographics

Eleven men and three women met the eligibility criteria in the study. Each candidate held a terminal degree from an approved university, had at least 10 years of public leadership experience in a sub-Saharan African nation, and authored multiple peer-reviewed books, papers, and policy reports. The demographic information gathered was pertinent information for this study's conceptual framework. The characteristics were gender, age, nationality, years of experience in public leadership in a sub-Saharan African nation, number of peer-reviewed publications or policy reports, and in-depth subject matter expertise in the study's central topic of inquiry. Pseudonyms are provided in an XY format, where X is represented by the generic letter P, which stands for "participation," and Y is the unique numerical identifier assigned to each participant.

The demographics of the study sample included males (11/14) and females (3/14), with ages ranging from 39 to 62 (average = 50.5). There were 14 participants: five from Nigeria, three from Ghana, two each from Rwanda and Sierra Leone, and one each from Kenya and Tanzania. The candidates' average public leadership experience in a sub-Saharan African country was 18 years, ranging from 11 to 25 years. Public leadership, technology readiness, technology diffusion, the green economy in Africa, and the diffusion of the circular economy model in Africa were the key topics of this study.

Data Collection

The IRB application was approved on October 3, 2022, and data collection began on October 9, 2022. Twenty candidates were identified as experts on the research topic, and fourteen consented to participate in the interview. Eleven of the 14 respondents

participated in the interview via Zoom video. Due to a computer internet outage and

schedule conflicts, one interview was completed via WhatsApp video. Two participants

selected in-person face-to-face interviews as their preferred option. The interviews were

conducted between October 9, 2021, and November 10, 2022, and lasted between 35 and

50 minutes (mean = 42.5). The data collection process was completed on November 10,

2022. The 14 participants expressed themes such as political will, leadership knowledge

gap, creating an enabling environment, the need to strengthen legal and regulatory

mechanisms, and developing economic and infrastructural capabilities for circular

economy transitions. I continued interviews until no new themes emerged and, thus, data

saturation was reached.

The minimal number of interviews required for qualitative multiple-case research

is five. However, I conducted interviews with 14 participants until I reached data

saturation, with similar data noted from Participants 11, 12, 13, and 14 (see Halkias &

Neubert, 2020; Schram, 2006). Data saturation became apparent during the data-

gathering process when the emerging themes contributing to answering the study

question began to reoccur, and no new themes emerged. The triangulation of multiple

data sources further validated the commonalities between the themes. The section on

Study Results includes additional information on the data saturation procedure.

Following IRB approval from Walden University, the following steps were taken:

(a) initial recruitment inbox mail to identified experts, (b) scheduling and conducting

interviews via the Zoom platform and two in-person face-to-face interviews, (c) creation

of reflective field notes, (d) review of seminal publications, and (e) transcription of the

interview recordings and member check. This data collection procedure was meticulously documented in a Microsoft Excel spreadsheet that served as an audit trail for each participant. This strategy enables me to track the progress of each candidate's completed and outstanding action items (e.g., initial contact, consent received, interview scheduled and completed, transcript completed, member check sent and received). This audit trail, in conjunction with the reflective field notes, enabled me to conduct the data collection process consistently and comprehensively, thereby establishing the rigor of the research.

The data collection occurred over four weeks, from October 9, 2022, to November 10, 2022. Eleven experts were interviewed using Zoom virtual meetings. Due to a computer internet outage and schedule conflicts, one interview was completed via the WhatsApp video app on my iPhone. Moreover, two participants in Lagos, Nigeria, and Accra, Ghana elected for in-person face-to-face interviews in a comfortable office environment supplied voluntarily by the participants. Once I received each participant's acknowledgment and approval of the given consent form, I planned and scheduled the interview. The interview date and time were mutually agreed upon to ensure that the participant had sufficient uninterrupted time to respond to the interview questions within the constraints of the research study's timeframe. Only the participant and researcher attended each interview, except for one participant who necessitated that his assistant logs in and listen. The semistructured interview protocol ensured the participants' comfort throughout the process. It acted as a guide for the interviewees to provide in-depth responses about the topic without worrying about issues of anonymity and confidentiality.

I began reflective journaling immediately after obtaining IRB approval from Walden University on October 3, 2022, to ensure the transparency of my research study. During the research, I documented my perspective, assumptions, beliefs, emotions, experiences, observations, and a chronology of all the processes. I maintained a reflexive journal during the duration of the investigation. The reflexive diary contains informal interactions with participants, remarks made during interviews, recruitment notes, and member-checking process feedback. The topic of the study was of interest to all interviewees and the researcher. It provided a point of connection, expedited the development of a collaborative partnership, and established a valuable rapport and a bond of trust between the study's participants and the researcher. This encounter enhanced my knowledge of the data collection procedure as a researcher. African public leadership experts gave me invaluable knowledge, making this data collection a rich experience.

During the data collection process, challenges included locating qualified experts and arranging mutually convenient interview dates and times. Initially, I could not identify enough candidates via Google Scholar and LinkedIn, so I extended my recruiting processes to include snowball sampling techniques by asking research participants for more relevant linkages in their network to reach the required number of willing participants for data saturation. Some identified experts did not respond immediately to the initial message and had to be contacted again as a follow-up. In four cases, the participants' busy schedules and dispersion across different time zones necessitated multiple emails and texts to secure a mutually suitable interview date and multiple rescheduling attempts. Except for one occasion in which we were compelled to use an

arbitrary WhatsApp video app via my iPhone, all interviews were done without real difficulty using the Zoom video platform and an in-person face-to-face interview at a conducive office location voluntarily provided by the participants. Different time zones were honored, and the participant's anonymity and data confidentiality were ensured. The audio was recorded and afterward used to transcribe the interview.

Each interview followed the interview protocol to guarantee uniformity across cases. I posed eight questions to the African public leadership experts asking them to describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. The participants were asked their views on three questions: the significant barriers and recommendations surrounding the promotion of technology readiness necessary for a successful transition to a circular economy. Three questions were designed to facilitate the emerging technologies necessary to transition from a linear to a circular economic model. There were two questions regarding the role of varied stakeholders and the organization's community in advancing sustainable development towards circularity. The participants were provided with the terms' definitions to ensure a shared understanding and uniform responses. The terms included the *circular economy, circularity principles, technology readiness, technology diffusion, sustainable development, and public organization* were all understood similarly by the experts.

Initial Contact

Using network sampling via the LinkedIn platform, I contacted the identified experts for the first time on October 4, 2022. The inclusion criteria for participation in the

study were (a) authored at least five peer-reviewed scientific papers or policy reports on the topic of African public leadership, technology diffusion, the green economy in Africa, and the diffusion of the circular economy model in Africa; (c) had a minimum of 10 years of public leadership experience in a sub-Saharan African nation; (c) held a terminal degree from an accredited institution; and (d) possessed in-depth expert knowledge (see Merriam & Tisdell, 2015). Several candidates were identified based on these criteria, their peer-reviewed publications or policy report as an African public leader, and their subject matter expertise in a sub-Saharan African country. In this study, additional experts were recruited using the snowball sampling method from the participant network.

From October 4, 2022, through November 10, 2022, participants acknowledged and consented to the consent form. The final outreach to participants concluded on November 10, 2022, following the final interview. As detailed in Chapter 3's recruiting procedures, circular economy experts were selected through Google Scholar and LinkedIn based on their fulfillment of the sample inclusion criteria. After identifying potential experts, I sequentially sent the recruitment letter, which included the attachment of the consent form, over the LinkedIn site inbox. Most participants instantly acknowledged and accepted the terms of the consent form via email or LinkedIn inbox, or text. Some responded with agreed interest, but the formal "I consent" response had to be requested. Few prospective candidates required follow-up to respond. Except for four participants who had several reschedulings, the agreed-upon and scheduled interview dates and times were kept. All candidates who met the inclusion criteria responded

positively to the study topic. Fourteen experts consented to informed consent and participated in the research following network sampling.

Interviews

Within a few days of receiving my recruitment mail, candidates indicated their interest in participating in my research study. Once participants responded "I consent" to the consent form, I inquired about their availability for a Zoom video interview or an in-person interview at the earliest convenience in their local time zone. Most candidates agreed to an interview date and time within a few days. Due to candidates' geographic dispersion and preferences, 83% of interviews were conducted via the virtual Zoom meeting platform. Due to network issues and scheduling challenges, one of the participants was interviewed through WhatsApp video with my iPhone after numerous attempts to connect to the Zoom platform failed. In addition, two participants were elected for an in-person face-to-face interview at a voluntarily participant-provided office in Lagos, Nigeria, and Accra, Ghana.

Eleven Zoom video interviewees requested that I create and send the meeting invitation. I used the Zoom platform to generate the meeting invitation, which included dial-in information. I also copied each participant on the Google calendar invite and pasted the information into the mail correspondence. All interviews via Zoom were live-video to provide a virtual in-person alternative and were captured using Zoom's integrated recording tool and voice recorded with the TapMedia Pro app on my iPhone. I had no problems connecting with the experts via the Zoom video platform or the in-person face-to-face interview venue, nor with any of the used recording equipment,

except for one instance where we were compelled to use the WhatsApp video app platform on my iPhone. The TapMedia Pro digital audio recorder software generated an initial transcript that was cleaned up and edited as necessary. Zoom's integrated recorder voice data was also transcribed via the rev.com transcription service.

All 14 participants consented to have their virtual or in-person interviews recorded. Before conducting the expert interviews, I thoroughly tested the Zoom platform and external TapMedia Pro recording devices to guarantee that the connection and recording would perform smoothly. I used the TapMedia Pro app digital voice recorder on my iPhone as a backup voice recorder for Zoom due to the significance of the interviews and the rarity of the opportunity to meet the selected experts. Using a virtual conference tool such as Zoom was essential due to the candidates' locations spanning many time zones, from East African (CAT+2HR) to West African (WAT-1HR). Each interview was done following the interview protocol (Appendix B). Using the Zoom video app as a virtual platform enabled me to recruit and interview circular economy experts regardless of their location, thereby expanding the scope of my research study (see Yin, 2017).

Journaling/Reflective Field Notes

On October 3, 2022, I received IRB approval from Walden University and immediately began journaling and recording my reflective field notes after IRB approval was received. Every day, I examined the audit trail for impending tasks and recorded any modifications or updates. I added activity items with due dates/times and timely reminders to my calendar. Microsoft Excel served as the audit trail platform and

documented all activity (previous and prospective) for each participant. My committee

chair received weekly or more frequent updates on my progress with each key stage. I

also kept a handwritten diary to supplement the audit trail and ensure the consistency of

information across documentation. Journaling and reflective notes improved the study's

information and strengthened its validity.

To avoid researcher bias and manage any expectations, I regularly documented

my ideas in a journal and reflected on them. Active and mindful listening enabled me to

maintain objectivity during the interviews and gather rich, in-depth material from

participants. During the conversation, pauses, tone of voice, speed, pronunciations,

mannerisms, and the expression of vocal and word patterns enriched the interviewees'

responses and highlighted particular points of interest. The participant's reactions to the

interview questions transcended the literal meaning of the phrases, thereby enhancing the

data collection. I was culturally sensitive and treated each candidate's diverse

background, feelings, and emotions respectfully and without prejudice or preconceived

conceptions. After completing each interview, I provided each participant with the

transcript so they could review their responses, clarify their answers, and make any

required corrections (Jacob & Furgerson, 2012).

During the interviews, active listening and note taking were used to collect the

data. After each interview, the rev.com transcription service transcribed the voice

recordings as I documented my thoughts and emotions regarding the interview in a

journal. I next focused on the interviewees' pauses, tone of voice, speed, pronunciations,

and vocal and word patterns as I listened to the recording. The mannerisms and

inflections of the participants complimented their verbal responses and enabled me to recognize common patterns and themes. I listened to each recording multiple times to ascertain that I accurately captured the conversation's meaning.

Using a systematic, manual coding technique on the collected data, I discovered themes that emerged from analyzing the meanings and the delivery of the social reality constructed by the participants (see Vaismoradi et al., 2016). Patterns and themes that emerge from a multiple case study design enable the researcher to examine data within and across cases (Yin, 2017). By carefully selecting examined cases to forecast similar results (literal replication) and contrasting results (theoretical replication), the emerging themes gain significance and achieve their whole meaning (Yin, 2017). Multiple data sources were triangulated to strengthen the dependability and credibility of the data.

In addition to the inclusion criteria, the participants were chosen based on their willingness to share their views openly and provide detailed, in-depth responses to the interview questions. All participants' credentials in public leadership included expertise in circular economy, environmental and social policy, and sustainable innovation strategies. All participants authored extensive research publications or policy reports on the topic of interest during their public leadership roles. In addition, most participants directly understood their functions as economic advisors and consultants implementing climate change targets for adaptation, mitigation, and resilience strategies for their territory's climate impacts following their respective nations' Nationally Determined Contribution (NDC) plans. For the experts and I to have an explicit understanding of the terms linked

to this research, I provided definitions of the circular economy, circularity principles, technology readiness, and technology diffusion before the interviews.

Transcript Review

After the interview, I shared a copy of the recorded transcription with each participant. I requested that the transcript be reviewed for accuracy and completeness and, if required, edited. Asking participants to validate their comments through perusal of the transcript ensures that the interviewee's voice is heard and accurately represented, enhancing the data's credibility (Hagens et al., 2009). Two participants provided additional clarifications, edits, and written responses. Most participants confirmed the transcript's accuracy without additions or changes. The transcript review process was shared through the corresponding inbox or text with participants and me and logged in the audit trail. Once the participants evaluated the transcripts, concerns regarding the data's accuracy were reduced, and the data's credibility was strengthened (Merriam & Tisdell, 2015).

The candidates were provided the interview questions beforehand so they may prepare for the research interview. During the interview, the participants also had access to the interview protocol as a reference for providing appropriate responses. The questions were designed to elicit a detailed view of the topic from the perspectives of the experts. Due to the semistructured nature of the interview, participants could respond to some questions in a manner that impacted subsequent questions. The consequent redundancy of responses did not affect the interview data, as the interview process ensured that all questions were addressed consistently and in-depth but extended the

interview length. Participants could check, verify, and, if necessary, edit their responses to increase the data's validity and adhere to ethical standards while reviewing the transcripts. After the interview, each candidate received their respective transcript via inbox or text. Participants evaluated the transcripts to clarify comments, eliminate misunderstandings, and prevent misinterpretation of the obtained data (Mero-Jaffe, 2011).

The participants were provided with a copy of the definitions of circular economy, circularity principles, technology readiness, and technology diffusion to establish a shared understanding and serve as a guide for the transcript review. The process of reviewing transcripts serves as an extra tool for validating the accuracy and completeness of data. Most participants concluded the procedure in days without changes or extra remarks. Only two participants edited the transcript and added clarification information to the responses. Before encoding the data, the final transcripts were saved in password-protected files and folders following the ethical protocols stated in Chapter 3.

Data Analysis

The descriptive coding strategy was used for analyzing the raw data collected to assign meaning to the data segment and for the emergence of words and phrases for further categorization and thematic analysis (Saldaña, 2016; Vaismoradi et al., 2016). The raw data (transcripts) from fourteen participants' interviews provided in-depth views on the phenomenon under study. Interview transcripts, journaling notes, and archival data were collected for the data analysis process using content analysis to categorize and identify categories and themes (Merriam & Tisdell, 2015). Data segments were identified

from transcripts, and codes were recorded to capture emerging patterns (Saldaña, 2016). The collected data from the transcribed interviews, coupled with the reflective notes and archival data, resulted in an in-depth understanding of the views of African public leadership experts on how sub-Saharan African leaders can enable the technology readiness and technology diffusion needed for a successful transition to a circular economy.

Using Microsoft Excel, a data transcription was created, analyzed, coded, and categorized (Yin, 2017). Identified themes, words of significance, viewpoints, and documented activities were analyzed and organized using thematic analysis to generate the models and themes from the data in developing a case study database (Yin, 2017). By aligning the data collection and analysis, I engaged with the concurrent emergence of critical concepts aligning with the purpose of the study (see Stake, 2013). The descriptive coding method involved manual coding, categorization, and recognizing emergent patterns and themes across the cases (see Saldana, 2016).

To evaluate case study data, I adopted Yin's (2017) suggestion of a "ground-up" approach. This strategy entailed analyzing the data from the "ground-up," allowing essential concepts to emerge by thoroughly examining the data. This strategy was the most appropriate for analyzing multiple case study data, utilizing emerging concepts to answer the research question (Yin, 2017). This strategy was also consistent with the descriptive coding method (Saldaña, 2016) I used. The thematic analysis approach was employed to code the data systematically for the descriptive coding method. The systematic process for mapping the structure of common themes enabled the researcher to

transition from data collection to data analysis. I uncovered data segments in the participants' transcripts that described experiences and categorized keyword sets (Saldana, 2016). Yin (2017) recommended cross-case synthesis as the most suitable data analysis method in multiple case study research. Cross-case synthesis is more expedient than content analysis for a Ph.D. study that includes comparing and contrasting cases rather than just analyzing individual cases. The cross-case synthesis method entails analyzing each case separately and synthesizing the findings across cases. When generating theoretical propositions from qualitative studies, designs that combine within-case analysis with cross-case synthesis be more robust than designs that only use within-case analysis (Halkias & Neubert, 2020).

After the interview data were coded, the next step was to organize the themes into classifications grounded in the conceptual framework and literature review discussed in Chapter 2. The codes highlighted common themes from the participants' responses while the researcher gathered research data and other field notes (Merriam & Tisdell, 2015). Each case illustrated the perspective that describes African public leadership experts' views on how sub-Saharan African leaders can enable the technology readiness and technology diffusion needed for a successful transition to a circular economy. Cross-case synthesis was used as the data analysis technique for this multiple-case research to establish whether the case studies are comparative by analyzing the convergence and divergence of the obtained data (Yin, 2017).

This study's thematic analysis was conducted by hand-coding the data following the descriptive coding approach (Saldaña, 2016). The descriptive coding approach was

utilized to provide meanings to segments of data obtained from interviews and the

descriptions of African public leadership experts' views on how sub-Saharan African

leaders can enable the technology readiness and technology diffusion needed for a

successful transition to a circular economy. This procedure identified words or phrases

for indexing and categorized the data (Saldaña, 2016). I manually coded the interview

notes using an Excel spreadsheet to insert the participants' transcribed responses to the

questions once the transcript evaluation was completed. The triangulation of data and

word coding also facilitated a more extensive discovery of patterns and enhanced

dependability by highlighting common linkages across multiple cases. I determined

coding categories and emerging themes that provided an answer to the research question

(see Yin, 2017).

In the course of analyzing the study's data, I identified a total of six coding

categories that contained a total of twelve overarching themes. The coding categories

were (a) African public leaders' technology readiness, (b) African public leaders enabling

technology readiness for a circular economy transition, (c) African public leaders'

adoption of technology, (d) African public leaders enabling technology diffusion for a

circular economy transition, (e) African public leaders' professional preparation for a

circular economy transition, (f) African public leaders' willingness to adopt a circular

economy transition.

The conceptual framework, which included two concepts, served as the

foundation for the six coding categories explaining factors of economic geography

impacting the diffusion of the innovation process within the countries of East Africa and

West Africa regions and the significance of stakeholders' views on rapid technology diffusion and its implication for labor market challenges within impoverished communities in sub-Saharan Africa: 1) Rogers's (1995) concept of *diffusion of innovations;* and 2) Grafström and Aasma's (2021) concept of *the circular economy*.

I immersed myself in the data using the manual descriptive coding method (Cronin, 2014). This strategy allowed me to connect deeply with the data and assisted me in developing a comprehensive grasp of the collected data and the research problem (Finfgeld-Connett, 2014). Following Saldaña's (2016) recommendations for beginning researchers, I chose manual coding over Computer Assisted Qualitative Data Analysis (CAQDAS) software for data analysis.

Throughout the data analysis, I used the semistructured interview protocol, with items grounded in this study's literature review and conceptual framework and field-tested by a panel of three experts. For triangulation purposes, I also referred to archival data in the form of current business, economic, and financial analyst reports and case studies on sustainability, sustainable development, economic development, and management of the transition to a circular economy business model in sub-Saharan Africa (see Yin, 2017) and my reflective field notes (Merriam & Tisdell, 2015). Throughout the data analysis process, I utilized my reflective field notes to reflect on participants' responses during within-case and cross-case data analysis. I substantiated my interpretations with archival data to manage my researcher's bias and stay focused on the research problem and purpose. I immersed myself in the data to improve my understanding and extensively analyze the responses to the interview questions in an

iterative verification cycle between the data obtained and emerging themes and categories.

Multiple data sources (interview transcripts, journaling, and archival data) were utilized to comprehend the perspectives of African public leadership experts. As I repeatedly analyzed obtained data, themes, patterns, and categories, I sought objective interpretations aligned with the research problem and purpose. The iterative technique enabled me to find recurring themes and categories, indicating that more coding would not yield new information (Fusch & Ness, 2015). Six coding categories based on the conceptual framework emerged from three root nodes, and 12 themes were gleaned from the thematic analysis of the raw interview data.

I used a hierarchal coding frame to organize codes and themes based on how they relate.

Root node: *preparing for technology readiness*

    Coding Category: *African public leaders' technology readiness*

        Themes: 1) lack of focus on technology capabilities for the CE, 2) leadership knowledge development on the CE

    Coding Category: *African public leaders enabling technology readiness for a circular economy transition*

        Themes: 1) CE transition remains unaddressed, 2) finance an adequate ICT infrastructure

Root node: *enabling technology diffusion*

    Coding Category: *African public leaders' adoption of technology*

Themes: 1) leadership education is needed to enable the adoption of the CE, 2) policymakers must develop legislation and programs to enable tech adoption for the CE

Coding Category: *African public leaders enabling technology diffusion for a circular economy transition*

Themes: 1) institutional and technical capacity building for technology diffusion, 2) engage stakeholders in the CE transition process

Root node: *leaders' preparation for a successful circular economy transition*

Coding Category: *African public leaders' professional preparation for a circular economy transition*

Themes: 1) leaders' knowledge barriers to launching a CE transition, 2) leaders' cultural barriers to a CE transition

Coding Category: *African public leaders' willingness to adopt a circular economy transition*

Themes: 1) willing to form public and private sector partnerships, 2) willing to develop economic and infrastructural capabilities

When presenting the results of a case study, Boyatzis (1998) suggested considering the data type, the study's purpose, and the intended audience to choose the most appropriate format for the presentation of the findings. This study presents the themes and categories as a table for a visual representation of African public leadership experts' views on how sub-Saharan African leaders can enable the technology readiness and technology diffusion needed for a successful transition to a circular economy (see Harding, 2018).

As shown in the hierarchal coding frame above, each theme belongs to its corresponding category. Differences occurred among the themes with the frequency of incidences, which present certain cases as more notable than others from the data analysis. Further discussion in Chapter 4 will identify the frequency of occurrence for every theme across the cases in the "Cross-Case Synthesis and Analysis" section with a visual representation graph.

Table 3 below presents the finalized coding categories and themes of this multiple case study, along with representative participant quotations aligning with each of those categories and themes.

Table 3

Coding and Theme Examples

Participant	Interview Excerpt	Coding Category	Theme
Participant 8	"Fundamental thing is really around actually being aware, themselves, that this is something that's important. And that being aware as possible, as far as technology goes, is a country to be more technologically driven. If we don't join that trend, then we're likely to be left behind, with all the consequences that come with that."	*African public leaders' technology readiness*	1) lack of focus on technology capabilities for the CE, 2) leadership knowledge development on the CE
Participant 3	"One of the key things that I feel is missing when you discuss the	*African public leaders enabling technology readiness for a*	1) CE transition remains unaddressed, 2) finance adequate ICT infrastructure.

Participant	Interview Excerpt	Coding Category	Theme
	circular economy, it's not so much that there isn't a circular economy, but when you talk to most people, they actually don't even understand what you mean by a circular economy. So, even at the level of tertiary education, I would argue that the way we look at economies has to change. We have to look at them in a slightly different... Right now, we just look at GDP. I would argue we need to start looking at things like, the blue economy, the green economy, the circular economy in order for people to begin to pay attention."	*circular economy transition.*	
Participant 5		*African public leaders' adoption of technology*	1) leadership education is needed to enable the adoption of the CE, 2) policymakers must develop legislation and programs to enable tech adoption for the CE
	"Also, we need to fix again leadership awareness gap, sub-Saharan African leaders, policy makers need to be aware of about the effects of climate change on the environment, on crops, um, our livelihood and climate financing opportunities and the carbonization credit and its usefulness in the transition to a circular economy and help meet		

Participant	Interview Excerpt	Coding Category	Theme
Participant 2	our SDGs pledges towards achieving net-zero in the continent. So, two things, technology acceptance and diffusion and leadership awareness."	*African public leaders enabling technology diffusion for a circular economy transition*	1) institutional and technical capacity building for technology diffusion, 2) engage stakeholders in the CE transition process
Participant 4	"Why I started off by saying that you've got to look at the technology diffusion in stages, or the type of technology in stages and where sub-Saharan Africa is, in my experience, is at the stage where perhaps maybe moving on from the least efficient into the slightly more efficient, as opposed to just going all the way to the other extreme… And it tends to fail at that stage because it's not being done right."	*African public leaders' professional preparation for a circular economy transition*	1) leaders' knowledge barriers to launching a CE transition, 2) leaders' cultural barriers to a CE transition
Participant 1	"So again, not that they've specified it as circular economy, but it's kind of like these are opportunities, as you say, for African countries to say, Okay, hang on a minute. If this is an opportunity for us to start to think about is there a possibility for circular economy to come into this play to make things cheaper and to avoid waste?"	*African public leaders' willingness to adopt a circular*	1) willing to form public and private sector partnerships,

Participant	Interview Excerpt	Coding Category	Theme
	"Okay, so what I would say is we need a political will for some of this to be done in Africa or sub-Saharan Africa because now the world is shifting, and we also have to move…the world is moving towards circular economy, and we cannot remain in a traditional economic system…there should be deliberate policies and government action in promoting digitization within our various countries."	*economy transition*	2) willing to develop economic and infrastructural capabilities

Evidence of Trustworthiness

Credibility

Credibility in a qualitative study can be strengthened by peer debriefing, member checking, prolonged engagement with the subject matter, deep knowledge of the topics, researcher reflexivity and competing explanations, triangulation, and referential adequacy, and a thorough examination of any cases that were not favorable to the researchers (Lincoln & Guba, 1985; Yin, 2017). It was vital for me to study my data extensively, match my data and analysis, and establish a strong fit between my data and emerging analysis (Shenton, 2004). A preliminary field test with subject matter experts determined if the study's interview questions would answer the central research question

(see Tracy, 2019). Upon candidates' acknowledgment and acceptance of the consent form and its provisions, the interview was planned at a time and day of their choosing to ensure they would be comfortable and uninterrupted. The specialists and I rapidly developed a rapport based on our mutual interest in the research topic, which fostered a cordial relationship from the initial contact to the conclusion of our conservations.

I encouraged each participant to elaborate on topics they were comfortable with and detailed each response to ensure clarity. To ensure the credibility of the study's results, I had each participant review and approved their final interview transcripts (Birt et al., 2016; Mak-van der Vossen et al., 2019). I interviewed experts beyond the minimum of five for qualitative multiple case studies until I reached data saturation with 14 participants. Participants 11, 12, 13, and 14 had comparable data (see Halkias & Neubert, 2020; Schram, 2006). I kept an audit trail and journal from receiving Walden's IRB approval until the last participant encounter.

Transferability

Transferability is the measure of generalizing and adapting research findings to new contexts and settings (Amankwaa, 2016). In qualitative research, generalization through transferability requires the researcher to conduct an in-depth analysis and interpret the study group using context-dependent knowledge (Carminati, 2018; Yin, 2017). Reflexive journaling enabled me to reflect on my bias and stance. Active listening and mindful note-taking allowed me to manage bias. I built a rapport with the participants and maintained a prolonged engagement to collect rich data that enabled me correctly depict the participants' remarks (Birt et al., 2016; Connelly, 2016).

Using a purposeful sampling strategy, I recruited and interviewed qualified experts who provided data addressing the research's central question. The careful selection of participants allowed me to obtain data saturation with a small sample of experts. The group's expertise produced thick descriptions and rich data, and personal biases were controlled without affecting the study's accuracy and generalizability (Hasson & Keeney, 2011; Morse, 2015). I utilized follow-up questions and encouraged participants to expound to get rich expert data. I detailed the data and analysis to make the study more transferable to another context (see Carminati, 2018). I kept track of the significance and implications of this study's findings by maintaining a detailed audit trail and reflexive journaling with all participants-related occurrences (Houghton et al., 2013).

Dependability

Dependability in qualitative research may be achieved by ensuring that the findings are consistent with the data gathered when there is a logical basis to the results, hence improving the likelihood of replication using diverse methodologies (Merriam & Tisdell, 2015). I used a detailed audit trail to describe every step with each participant from the initial to the last contact and document every decision I made and action taken to describe the consistency within the research. I established a linkage between the findings, the obtained data, and the research question by ensuring the reliability of the analysis (see Connelly, 2016).

The detailed audit trail enhanced the study's credibility, transferability, dependability, and confirmability (see Amankwaa, 2016). My audit trail contained the raw data, a detailed data reduction process, analysis, synthesis, reflective journaling, and

data analysis triangulation strengthened the study's dependability (see Lincoln & Guba, 1985). For the effective alignment of all phases of the research, I supported the evidence linking the findings to the study's central research question and the clear and succinct writing of the results (Yin, 2017).

Confirmability

In qualitative research, the concept of confirmability addresses the critical issue that the results should be as close to the actual case being studied as feasible, not the researcher's personal views or biases and that the researcher's subjectivity should be kept in check (Amankwaa, 2016; Hasson & Keeney, 2011; Morse, 2015). To maintain the objectivity of this study, I was conscious of my subjectivities, used persuasive strategies to formulate neutral questions, and was cognizant of my function as the researcher and not the expert (see Morse, 2015). However, according to Berger (2015), the use of audit trails, triangulation, and researchers' participation in reflexivity through a research journal is necessary to keep participants' voices and perspectives alive and to retain researchers' awareness of their roles and associations (social and emotional) with participants.

To mitigate bias in this study, I meticulously logged each participant's activities through an audit trail. This audit trail included documentation of all decisions and actions executed. I was able to construct objective interview questions by reflecting on my beliefs, assumptions, emotional experiences, and bias through the use of reflexive journaling. I managed my bias consistently by retaining the raw transcripts of the expert's responses. To reduce my bias during data collection and analysis, I utilized a transcript review procedure that allowed each participant to evaluate and approve their transcript.

Utilizing triangulation amongst many sources confirmed the study's findings and consistency and strengthened its confirmability.

Study Results

This qualitative multiple case study is framed by two key concepts that focus on the significance of stakeholders' views on rapid technology diffusion and its implication for labor market challenges within impoverished communities in sub-Saharan Africa: 1) Rogers's (1995) concept of *diffusion of innovations;* and 2) Grafström and Aasma's (2021) concept of *the circular economy.* The study's conceptual framework aligns with the study's purpose to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy.

A sample size of 14 subject matter experts participated in the interview process and shared their views on the strategies needed by African public leaders for a successful transition to a circular economy. This study's overarching research question was: *How do African public leadership experts describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?* A multiple-case study design helped me collect data segments to build a list of phrases and words to categorize and index, as Saldaña (2016) recommended when using the descriptive coding method.

The manual coding method was used to formulate the themes that emerged from the thematic data analysis and cross-case synthesis analysis so that I may evaluate and describe convergent and divergent data across 14 cases. The multiple case study design's

primary goal is to replicate the same findings across several cases by exploring the differences and similarities between and within cases (Eisenhardt & Graebner, 2007). The unit of analysis in this study was the African public leadership expert. Each unit of analysis becomes a case study by itself (Eisenhardt & Graebner, 2007; Yin, 2017). The reliability of multiple data collection methods ensures rigor and credible results for replication studies in the future (Yin, 2017). Identifying similarities and differences in the evolving themes across the cases and eliminating the issue of non-relevant information was iterative throughout the data analysis and included developing reflexive journal notes explaining participants' experiences and views regarding the subject matter and the studied phenomenon during the interview process (Yin, 2017).

Using a convergence and divergence analysis of the data obtained, the cross-case analysis conducted during the data analysis helped identify the similarities across the cases (Halkias et al., 2022). Several sources gathered evidence using diverse data gathering methods, such as semistructured interview protocols, reflexive field notes, and archival data such as current business, economic, and financial analyst reports and case studies on sustainability, sustainable development, economic development, and management of the transition to a circular economy business model in sub-Saharan Africa, were used to implement triangulation. Audit trials and transcript reviews were also conducted throughout the data collection and analysis processes (see Merriam & Tisdell, 2015; Yin, 2017).

Yin (2017) recommends using a harmonized platform for cross-case comparisons and thematic analysis to ensure consistency when gathering and analyzing data in a

multiple-case study design. The cross-case analysis was conducted by categorizing the

emerging themes in a tabular format during the data analysis process, allowing a cross-

reference of the results to visually represent the participants' direct quotes (see Halkias &

Neubert, 2020). The two phases of this study's data analysis were completed as described

in detail below: a within-case analysis of each selected case and a cross-case analysis of

the data to find similarities and differences across the categories and themes (Yin, 2017).

First Phase: Thematic Analysis of the Textual Data

Because synchronized data collection and data analysis could impact the strength

of study results, Nowell et al. (2017) recommended conducting the data analysis in a

sequence of steps for the trustworthiness process. A step-by-step process allows for a

logical and objective obtention of study results, reflecting the data collection and analysis

processes and delivering credibility and dependability. The following paragraphs present

the themes from the interview data collected and analyzed, along with representative

verbatim quotes for an in-depth understanding of participant voices in the study results

presentation. The participant's responses were categorized into the following 12 themes

based on the coding and analysis results.

Lack of Focus on Technology Capabilities for the CE

This theme describes the lack of technological capacities for the circular economy

in Africa due to inadequate infrastructure, financial resources, and competent human

capital. Innovation is recognized to play an increasingly important role in developing

countries of Africa since it can link a new invention and its widespread adoption across

all income groups, including individuals living in impoverished regions (Chunguang &

Quayson, 2022). Scholars argue that developing African countries still register a gap in the relationship between general technology diffusion and innovation, characterized by a lack of efficient technology capabilities (Orji et al., 2022; Santos & Halkias, 2021). Participants discussed the challenges in facilitating access to new technology that enable circular economy innovative solutions in Africa, characterized by a lack of leadership awareness critical to socioeconomic growth and as the most crucial factor in resolving ecological problems and driving globalization to boost circularity toward sustainability.

Participant 3:

Well, I'm not sure that the government's technology readiness agenda is devoted solely to... What do you call it? To the circular economy. I will discuss with you in very broad terms what the government's agenda is. And I think at the heart of it, we have seen the agenda on technology gain ground perhaps most efficiently and effectively in terms of financial technology. However, it is now beginning to move. And by the way, the agenda around financial technology, even though we have not made the inclusion milestones that we have intended. But what is clear is that the government has moved in terms of financial technology to enable people who ordinarily would not have bank accounts, who would ordinarily not be involved in transactions to become involved therein.

Participant 13:

Uh I believe we should focus on boosting clean energy and renewable energy in all its forms um. We should also look at how technology and digitization are changing the way we do things. For example, the use of hydrogen is growing,

particularly in industrialized countries, and we hope that this trend will spread to Africa. Because, in my opinion, and I'm saying this because, in addition to the technological platforms we already use, such as solar power, adoption of precision farming through internet access and maybe AI, and platforms where we use technology to extract organic fertilizers, and so forth., we need to find new ways to use technology. AI-enabled machine processes are also the subject of a lot of research. I think that both on-grid and off-grid solar power, along with hydrogen, are seen as important parts of the transition. I also think it's apparent we are lagging in tech readiness and utilization also, with what could be available to us due to the unique challenges Africa faces.

Participant 2:

Okay, Okay, so in order to try and move, sub-Sahara Africa along this path of growth whilst fitting into the transition discussion, all kinds of things can be done, for technology diffusion. So, there are ways to break it down, the first question I want to ask myself is twofold. One, what type of technology? Two, what stage of technology development? To navigate those kinds of things, then we have to ask ourselves another question, which is where are we? And when I say, we now – sub-Saharan Africa. So where are we at the stages of developed, right? Take a country like Nigeria, which is where you and I are both familiar. We are referred to in some, some of the literature as a gas province with some oil in it. So, in terms of the resource base, there is that fossil still. But a lower emitting type of resource available. When you superimpose where the country is, in-terms of it

stage of development, you then have challenges such as, structural challenges,

such as power generation. You have, um, healthcare problems. You got education

issue.

Leadership Knowledge Development on the CE

This theme describes how to develop leadership expertise on technological

readiness and technology diffusion needed for a circular economy strategy that might

accelerate the transition to a circular economy. For sub-Saharan African leaders to enable

the technology readiness and diffusion necessary for a successful transition to a circular

economy to take root and be compelling, it should be adopted at all levels of the economy

(micro, meso, and macro) and every stage of the value chain (Grafström et al., 2021).

African public leadership is, thus, critical at this level to co-developing strategies through

goal-oriented network governance facilitated by transition brokers to promote the

transition to a circular economy (Cramer, 2022). Participants described the challenges

posed by insufficient guidance activities for developing circular economy actual economy

links and networking to increase circular economy undertakings' success rates and

productivity, promote circular economy investments and activities, ensure benchmarks,

and facilitate collaboration.

Participant 4:

So, if I look at it from a digital perspective, things that we've looked at is how

digital technology can enforce or foster and support circular economy across

different industries by creating things like shared platforms. Another thing that

we've been looking at is what does that mean for business models? So, if you're

starting to think about circular economy and in incorporating that into a supply chain, what will the business model look like? Who gets to be the clients? Who gets to be the consumers? Who gets to be the benefactors of it? What is the value proposition and what sort of business model will fit into the pre-existing model? Should it be separate? Should it be something that is added on? So, at the moment, what we are doing in our sector is facilitating those discussions with the private sector as well as government officials.

Participant 5:

It's just using tools that exist. So, we use mobile. Yeah, I'm the minister of education as well. Um, a major part of what we did is the curriculum change. So, we bring back in, environmental education in the curriculum. […] Like I said earlier all this are all sort of capacity building needed, it is about developing the needed skills in- country to be resilient.

Participant 14:

First of all, in plastic bags, it's not us as government that do the recycling that we use, but we have private sector institutions that are in charge of that. So So, the technology falls within their industries, I would say, but I have been able to visit some of these industries. They have got some machines that are used to change these plastic bags into other different products. We also have another industry that recycles the e-waste like computers, and they also have their own systems in there. I'm not using it, the technologies of the industry set up, but they have their own industry, and they collected these laptops across and then try to manufacture

them into other products. So that is what we are doing. I am not very sure of the

kind technology, but yes there are some machines, there are some inventories that

they have met, and the progress is really, really very interesting if you see how it

is made. But yes, I'm sure there is some technology that is being used within those

machines because plastics are changing into other specific products and the same

as e-waste, including computers.

CE Transition Remains Unaddressed

This theme describes the absence of national frameworks that ensure technology

readiness and circularity among programs, the diversity of socioeconomic conditions, and

the determination to address them directly. Scholars argued that most African nations

lack the necessary support of formal institutions and legal and regulatory frameworks

essential to enable circularity, owing to the slow or non-existent implementation of

mechanisms for transitioning to CE (Ezeudu et al., 2022; Grafström & Aasma, 2021;

Panwar & Niesten, 2022). Ostensibly, most policies were not designed to promote the

circularity of the economy, and the infrastructure in many African nations was not

intended to support the circular economy (Dunmade, 2018). Participants discussed the

challenges of integrating formal and informal enterprises in cluster synergy formation to

improve scale, skills transfer, productivity, and competitiveness to support the

implementation of technology readiness and knowledge needed in sub-Saharan African

nations through government commitment to facilitate climate finance/carbon credits to

promote circular economy business model development.

Participant 7:

The issue of climate change must be taken seriously but I understand Africa need funding, but we also lack frameworks or modalities to even attract these funds available in the market. For example, some reports solicited that carbonization funds, um the carbon credits is a probable opportunity to strengthen sub-Saharan African economies and stimulate climate action positively.

Participant 5:

Mind you most of these things are novel in our environment and difficult to comprehend even at leadership not to mention the regular African with several other priorities. So our leadership current priority is time is education beyond what we want to do, and we're looking at how we earn the carbon financing, uh, climate financing, and about using technology, renewables, green energy. So, it really is just a set of questions and priorities that the leadership has.

Participant 4:

But I do know that countries in the Eastern Africa, looking around the solar panel issues, are looking to start implementing that as part of their energy plans for in the future. But to get to that step, and I think some other countries might have already explored it, they are starting to think about, Okay, what are the things we need to be thinking about when we think about solar panels? If this is going to become part of our end to end, do we need to start to consider local markets and what does that look like? So again, not that they've specified it as circular economy, but it's kind of like these are opportunities.

Finance Adequate ICT Infrastructure

This theme describes how the transition to the circular economy depends on systems built on enabling technologies, with adequate funding serving as a crucial enabler of the transition by enhancing socio-economic levels with proper access to information and communication technologies (ICTs) and their use of the Internet for multiple purposes. Compared to developed nations, most African nations have a poorer capability for 4IR (digital infrastructure and ecosystem) than advanced economies (Signé, 2020). Consequently, investing in technological infrastructures and businesses is vital to bolstering Africa's resilience and circular economy readiness, particularly in broader digital infrastructures, ICT technologies, tech ecosystems, or startups (Signé, 2020). Participants discussed the challenges associated with determining whether the continent's leadership will make the necessary investments to maximize the benefits of emerging technology. African leaders must proactively handle any risks while supporting improved access to technology to allow consumer usage of circular economy solutions (through ICT infrastructure/mobile phones) and the transition from a product-based to a service-based economy that is less dependent on natural resources.

Participant 8:

I think the main thing we did there was really to look at financing the telecoms infrastructure. In particular, we financed one company that built fiber optics cables and data center, and really improved connectivity to Nigeria and the rest of Africa at the time. We help foster the telecommunications technology infrastructure that enhances internet access connectivity and thus, digitization

access to a variety of industries and communities. That, I think, is the main thing that we did.

Participant 9:

We have reached the time that without technology, we are not going anywhere. If we ignore technology, we do it at our own demise. In Ghana right now, we want to expand trade, we want to expand our production, we want to make sure that people are able to engage one another but using the electronic platform. There's one division at my ministry, Business regulatory [inaudible 00:26:10] Reforms. What they're doing is that they want to make sure that we have a common platform, that all business laws, permits, certificates, everything is uploaded on one platform. So a business-... sitting anywhere, by a click...Yes, digitalization. […] So I can assure you, technology is something that we should not shy away from. It's something that we must all imbibe, but like I said from the beginning, it comes with costs, it comes with skill training. And then the last but not the least, it comes with change management. So you need to get all these things into play so that people can accept it and run with it. Especially at our economies where people believe that we need to have mass employment. Sometimes people see that with the coming in with technology, we are rather getting people out of employment because technology, robotics and other things, are making [inaudible 00:29:26] the manpower. So, these are some of the things that we need to make sure that we build an ecosystem. Yes. So that if there's technology, then we also

look at the value chain where human hands can also be employed so that we can build a sustainable economy.

Participant 12:

Well, we know digitization. I mean, we believe that as a country, we believe digitalized economy now. So almost everything that we do with digital technology is a driving force. So we have what you call the mobile money transactions that we do. Yeah, we also have interoperability where people can transfer money from one mobile network to another

Leadership Education is Needed to Enable the Adoption of the CE

This theme refers to narratives about decoupling economic growth from resource needs as Africa moves toward a circular economy through leadership education, understanding of the consequences of climate change on the environment, and the current economy's realities and opportunities on technology readiness and diffusing the necessary technologies. Expert knowledge supporting policy action and influencing public policy might play a significant role in determining the directionality of circular economy transitions through environmental laws, standards, tariffs, subsidies, and innovation policies (Kern et al., 2020; Köhler, Geels, et al., 2019). Participants discussed the responsibility challenges of African public leaders as transition role models, as well as the government's inability and lack of awareness to develop guiding principles and create several knowledgeable change brokers to assist the private sectors and stakeholders in understanding the economic growth opportunity by the circular economy model.

Participant 3:

I think at the heart of it is going to be education. Because it's one thing to have technology and have technology platforms, it's another thing for people to understand what these technologies are about, what they can enable and how they should be able to deploy them. Now, and at the heart of that, as I say, is education across all levels. […] We are talking about it, but I'm not even sure that in terms of public discourse, that this is at the heart of any public discussion. And so for me, education awareness becomes very, very important.

Participant 10:

Stop the talk. Stop the talk and walk that talk." Yeah? We don't like photo opportunities, execution, bring it to life. So that's what it is really. Walk the talk. That's what's happening in Rwanda. Look, the only country with a huge representative of women in government is Rwanda. And it's not just women, we're talking about youth. People who are holding serious offices are the youth. Most of them are under 40, […]. When you have dinosaurs, how can you move forward with dinosaurs in the right offices? So, we have the wrong people in the right positions. That needs to happen. You need people that are in touch with reality, people that are tech-savvy, be part of policy making body, those conversations. Having the right people in right places does the job. This is not rocket science. Why do you need a godfather to be in office or to hold a position? So that's one of the problems.

Participant 6:

Technology readiness? I think they have to put certain structures in place. You

need to be able to establish a team or an institution that is going to take up that

mandate responsible for ensuring the successful seamless implementation of the

energy transition plan, and within the institution, they will have to have the

relevant units or departments responsible for the technological aspect of the plan.

Policymakers must develop legislation and programs to enable tech adoption

for the CE

This theme describes the strong public leadership traditions of regulatory

frameworks and programs required to facilitate tech uptake for the circular economy and

the active involvement of states in supporting and implementing circular economy

activities to maintain competitiveness. The legal and regulatory frameworks necessary to

promote circularity are still in their infancy in most African nations (Desmond &

Asamba, 2019). Most policies were not designed to promote the circularity of the

economy since the technological and economic infrastructure in many African nations

was not intended to support the circular economy (Dunmade, 2018).

As a result of a thorough understanding of significant trends in practice, the

drivers and barriers to such transformative reform from a linear economy to a viable

circular economy are of policy interest (de Jesus & Mendonça, 2018). Participants

described the challenges faced by sub-Saharan Africa to realize its economic prospects,

the necessity for clear policies to regulate or incentivize the industry's shift towards

circularity, and how African policymakers should mobilize regional development

financial institutions and stakeholders to support scalable technology and establish

deliberate legislation guided by circular principles in order to industrialize.

Participant 12:

So, there should be deliberate policies gear towards circular economy, there

should be deliberate policies and government action in promoting digitization

within our various countries. And there should be support. That's why I'm talking

about, political will, because once there's a political will, various government will

be able to do what they have to do. There should be a support from the

government for the various actors within the circular economy to be able to

promote their works and to be able to advance whatever activities that they find

themselves doing. So, this is what I expect or will advise the various government

within the sub-Saharan African country to be able to do.

Participant 3:

Number one, Africa needs to have informed understanding about how building a

circular economy positively impacts its own development and goals. Because

unless there is demonstrative or a demonstrable positive impact... So as I was

saying, the first thing is that there has to be a demonstrably positive impact of

pursuing a circular economy agenda on growth, on development within the

African context. If we cannot show that, then forget it. Nobody is going to listen

to you. And I think that is very, very important because a lot of people in my view

take it for granted that it is going to be positive if we can generate... How? Why?

And what nature are the benefits that [...]. So, that for me is number one, that we

need to be able... Number two is then that policy makers having understood what the benefits are, having been able to identify them, can now begin to build a framework of legislation, policy, and programs. So, it's three things, legislation, policy and programs that enable a circular economy to be built. Because again, without that, we're just wasting everybody's time. Because without the framework, it doesn't matter whether it's national, sub-national. And then the third thing becomes, in my view, how do we bring people in? How do we crowd people in? And it's not always about money, even though resources are a big part of it. And that is where we go back to the point that I was making earlier about awareness creation and the like.

<u>Participant 7</u>:

Well post Covid, it became very clear that the future of the world is being able to integrate technology in every aspect of our political and social economy. And so, the advice I'll give the African leader must, as a matter of necessity adapt technology to be the foundation for creating values and doing the work they do. It has to be made a law or policy or an organizational direction that technology is a priority and it's a foundation.

Institutional and technical capacity building for technology diffusion

This theme describes how the technical capacity and willingness to plan, implement technological diffusion in society, and promote change have been viewed as an increasingly vital component of public sector organizations and leadership. Most African nations lack the support of formal institutions and legal and regulatory

frameworks to enable circularity, owing to the slow or non-existent implementation of mechanisms for transitioning to circular economy (Ezeudu et al., 2022; Grafström & Aasma, 2021; Panwar & Niesten, 2022). Participants discussed the challenges of realizing the circular model's goal of cyclical and regenerative environmental breakthroughs in societal governance, manufacturing, and consumption in African nations, citing the need for universal access to renewable energy.

Participant 6:

You have to have that driving institution that's number one. You can't just allow international companies or organizations or development partners to just come and do everything for you. It won't be coordinated. You need to have a coordinated body that's going to receive support from various players, development partners, development finance institutions. Ultimately, you need that coordinating institutional entity who's going to be responsible for driving the transition. And within those units, you have various sub-units responsible for different aspects for example, new technology, on-grid/off-grid space etc. This institutional entity really has to be intentional towards helping countries achieve net-zero. If not, you may find a lot of duplication of effort amongst well-intentioned international organizations. Therefore, there is need for a coordinated body that would allow for all the various moving pieces to fit together.

Participant 12:

I must add that a lot still need to be in place to achieving universal access through the energy transition strategies for example, emissions reductions planning,

focused on scaling up for boosting the clean energy in the form of renewables in their different forms and the technological digitization responses needed to diffuse power generation accessibility in our societies. Also, for instance, the use of hydrogen is on the increase especially in the developed countries. Africa could be supported to adopt these new and emerging energy technologies and scale through collaborations with the global global north.

Participant 2:

You can quote-unquote leapfrog on existing technology. Yes. An existing technology. Um, and then there's also a third layer to that, which is, you've got the resources, you've already been producing gas, so you can't necessarily, it's going to be difficult to turn away from it. But in the production of your gas, you've also been providing power generation using heavy fuel oil, and diesel. So, you can move away from those, into that middle, middle fuel as you develop other technologies. I stress this point because I would argue that one of the reasons why developing countries in particular have not been able to accelerate these parties because they don't have the means from guarantees to fiscal tools. To provide those kinds of incentives.

Engage stakeholders in the CE transition process

This theme refers to the targeted engagement of public actors, particularly the mobilization of proactive drivers and stakeholders willing to join forces and offers improved prospects for advancing circular initiatives. Collaborative engagement may be more likely to lead to high levels of circular economy innovation and socio-economic

change, encouraging other players (e.g., government, institutions, or public leadership) to

explore new circular economy solutions that create an alignment of economic, modern

technology, and social elements to expedite the transition to a circular economy

(Andriamahefazafy & Failler, 2021). Participants described the challenges associated

with transitioning to a systemic circular economy, which involves multiple stakeholders

for various methodologies, such as legislation and policies, support infrastructure, and

social awareness and involvement of stakeholders.

Participant 4:

So, I see it as when I say ecosystem of players, you need to look at industry

experts, policy makers, legal systems, legal people, private sector. Universities are

very important. So, it's looking at your ecosystem and what role they play in that

area.

Participant 10:

The missing stakeholder here is the government. So it's all about getting the

government to actually join the party because they have been the missing voice in

all of it. We need the enabling environment, and the private sector and other

stakeholders need to call on the government, they need to be a bit more forceful in

forcing policy change.

Participant 3:

And so at the heart, first and foremost is you must have a stakeholder mapping.

And that stakeholder mapping must be comprehensive enough to identify what

the various stakeholder interest is in the circular economy… we have to begin to understand, what are the issues that hinder building a circular economy?

Leaders' knowledge barriers to launching a CE transition

This theme describes the knowledge gap among public leaders regarding the circular economy and the roles of digital technology in supporting the circular economy. Despite numerous critical technology advances, multiple studies have found that those who utilize these solutions lack in-depth knowledge and expertise to appropriately transform their organization for participation in the circular economy (de Jesus & Mendonça, 2018; Tan et al., 2022; Tura et al., 2019). In this context, learning from other nations and recognizing the diversity of issues encountered by different sectors is critical for successfully implementing a circular economy at the national level while minimizing barriers to sustainability (Grafström et al., 2021; Masi et al., 2018). Participants discussed the challenges that circular economy technology may be built on specialized technologies outside the organization's domain of competence, mainly driven by a lack of knowledge and lack of clarity on paths to a more extensive diffusion of digital and emerging technologies needed to support their transitions from a linear to a circular economy model, as well as low human capital capability.

Participant 11:

Yes. So, I think at first, Government have taken one very good step of launching the start-up act. I think that that was probably last month. Launching start-up act, which is meant to support tech businesses and also provide some guidelines. I hope they execute the act and continue continuously review and improve it going

forward so that there can be an intentional effort towards helping tech businesses to grow and then to be sustainable. Because tech businesses, they seem alien. So quite a number of people withdraw. And that even brings us another thought that again, we need also need our leaders to embrace and show support.

Participant 7:

The issue of climate change must be taken seriously but I understand Africa need funding, but we also lack frameworks or modalities to even attract these funds available in the market.

Participant 8:

As an organization we were not, per se, pushing SDGs or anything, but I think that to the extent that obviously what we were doing on a day-to-day basis, was aligned to many of the sustainable development objectives. And that sort of came out as a byproduct, if you like, of our mission. But it wasn't something that we really felt that we were there to push, as an agenda.

Leaders' cultural barriers to a CE transition

This theme describes how the circular economy generic model can be a hindrance or be adapted to meet the demands of cultures and communities centered on their cultural, socioeconomic, political, and demographic characteristics. Ezeudu et al. (2022) suggested that circular economy models may adopt places based on political, economic, social, demographic, and even sociological characteristics. Consequently, governance and policy experimentation for transitions may improve social learning, challenge prevailing values, attract new actors, and promote the accelerated diffusion of alternative solutions

(Köhler, Geels, et al., 2019). Cramer (2022) emphasized that national governments might improve circular economy undertakings using public and network governance, regulatory, financial-economic, and social policy tools in different socio-cultural and political contexts. Participants discussed that the challenges to diffuse and sustain the circular economy ambitions would require strong public leadership and responsiveness to critical stakeholders in sharing information about potent ideas and values among individuals and participating organizations.

Participant 3:

And by the way, there are also cultural morals that you would need to address that enable you empower those who you say you want to be participants then. So, start in stakeholder mapping, creating awareness amongst stakeholders, education, and then dealing with whatever are those hindrances that deter recycling and interest in recycling. […] By the way, let me make the point. And I think it's very important. Now, when you talk about circular economy, it cannot be circular economy from the dimensions and from the perspective of the West. Every country has to have a very nuanced understanding of the nature of its own economy, of the dynamics of its own economy, and therefore of the circularities that are necessary. Yes, I understand enough where, today across the West, even at household levels, you separate your waste. Because that enables its reprocessing. So, at such basic levels, I don't have a problem. However, we need to understand the dimensions of our own endowments and the nature of the circularities that are required to make for an enhanced utilization. You cannot

come and tell me that it is the policies of the West or the East that... No, we have to understand. And that's why I'm saying, if you don't measure it, you're not going to go very far.

Participant 5:

I think a lot of it is just driving that culture within the vision and having an example, having people see it. I think it's just a desire and from leadership.

Participant 14:

Yeah. Thank you very much. Rwanda, I think is much more unique based on the way we operate some of these things. One is that we have the coordination mechanism from the macro level under the Ministry of Finance and Economic Planning that does the coordination for whatever policy and strategy that is going to be developed. So that means bringing on board relevant stakeholders vis-a-vis the strategy or policy or any other guidance or any other discussion that needs to take place becomes easier because Minister of Finance knows which institution, which stakeholder force and what. So that becomes very easy.

Willing to form public and private sector partnerships

This theme refers to how private-sector collaboration and stakeholder participation are important features and priorities for integrating circular economy into the public sector and implementing it effectively. Transitioning to a circular economy requires technological readiness and integrative software (Bai et al., 2022; Grafstrom & Aasmo, 2021). At the same time, authors have emphasized that systemic circular economy transition initiatives involve multiple stakeholders (Salvioni & Almici, 2020;

Velter et al., 2020). Participants discussed the challenges in managing this complex transformation beyond public administrative boundaries and the ability and knowledge required to promote coordination and collaboration and overcome barriers to adopting and fostering the circular economy.

Participant 13:

We need to improve our investment options, work as a public-private partnership (PPP), included in our framework or purposeful incentives in addition to government actions, and set a realistic target timetable and interconnected approach by sub-Saharan African countries rather than a series of isolated actions. This is where, the the initiative of AfCFTA, the African continent free trade agreement comes into play. […] The point is, government as an entity on its own, and even development banks and partners can't accomplish this on their own. It's crucial to bring in the necessary private sector investment and technical expertise, but are we motivating them enough to encourage them to help not only bridge the energy access gap but also to help in um transitioning existing technology to and in Africa? So at this level we believe in collaboration with critical stakeholders, particularly in sharing helpful ideas within participating bodies to put into practice strategies with the corporate sector that would help with both new technology solutions, and on the clean energy side investment to create affordable access.

Participant 1:

You have to engage them. So those in the public sector and those in the private sector need to engage in a topic. I mean, this is the future. Ultimately, if we look

at it very clearly, it's quite evident that the poverty line, in the future, the poverty line will be the digital line.

<u>Participant 4</u>:

As a expert in circular economy and a community leader, I would say it has to be a PPP. Well, public private sector partnership. Yes. It definitely has to be a PPC or a PPB, whatever it is. I think circular economy has the opportunity to create new business opportunities and new markets if implemented properly.

Willing to develop economic and infrastructural capabilities

This theme refers to how several extant and emerging technologies provide the African continent a willing opportunity to reform its economic and infrastructural capacities into those required for circular economy. Africa has the potential to stimulate growth by instituting fundamental changes through the use of new and developing approaches based on integrative infrastructure using cutting-edge technologies, materials, and processes to help the continent advance national development, protect the environment, foster circularity, and promote sustainable development (Ugwoji, 2022; Vaska et al., 2021). Participants discussed the challenges of implementing sound monetary and fiscal policies to promote green industrialization.

<u>Participant 13</u>:

Sub-Saharan African leaders must have rules in place, as well as data, so that innovators and investors may bridge the access gap with renewable energy projects. They must also provide blended finance to handle the project risks of private sector developers. African public leaders and policy makers must

deliberately consolidate ongoing engagement with peers in the global north to improve technical know-how, whether through technological innovation or commitment to accessible climate finance for transitioning, and favorable policies and opportunities for employment, um for example Africa need to be able to make batteries and build solar panels from the ground up, climate smart agriculture modalities, create a cluster of decentralized solutions for these economic areas not just import and put them together. We also need to educate our people so that they can really understand the implications of the transition to renewable energy means to comprehend the effects of climate change and the idea of a circular economy in production and consumption, the Africans and its leadership needs to have a clear idea of what they are.

Participant 14:

Yeah. They have to have political will vis-a-vis some of these aspects. Climate change, environment, green economies, circular economy because when the government will is not there, then you will not even be in position to request private sector to participate.

Participant 6:

But we need those in those positions, those organizations that are responsible for really accepting technology or proving the types of technology that can be utilized, to be open to innovation or innovative types of technology. There needs to be a policy that requires consistent research and capacity building. Whether it's taking them abroad to see new infrastructure on a regular basis as opposed to

simply just continuing to use infrastructure that's been previously certified, […].
We should be encouraged to use new products but because they're not exposed to
that technology, and sceptical towards these technologies or see digitalization as
job displacement leading to a consistent resistance to protect their roles. […]
Yeah. But there needs to be a lot more exposure, a lot more training, perhaps
international training. From a policy standpoint, we need to ensure that we have
hubs which are Nigeria focused, dedicated to research, or coming up with new
technological ideas for the sector, working with other innovative hubs globally to
come up with solutions. They do need also to be part of this drive.

Second Phase: Cross-Case Synthesis and Analysis

Data analysis using cross-case synthesis increases data trustworthiness and
generates robust multiple-case study outcomes (Merriam & Tisdell, 2015). The analytic
approach comprises both within-case and cross-case analysis to identify patterns within
the data for multiple case study designs. In the latter stages of analysis, it is prevalent to
include relevant literature to improve constructs and theoretical assumptions (Halkias &
Neubert, 2020). Discovering the divergence and convergence between the cases through
the data and removing isolated data from the analytical process are the cross-case
synthesis approach's objectives (Halkias et al., 2022).

In addition, cross-case synthesis facilitates an orderly investigation of the
rationale relating the research findings to the conceptual framework of the study (Cooper
& White, 2012; Yin, 2017). I used an iterative cross-case analysis approach to examine
data from all 14 cases, drawing up common themes and patterns across the views of

Africa's public leadership experts. Figure 1 displays the cross-case analysis of convergent and divergent data across the 14 cases as each theme's cumulative frequency of occurrence.

Figure 1

Cross-Case Synthesis Results
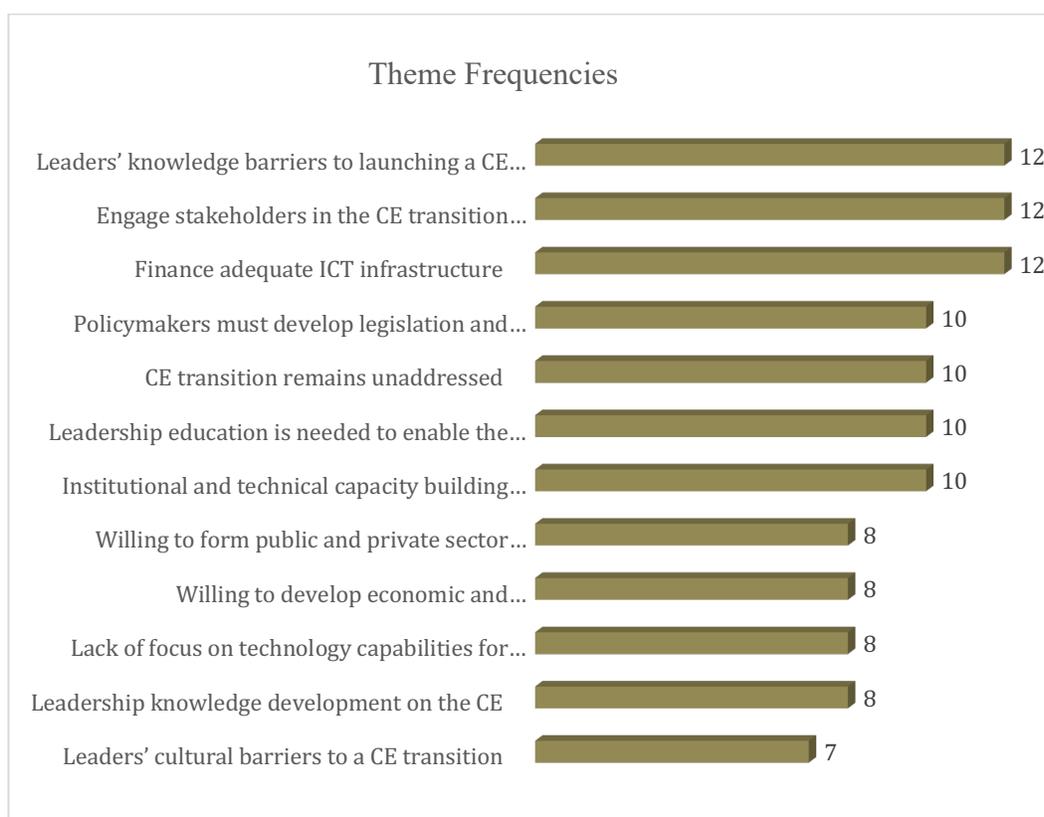
In my research, the role of the public leadership expert is that of a knowledgeable person who occupies a public office and serves and guides the community to promote, influence, and provide improved public value. The expert interviews in my study also served an exploratory function, emphasizing interpretative knowledge (Littig & Pöchhacker, 2014). The interview data's orientations, interpretations, and evaluations were analyzed to establish guidance for subsequent study in new theoretical areas. Using

thematically focused narratives in expert interviews can be seen as a theory-extending exchange where participants share their perspectives and viewpoints (Van Audenhove & Donders, 2019).

Interviews in an exploratory nature with subject matter experts should be conducted as transparently as feasible to enable the collection of a vast array of data and interpretations. According to Witzel and Reiter (2012), the purpose of the expert interview is to permanently revise a study topic while extending the specified existing body of knowledge, thus the goal of the expert interview in this study. The dearth of practical knowledge about how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy necessitates the development of novel ideas based on scholarly and practitioner-based knowledge.

According to Flick (2018), there is no one method for conducting expert interviews, nor is there a consistent technique for assessing such interviews. For analyzing primary data from expert interviews, whichever qualitative social research analysis method, including the code-based procedures widely employed in qualitative thematic analysis, can be applied (Bogner et al., 2018). In formulating implications for the study and focused recommendations for further research in Chapter 5, my interpretive narrative will be based on the frequency with which expert-generated themes occurred together in at least 10 out of the total of 14 cases (Rosenthal, 2018). This paragraph presents the two sets of prominent themes emerging from the cross-case analysis—those discussed by ten and twelve participants. No one particular theme was discussed by all 14

participants. Three themes that figured most prominently across the data collected from 12 cases out of 14 were (a) leaders' knowledge barriers to launching a CE transition, (b) engage stakeholders in the CE transition process, and (c) finance adequate ICT infrastructure. The four themes that figured prominently across the data collected from ten cases were (a) policymakers must develop legislation and programs to enable tech adoption for the CE, (b) CE transition remains unaddressed, (c) leadership education is needed to enable the adoption of the CE, and (d) institutional and technical capacity building for technology diffusion. The implications of the managerial practice and research of these prominent themes will be further analyzed in Chapter 5.

Triangulation

Triangulation of data ensured the trustworthiness of my study's findings and enhanced the study's overall methodological rigor (Stake, 2013). consequently, as a qualitative researcher, I used instruments that would generate themes to corroborate the gathered data by achieving the study's purpose. In order to keep track of the evidence I obtained as the study progressed; I kept an audit trail (Stake, 2013). During the data-gathering phase of my study, I utilized multiple sources of evidence to explore diverse public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy.

Several sources gathered evidence using diverse data gathering methods, such as semistructured interview protocols, reflexive field notes, and archival data such as current business, economic, and financial analyst reports and case studies on sustainability,

sustainable development, economic development, and management of the transition to a

circular economy business model in sub-Saharan Africa, were used to implement

triangulation. An audit trail and transcript reviews were also conducted throughout the

data collection and analysis processes (see Merriam & Tisdell, 2015; Yin, 2017). Data

triangulation was employed to corroborate information derived from multiple data

sources (Farquhar et al., 2020). Interview transcription accuracy reinforced my

positionality and reflexivity (Berger, 2015).

During the member-checking process, transcript reviews were conducted,

allowing participants to review and correct discrepancies in their transcribed words.

These evaluations contributed to the credibility of the findings (Merriam & Tisdell,

2015). The interview transcripts were accompanied by handwritten notes that recorded

extra information, including pauses, tone of voice, pace, pronunciations, and the

expression of vocal and word patterns. The experts' intonations mirrored their verbal

responses and resulted in more thorough documentation of the interaction with the

participants.

Using data triangulation, I further strengthened the trustworthiness of the study's

analysis (Halkias et al., 2022). I read roughly 300 scientific peer-reviewed scholarly

publications and journals to gain a deeper understanding of the research topic and to

continue the method triangulation process to answer the research question. I annotated

over 400 publications, including government, media, and economic reports, and found

about 245 pertinent to my study. Although not all of these articles were substantial

enough to be included in the literature review, they enriched my knowledge of the

research topic. They also served as a complement to the semistructured expert interviews. Using these archival data enabled me to identify and articulate reoccurring concepts and themes emerging from the data analysis underpinned by the conceptual framework.

As a consequence, triangulation enhances the depth and robustness of data (Farquhar et al., 2020). Each case can be grounded in the reviewed literature in a multiple-case study, allowing the findings to confirm or extend prior knowledge in the discipline. Analysis and interpretation of the study results and findings were conducted in the context of the aforementioned conceptual framework, with particular attention given to how these findings contribute to the extension of theory (Halkias & Neubert, 2020).

Summary

In Chapter 4, I presented a case-by-case analysis of 14 participants, followed by a cross-case synthesis analysis to answer this study's central research question: *How do African public leadership experts describe their views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?* This multiple case study revealed the views of subject matter expert participants, which emerged from the data analysis. This study's data analysis process was completed following a two-step process: (a) a thematic analysis of the textual data and (b) a cross-case synthesis analysis (see Yin, 2017).

Using the multiple case study design, I implemented the cross-case synthesis method for data analysis to generate themes representing the convergence and divergence of participants' experiences within and between cases (see Yin, 2017). Six codes arose from data collected in this multiple case study, including 12 themes, delivering rich data

from participants' experiences. The six conceptual coding codes that emerged from the initial steps of the thematic analysis were (a) African public leaders' technology readiness, (b) African public leaders enabling technology readiness for a circular economy transition, (c) African public leaders' adoption of technology, (d) African public leaders enabling technology diffusion for a circular economy transition, (e) African public leaders' professional preparation for a circular economy transition, (f) African public leaders' willingness to adopt a circular economy transition.

The 12 themes that emerge from the data analysis include (a) lack of focus on technology capabilities for the CE, (b) leadership knowledge development on the CE, (c) CE transition remains unaddressed, (d) finance adequate ICT infrastructure, (e) leadership education is needed to enable the adoption of the CE, (f) policymakers must develop legislation and programs to enable tech adoption for the CE, (g) institutional and technical capacity building for technology diffusion, (h) engage stakeholders in the CE transition process, (i) leaders' knowledge barriers to launching a CE transition, (j) leaders' cultural barriers to a CE transition, (k) willing to form public and private sector partnerships, (l) willing to develop economic and infrastructural capabilities.

I triangulated interview data themes with data from reflective field notes and archival data in the form of current business, technology, and government reports relating to my study topic, to enhance the trustworthiness of the findings and make suggestions for further research (Farquhar et al., 2020; Halkias et al., 2022). The results of this multiple case study were analyzed and explained through the study's conceptual framework, that focus on the significance of stakeholders' views on rapid technology

diffusion and its implication for labor market challenges within impoverished communities in sub-Saharan Africa: 1) Rogers's (1995) concept of *diffusion of innovations;* and 2) Grafström and Aasma's (2021) concept of *the circular economy*. Previous researchers highlighted that African public leaders need a practical roadmap to champion the Continent's transition to a circular economy model (Cramer, 2022; Klein et al., 2022)

      This multiple case study's purpose was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. Public leaders in sub-Saharan African nations may lack the technology readiness and knowledge needed to enact policies on technology diffusion to support a circular economy transition (Boon & Anuga, 2020; Nwaka, 2021). This study may be significant to theory extension by contributing original, qualitative data to the literature on how sub-Saharan African leaders can enable the technology diffusion needed for a successful transition to a circular economy (see Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021).

      In Chapter 5, I will present an interpretation of the findings from this study in contrast to the extant literature. The implication of the findings to social change, theory, practice, and policy are detailed in Chapter 5, where I will further describe how my study extends the knowledge of how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this qualitative, multiple case study was to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. To meet the purpose of the study and address this documented knowledge gap among sub-Saharan African leaders and be consistent with the qualitative paradigm, a multiple case study design (see Yin, 2017) was used to collect data from a purposeful sample of African public leadership experts.

To address the research problem and purpose of the study, I used qualitative data collected from multiple sources of evidence, including interviews, archival, and reflective journaling notes (see Merriam & Tisdell, 2015). Using qualitative research methodologies and data triangulation, I gathered data that reflected on the perceptions shared by participants in the study on how African public leaders might enable the technology readiness and the technology diffusion needed for a successful transition to a circular economy. Furthermore, the interviews allowed participants to elaborate on their perceptions and professional knowledge, making it easy to identify any emerging discrepant data (Halkias et al., 2022).

For a more in-depth understanding of policy complexities in current regional innovation debates on the diffusion of the circular economy in sub-Saharan Africa by this study, I developed a conceptual framework that accounts for factors of economic geography in the diffusion of the innovation process within the countries of East and

West Africa regions built on two key concepts: (a) Rogers's (1995) concept of diffusion

of innovations; and(b) Grafström and Aasma's (2021) concept of the circular economy.

Using a multiple case study approach was particularly useful for my study design

because it allowed me to iterate previous assumptions from scholarly studies to extend a

theoretical model (see Halkias & Neubert, 2020; Stake, 2005). The cross-case synthesis

analysis of data from interviews with 14 participants revealed the following 12 prominent

themes: (a) lack of focus on technology capabilities for the CE, (b) leadership knowledge

development on the CE, (c) CE transition remains unaddressed, (d) finance adequate ICT

infrastructure, (e) leadership education is needed to enable the adoption of the CE, (f)

policymakers must develop legislation and programs to enable tech adoption for the CE,

(g) institutional and technical capacity building for technology diffusion, (h) engage

stakeholders in the CE transition process, (i) leaders' knowledge barriers to launching a

CE transition, (j) leaders' cultural barriers to a CE transition, (k) willing to form public

and private sector partnerships, and (l) willing to develop economic and infrastructural

capabilities.

Interpretation of Findings

The findings of this multiple case study confirmed or extended current knowledge

in the discipline, with each case result interpreted through the extant theoretical and

professional practice literature. In this section, the study's findings are presented and

reviewed in the context of the six coding categories that emerged from the data analysis:

(a) African public leaders' technology readiness, (b) African public leaders enabling

technology readiness for a circular economy transition, (c) African public leaders'

adoption of technology, (d) African public leaders enabling technology diffusion for a circular economy transition, (e) African public leaders' professional preparation for a circular economy transition, and (f) African public leaders' willingness to adopt a circular economy transition.

I compare these categories with relevant concepts from the conceptual framework and the theoretical literature reviewed in Chapter 2. I provide evidence from the 14 semistructured interviews to support how the study's findings either confirm, disconfirm, or extend existing knowledge. Extension studies, such as this multiple case study, provide replication evidence for future researchers and valuable insights and theoretical directions (Bonett, 2012). This process of analyzing and presenting data evidence for theory extension supports the complexity of responding to a qualitative data set through inductive and deductive evaluation processes (Halkias & Neubert, 2020).

African Public Leaders' Technology Readiness

The transition to a circular economy requires technology readiness and the diffusion of integrative software (Bai et al., 2022; Grafström & Aasma, 2021). However, investing in technological infrastructures and businesses is vital to bolstering Africa's resilience and circular economy readiness, particularly in broader digital infrastructures, ICT technologies, tech ecosystems, or startups (Signé, 2020). My study results confirmed that sub-Saharan African countries continue to lag in developing technological infrastructure. Expert interview data indicated that African public leaders lack the technological capacity to mobilize more robust coordination mechanisms with broader stakeholders because they are likely to exist in silos and operate in a fragmented

environment due to inadequate infrastructure, financial resources, and knowledge of human capital.

Study participants confirm that digital technology may enforce or promote and support circular economy across various industries; however, African public leaders need to catch up in tech readiness and adoption due to Africa's unique challenges in the development stage. The interviewees confirmed a massive need for technical and financial capacity for climate mitigation, adaptation, and resilience that could assist Africa's Nationally Determined Contributions obligations. This study aligns with Nwaka's (2021) conclusions that significant social and economic vulnerabilities are associated with failing to capitalize on new technology innovations in sub-Saharan Africa. The study results extend knowledge based on the works of Rogers (1995), Grafström and Aasma (2021), and Nwaka (2021) on how African public leaders and policymakers can address how regional institutions and government agencies promote scalable technology readiness and adopt deliberate regulations guided by circular principles and a just transition.

African Public Leaders Enabling Technology Readiness for a Circular Economy Transition

For sub-Saharan African leaders to enable the technology readiness and diffusion necessary for a successful transition to a circular economy to take root and be compelling, it should be adopted at all levels of the economy in symbiosis at the micro (enterprises and consumers), meso (eco-industrial parks), and macro (cities, regions, and national governments) levels and every stage of the value chain (Grafström et al., 2021;

Mishra et al., 2021; Tan et al., 2022). My study results confirmed that inadequate legislative and regulatory frameworks hinder Africa's digital economy and competitiveness, which could ensure the technology readiness and knowledge needed to execute policies that integrate new business models for circularity among programs, with proper access to ICTs infrastructure and internet use for multiple purposes in sub-Saharan African nations.

Study participants confirmed that there needs to be more frameworks or modalities to attract adequate climate finance and that incorporating formal and informal enterprises in cluster synergy industrialization could promote new technological nexus overlapping various sectors and strengthen scalability, technology transfer, productivity, and competitiveness. This study aligns with Zeufack et al. (2021) conclusions that given the importance of the circular economy and digital technology's role in the socioeconomic development in developing countries, it necessitates policy reforms. Such policy reforms must address digital infrastructure gaps, concentrating on creating more inexpensive skill-building solutions for all sectors of society to improve digital technology adoption and create skills base readiness to utilize internet prospects for more and better opportunities in sub-Saharan Africa. The study results extend knowledge based on the works of Rogers (1995), Grafström and Aasma (2021), and Mutezo and Mulopo (2021) on how the concept of circular economy has received wide recognition as a feasible accelerator of sustainable development globally, achieving a circular economy in Africa to meet the UN's sustainability agenda by 2050 is impossible without the necessary technology readiness and broader technology diffusion.

African Public Leaders' Adoption of Technology

Scholars found that if used efficiently, new and disruptive digital technology like big data, AI, blockchain, IoT, Industry 4.0, cloud computing, and DF may allow organizations to migrate away from a linear economics approach to circular economy. The circular economy may contribute to social sustainability by potentially speeding up the adoption of end-of-life strategy, encouraging the adoption of new policy and regulatory measures, and expanding social and economic potential in Africa (Bai et al., 2022; Chauhan, 2022; 2022; Ugwoji, 2022). My study results confirmed that as Africa transitions toward a circular economy to sustain competitiveness, the use of digital technology serves as an enabler and trigger, with the fundamental features supporting the right mix to both economic growth from resource needs and environmental challenges.

Study participants confirm that African leaders need to understand how building a circular economy impacts its development and goals. The interviewees confirmed that all levels of government, from the federal to the state and local levels, require concerted efforts to leverage technology adoption on policy reforms and sector-specific and regional location action plans embedded in circular economy principles necessary to achieve industrialization growth. This study aligns with Santos and Halkias's (2021) conclusions that if successfully adopted by policymakers, participatory approaches to technological adoption might result in more experientially embedded information and communication technology poverty reduction across several aspects of the poverty line, including diffusion of innovation. The study results extend knowledge based on the works of Grafström et al. (2021), Bai et al. (2022), and Dosso, Nwankwo & Travaly

(2021) on how integrating new and disruptive technologies, materials, and technology-enhanced processes and systems provide many opportunities for agricultural and industrial modernization that can assist the African continent in progressing toward sustainable societies and overcoming developmental challenges.

African Public Leaders Enabling Technology Diffusion for a Circular Economy Transition

Collaborative engagement may be more likely to lead to high levels of circular economy innovation and socio-economic change, encouraging other players (e.g., government, institutions, or public leadership) to explore new circular economy solutions that create an alignment of economic, modern technology, and social elements to expedite the transition to a circular economy (Andriamahefazafy & Failler, 2021). My study results confirmed that to realize its economic prospects, the necessity for clear policies to regulate or incentivize the industry's shift towards circularity. My study further confirmed that African policymakers should mobilize regional development financial institutions for innovative financing structures and inclusive stakeholders to support scalable technology and enact deliberate legislation based on circular principles.

Study participants confirm that a comprehensive understanding of the drivers and barriers to such transformative reform from a linear economy to a viable circular economy is of policy interest, utilizing system thinking of design and taxonomy of circular economy transformation paradigm to boost productivity. The interviewees confirmed that all parties involved must redefine their responsibilities and obligations to expedite the transition and facilitate the alignment of economic, technological, and social

factors. This study aligns with the works of Salvioni and Almici (2020), Velter et al. (2020), and Ezeudu et al. (2021), conclusions that systemic circular economy transition efforts require engagements with multiple stakeholders and that multi-stakeholder collaboration is a significant antecedent to implementing circular economy in a developing world. The study results extend knowledge based on the works of Grafström and Aasma (2021), Andriamahefazafy and Failler (2021), and Ddiba et al. (2020) on how transitioning to a circular economy involves strategic infrastructure investments and policy consistency, coordination, and collaboration across sectors and governance levels.

African Public Leaders' Professional Preparation for a Circular Economy Transition

Some reasons sub-Saharan African nations remain unprepared to launch a broader diffusion of digital and emerging technologies needed to support their transitions from a linear to a circular economy model include low preparedness of human capital, a lack of digital policymaking research, weak financial markets, slow decision-making among public leaders, and infrastructural deficiencies (Circera & Maloney, 2017; Kambou et al., 2021; Kern et al., 2019). My study confirmed that Africa does not need to replicate misleading trends of development, production, and consumption, which now require deep alternative solutions. Expert knowledge supporting strong public leadership efforts, leapfrogging technological development stages, mainstreaming long-term partnerships, and collaborating, strengthening climate action through carbon credits at the global level, are requested to support the achievement of sub-Saharan Africa circular economy transition and SDGs.

Study participants confirmed that sub-Saharan Africa public leadership needs to bridge an enormous infrastructural and knowledge gap, take advantage of the opportunity to acquire underpinning digital skills, and create an institution responsible for ensuring the successful, seamless implementation of the Green-Tech transition plan. The interviewees confirmed that creating new structures with authority may integrate operations across national government and ministries and state and local governments to promote successful public-private dialogue. This study aligns with the works of Panwar and Niesten (2022), Kern et al. (2020), and Köhler, Geels, et al. (2019) conclusions that expert knowledge supporting policy action and influencing public policy might play a significant role in determining the directionality of circular economy transitions.

A more nuanced theoretical understanding of the specific environmentally friendly innovation pathway and business models required for a transformative and widespread circular economy transition that eliminates specific traditional institutional systems is needed. The study results extend knowledge based on the works of Grafström and Aasma (2021), Zoogah (2022), and Masi et al. (2018) on how learning from other nations and recognizing the diversity of issues encountered by different sectors is critical for successfully implementing a circular economy, at the national level while minimizing barriers for positive outcomes that advance African societies can be sustainably achieved.

African Public Leaders' Willingness to Adopt a Circular Economy Transition

Africa has the potential to stimulate growth by instituting fundamental changes using new and developing approaches based on integrative infrastructure using cutting-edge technologies, materials, and processes to help the continent advance national

development, protect the environment, foster circularity, and promote sustainable development (Ugwoji, 2022; Vaska et al., 2021). My study confirmed that the engagement of public leadership presents an opportunity to embed circular economy principles into climate action plans through expert networks. Effective leadership is crucial and must include a willingness to learn and change, that public policies play a crucial role in addressing all global sources of greenhouse gas emissions, and that effective adaptation builds community resilience by embracing the path toward smart and integrated infrastructure in renewable energy, agriculture, water security, and sustainable transport.

Study participants confirmed that African public leaders must build PPP to make circular economy initiatives more commercially attractive in all facets of the political and social economy, offer an enabling environment, invest in technological infrastructure, and upskill and reskill the labor force to pave the way for the future generation of leaders. The interviewees confirmed that numerous existing and emerging technologies present an opportunity for the transformation of the African continent, which may also contribute to societal advancements through comprehensive professional development programs, research, innovation, and collaborative efforts. This study aligns with Agrawal, Wankhede, Kumar, Upadhyay & Garza-Reyes (2022) conclusions that Africa's circular economy readiness should be seen from a sustainable development perspective, which includes global concerns (poverty alleviation, climate change, sustainable natural resource management, and biodiversity protection).

The study further aligns with Köhler, Geels, et al. (2019) conclusions that transition governance and policy experimentation may improve social learning, challenge prevailing values, attract new actors, and promote the accelerated diffusion of alternative solutions. The study results extend knowledge based on the works of Grafström and Aasma (2021), Desmond and Asamba (2019), and Cramer (2022) on how African public leadership is critical at this level to codeveloping strategies through goal-oriented network governance. Transition brokers can facilitate governance of a circular economy transition to promote sustainable socio-economic and environmental progress towards industrialization in sub-Saharan Africa contexts.

Limitations of the Study

A case study research limitation is a feature of the research process over which the researcher has no control, and which influences the interpretation of the findings (Yin, 2017). The first limitation is the nature of the study, as the selection of participants was tailored to specified inclusion criteria that narrowed the study's scope, thereby limiting the generalizability of the findings and representing a systematic bias. The type of sampling method a researcher selects should flow from and assist their inquiry into the research questions posed (Morse, 2010). I developed an interview guide grounded in the literature review. I cross-referenced the research purposes and interviewed questions to obtain the most comprehensive information feasible following the study's purpose and central question through purposeful sampling. This procedure strengthened the research and ensured that the gathered data were credible and valid for the study's purpose.

The second limitation is that this study is qualitative; thus, its small sample size may not represent the general population. However, qualitative research focuses on context rather than generating broad generalizations about hypotheses, and sample sizes in qualitative studies should typically adhere to data saturation (Mason, 2020). I incorporated participant observation into the in-depth semi-structured interview, which bolstered the study's findings and improved the quality of the interviews (see Rubin & Rubin, 2012). Furthermore, I recruited 14 subject matter experts in the field, established a complete audit trail, and triangulated the interview responses, historical literature, and field notes to provide more context, enhance inter-rater reliability, and broaden the study's transferability.

The third limitation relates to the data gathering, interview, and positionality biases. I used a standardized interview protocol and triangulated the interview data with reflective field notes and archival data. This enabled participant engagement consistency boosted the findings' reliability, and highlighted suggestions for further research (see Halkias et al., 2022; Jacob & Furgerson, 2012). Using multiple case studies instead of a single case study design enhanced the transferability. It ensured its trustworthiness, mitigating the qualitative research limitation and ensuring that the research findings were credible, transferable, dependable, and confirmable (Stahl & King, 2020).

Recommendations

In the wake of growing global concerns about conserving scarce resources while preserving the environment and promoting economic sustainability, leadership and sustainability literature scholars contended that most African governments lack the

requisite support of formal institutions and legal and regulatory frameworks to enable a circular economy transition in sub-Saharan Africa. The findings of this study confirmed those of previous studies while also illuminating key components that enable public leaders in sub-Saharan African nations with the knowledge required to implement policies on technology readiness and the technology diffusion needed for a successful transition to a circular economy. The result of my study provided actionable strategies for instituting found components and addressing prevalent challenges related to the knowledge required to implement policies on technology diffusion needed to enable a transition to a circular economy.

My research findings also offered insights from African public leadership experts on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed to successfully transition to a circular economy. The purpose of my qualitative multiple case study was not to draw broad conclusions across the entire African public leadership population. Nonetheless, the findings of what was learned and how I described what I learned may assist sub-Saharan African public leaders in enabling technology readiness and the technology diffusion needed for a successful transition to a circular economy. The study's outcomes confirmed and significantly expanded the conceptual framework and highlighted prospects for future researchers.

Recommendations for Scholarly Research

The research design adopted to complete this study can easily be leveraged to undertake future comparative studies focusing on other key stakeholder groups within the circular economy ecosystem that were not hitherto explored. Those study outcomes could

further extend Rogers's (1995) concept of diffusion of innovations and Grafströmm, and Aasma's (2021) concept of the circular economy works to understand better the technology readiness and expertise required to adopt policies on rapid technology diffusion to enable a circular economy transition, and its implication in securing the long-term livelihoods of sub-Saharan Africans. As per the views of African public leadership experts interviewed, more study is needed to progress towards a circular economy and stimulate socio-economic transformation while conserving and protecting the environment, all of which can aid in the transition to a net zero economy.

The participants' expert views focused on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. The participants provided in-depth knowledge and crucial attributes within circular economy critical stakeholder ecosystems and regulatory complexities in current regional innovation on topics that can drive future scholarly research: African public leaders' technology readiness, African public leaders enabling technology readiness for a circular economy transition, African public leaders' adoption of technology, African public leaders enabling technology diffusion for a circular economy transition, African public leaders' professional preparation for a circular economy transition, and African public leaders' willingness to adopt a circular economy transition.

Future studies could focus on developing a quantitative knowledge of these factors and how they impact policies on technology diffusion needed to enable a transition to a circular economy and promote sub-Saharan Africa's sustainable

development goals. Researchers are implored to replicate this study's findings using quantitative methods to validate them in comparative or distinct contexts. A quantitative technique incorporates a broader overview of variables, including more substantial research samples from other population groupings. Using African public leadership experts as the unit of analysis strengthens the generalizability of findings and permits more strong objectivity and improved empirical statistical power. Using multivariate statistical analysis to analyze the structural relationships might quantify the performance of regional public leadership 12 to 24 months following the creation of embedded circular economy structures that integrate modern tech diffusion throughout national governments in sub-Saharan African nations. A structural equation modeling (SEM) technique in quantitative research, according to Harkiolakis (2017), combines factor analysis and multiple regression analysis to investigate the structural relationship between measured variables and latent constructs.

A prospective research possibility also related to expert knowledge supporting strong public leadership efforts and how leapfrogging technological development stages can support the achievement of sub-Saharan Africa's circular economy transition and SDGs. In this study, experts broadly agreed that public leadership must bridge an enormous infrastructure and knowledge gap in sub-Saharan Africa. African public leaders can take advantage of the opportunity to acquire underpinning digital skills and create an institution responsible for ensuring the successful implementation of the circular economy transition plan. The experts in this study also mentioned the need for creating new circular economy structures with authority that might integrate collaboration

across national government and ministries and state and local governments to promote successful public-private dialogue, which presents another opportunity for future research. Furthermore, underlying components such as political will, legal and regulatory reforms, circular economy education and technical capacity building, and developing economic and infrastructural capabilities for circular economy transitions for sub-Saharan Africa transformation necessitate additional research.

Recommendations for Policy and Practice

When this study was conducted, sub-Saharan Africa public leaders had limited in-depth knowledge of enabling technology readiness and the technology diffusion needed for a successful transition to a circular economy to support their nation's long-term sustainable development (Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021; Grafström & Aasma, 2021). This research highlighted six key attributes that enable sub-Saharan African leaders to implement circular economy action plans across national and regional-level sector-specific policy and professional practice recommendations:

- A legal and regulatory framework and strategy are needed to create a National circular economy policy. Developing economies must consider circular economy initiatives by national governments as a critical policy action to encourage sustainable production and consumption. To put this into effect, it is of the utmost importance to build a national circular economy strategy with legal frameworks, institutional strengthening, and accompanying intervention initiatives that embrace circular economy practices, thereby enabling sustainable industrialization and environmental protection.

- Establish circular economy institutional and financial frameworks for public-private partnerships (PPP) and rethink sector-specific and regional location initiatives on incentivizing sustainable resource production and use. Africa public leaders must actively establish and harmonize policies, guidelines, and standard operating procedures, leveraging local and foreign investment to determine PPP structures. In addition, the importance of embracing technical advisory services and training, market linkages, and strategic partnerships to advance knowledge, insights, and expertise. This strategy can boost Green-Tech scale, skills transfer, productivity, and competitiveness to expedite the development of a circular economy related sector-specific self-reliant economy.

- The African continent can take immediate advantage of improved support for scalable new technologies and materials that enable circular economy. Instead of working in silos with inadequate resources, public leaders can make the most of its regional integration (e.g., The African Continental Free Trade Area (AfCFTA) and The African Circular Economy Alliance) agenda. Africa must develop and implement strategies to increase its capabilities, such as establishing a regulatory and ethical framework, forming network governance, and/or transitioning broker partnerships. To tackle future challenges in areas like start-up capital, modern technology intervention, and economic transformation and enable the corporation between intra-Africa and the rest of the globe. This strategy can help scale technology diffusion and circular economy education awareness in new markets.

- African public leaders can encourage international and regional development financial institutions (DFIs) to enhance circular economy projects by mobilizing blended and innovative finance instruments through collaborative efforts among key stakeholders. In the medium to long term, the viability of alternative innovative financing strategies (such as exploration of Africa's vital carbon sinks for voluntary carbon markets ecosystem for African carbon credits revenues, multi-donor impact investments, and public capital invested in a concessionary context to catalyze increased community opportunities) for creating circular economy intervention projects, policy direction, and legislation reform. These measures can assist future collaboration with key actors, enable local economic growth and coordination with regional and international DFIs, and leverage access to affordable capital. This strategy may incorporate interfaces with industry and venture funding for start-ups to scale up and sustain human capital and micro, small, and medium-sized enterprises (MSMEs) that dynamically respond to local development changes.

- Effective public participation in the circular economy development would require massive support and education across socioeconomic groups. Government, development partners, Effective public participation in the circular economy development would require massive support and education across socioeconomic groups. the private sector, research institutions, and communities must learn about circular economy principles and practices. Strong circular economy institutions need knowledge-sharing possibilities. Investing in R&D can boost

domestic high-tech innovation and entrepreneurship. Continuous professional development and high-level advisory and policy oversight for leaders can build confidence and leadership upskill and reskill that create innovation and a green entrepreneurial mentality that is relevant and contemporary. Based on cutting-edge technology, this can support smart integrative infrastructure for mobility, connectivity, clean energy access, the built environment, and sustainable agriculture. This strategy can form capacity-building and technical advisory groups to increase circular economy awareness and partnerships between enterprises and higher education institutions. To develop circular economy accelerators and incubator centers of excellence initiatives that encourage locally generated solutions to global environmental concerns.

- Transitioning to a circular economy requires the participation of all groups in society; public leadership, business innovation, legislation, and lifestyle changes need to go hand-in-hand. Africa's circular economy transformation needs clear policies to regulate or incentivize the industry's transition to circularity. Mobilization of multiple sectors, including start-up capital requirements and leadership training for circular economy administrators to impact green industrialization intervention. Sub-Saharan African leaders can integrate formal and informal businesses in sector-specific clusters to achieve synergy and efficiency. These opportunities for all enabled improved monetary and non-monetary policies to facilitate private sector engagement with the assistance of transition brokers to promote the digital transformation of public and private

organizations with a primary emphasis on co-creating and co-innovating solutions. This purpose-driven strategy must be implemented in line with circular economy principles, values, and standards to enable countries to achieve the United Nations' sustainable development goals (SDGs).

Implications

Implications for Positive Social Change

This study addressed a knowledge gap regarding how sub-Saharan African leaders can enable the technological readiness and diffusion needed for a successful transition to a circular economy. It also contributes to positive social change by providing public leaders in sub-Saharan Africa with a greater awareness of how chances for accelerating the transition to circular economy in Africa might contribute to the attainment of SDGs, considering the cultural context of the region. Sub-Saharan Africa's commitment to the circular economy can fuel the desire to promote socioeconomic progress while conserving and protecting the environment.

By recognizing and responding to societal problems, scholar-practitioners become agents of positive social change. The concerted efforts of African policymakers can facilitate high levels of circular economy innovation and socioeconomic change. Leadership can then inspire other actors to align economic goals, sustainable goals, cutting-edge technology, and social components to facilitate the transition to a circular economy. Sub-Saharan Africa is facing many sustainable development issues. However, Africa can initiate profound social change through regional financial institutions and government agencies if they follow the advice of African public leadership experts and

scholars in the leadership and sustainability paradigm. These recommendations contain the increasing need for empirical data to be gathered to establish a practitioner protocol to successfully affect technology diffusion to promote a circular economy transformation.

Given Africa's growing population and rapid urbanization, sub-Saharan Africa leaders can establish purposeful policies guided by circular principles and a just transition to modify the national strategy for systemic change in circular economy to increase their nation's competitive edge and productivity. The continent's public leadership and key stakeholders can use the drivers for public governance and enablers identified to establish resilient communities in environmental preservation, economic development, and job creation, embracing the pathway toward the transition to a circular economy. These enablers include the establishment and execution of policies and regulations, providing business support, investments in quality infrastructure, expanded access to funding and technology, and greater availability of data and information. To stabilize development in the socioeconomically volatile post-COVID-19 age, aggravated by the Ukraine conflict.

Desmond and Asamba (2019) advocated investigating more insight into the fundamentals of public governance to learn about circular economy from low-income nations and indigenous cultures. For archival research, researchers may utilize in-depth interviews, biographical interviews, and focus group discussions. The results of this study may contribute to positive social change by providing public leaders in sub-Saharan Africa with a clearer understanding of how to enable policies on technology readiness and the technology diffusion needed to support their nation's transition to a circular economy and its sustainable development.

Implications for Practice and Policy

Economic growth, job creation, and the launch of new businesses all depend on understanding how technology adoption acts as an enabler and trigger for implementing circular economy as a new alternative production and consumption model for sustainable growth. Public leaders in sub-Saharan Africa might benefit from these capabilities as a resulting implication for practice and policy if they can implement significant systemic changes based on smart and integrative infrastructure that uses state-of-the-art technology, materials, and processes. That would allow the continent to progress in national development, preserve the environment, support circularity, and promote sustainable development (Ugwoji, 2022; Vaska et al., 2021).

Public leaders in sub-Saharan Africa can advance their transitions from a linear to a circular economy model, provided they grasp the fundamental aspects for a broader diffusion of digital and emerging technologies. Economic development in sub-Saharan African countries has been hindered by poverty, poor infrastructure, and unemployment. Understanding the drivers and barriers of such revolutionary reform from a linear economy to a viable circular economy is of policy importance (de Jesus & Mendonca, 2018). To avoid some of the significant challenges of circular economy implementation and to take advantage of its benefits, clear circular economy policies are required to regulate or incentivize the industry's shift toward circularity and to mobilize MSEs to industrialize. By empowering circular economy stakeholders with education and training to create the right environment for economic development, value creation, and skills development, there is an opportunity to tackle those mentioned above and other issues.

Developing economies can invest proactively in the transformational elements of their digital economies. However, more research is required to understand how to implement circular policies and business principles in sub-Saharan Africa's sociocultural and political context. Taking into account the perspectives and experiences of a wide range of actors will be an opportunity to coordinate action plans in individual countries toward long-term benefits on livelihoods, the environment, and job creation, as well as working towards achieving the SDGs (Desmond & Asamba, 2019). In order to maintain competitiveness, it is essential to implement the legislative and regulatory frameworks required to promote circularity and the transition to green economies.

On its journey towards more robust circular economy reform, sub-Saharan Africa can draw from the experience of a diversity of other nations. In this context, learning from other nations and acknowledging the diversity of obstacles confronted by various sectors is essential for establishing a circular economy at the national level while minimizing barriers to sustainability (Grafstrom et al., 2021; Masi et al., 2018). Creating more effective circular economy structures is hampered by a lack of infrastructure and government institution inadequacies in Africa, particularly in mobility, ICT, and clean energy access. The utilization of Public-Private Partnerships (PPP) to leverage private capital can be a significant priority, along with sound governance and strong leadership capacity. Collaboration with public and private partners may be more likely to result in high levels of circular economy innovation and socioeconomic transformation (Andriamahefazafy & Failler, 2021).

This study confirmed that there needed to be a clear strategic roadmap to solve key policy impediments in legislation and governance. The technology readiness and the diffusion of technology required to enable a circular economy alignment with fiscal authority initiatives across the government, with the capacity for successful implementation, is needed. Digital technologies, particularly artificial intelligence (AI), integrated with new production technologies (Industry 4.0), provide sub-Saharan Africa with tremendous benefits and flexibility. Nonetheless, the African economy is hindered by education institutions and skill systems that struggle to meet student populations' requirements and the broader economy.

These limitations are due to inadequate public sector capacity, severe deficiencies in providing quality education, and leakages in financial institutions, resulting in high operating costs in Africa. This deficit will exist until adequate infrastructure, financial resources, and skilled human capital is trained in the short and long term (Dosso, Nwankwo & Travaly, 2021). In order to address the continent's challenges, Africa needs a labor force with specialized skills and knowledge, as are integrated eco-systems founded on shared principles and a strategy that accounts for Africa's unique circumstances. Expanding government investment in research and development (R&D) and education is vital to sustaining the momentum of the twofold advancement of technology and human resource exploitation, culminating in green economic development in emerging nations (Jin et al., 2022).

My study's outcome identified six vital elements sub-Saharan African leaders must pay attention to and provide actionable steps to grow and embed those components

in their national strategies. Based on the study's findings, I made recommendations that may offer the opportunity for continued research to further create knowledge in mobilizing systemic change to enable circular economy strategies in the African context.

Implications of COVID-19

Sub-Saharan Africa is burdened by fragile technology inefficiencies, depletion of resources, poor infrastructure, and adverse consequences from climate change, and the COVID-19 pandemic exacerbates dwindling capital flows, including the poverty rate. Digital infrastructure and services and apps that use digital technology have been necessary to stop the spread of COVID-19, deal with uncertainty, and ensure that governments and the private sector can keep doing business during social alienation (Zeufack et al., 2021). Circular economy ventures that take advantage of new technology and government policies, are well-led by solid leadership, and have access to sufficient funding can help sustain the economic recovery and open up promising new markets (Nwaka, 2021).

Africa is well-positioned to take advantage of these new prospects to construct green and resilient post-COVID-19 economies across the region for economic development and job creation as an alternative to the traditional linear economic trajectory. The COVID-19 epidemic reminds countries of the importance of research, innovation, and education systems that generate knowledge and address societal challenges (Nwaka, 2021). Technological innovation drives globalization and growth, and Africa's socioeconomic and ecological concerns require new technology. Many I4.0 technologies will rely on internet connection in the future. Therefore, investing in

physical and digital infrastructure in Africa is crucial to tackling other post-covid-19 concerns facing Africa's economy, citizens, and governments.

Post-covid, Africa's technological innovation and broadband network connectivity are crucial (Signé, 2020). The study was conducted during the post-COVID-19 pandemic with African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. I interviewed individuals in-person and virtually and sought clarity during the post-COVID-19 crisis. In this study, experts agreed that in the post-Covid-19 era, the global future would integrate technology into every facet of the socioeconomic and political economy. A good section of the public today realizes the role of public leadership and robust policies to encourage the nexus of digitalization and accessibility in education, fintech, the private sector, and in fighting diseases (Nwaka, 2021).

Following COVID-19, the global economy resolves to accommodate these demands, opening doors for many exciting new digital platforms across Africa. However, the long-term implications of COVID-19 on the circular economy could undermine initiatives and developments (Wuyts et al., 2020). African governments and institutions must collaborate to amplify post-COVID-19 recovery and reconstruction resources for a successful impact. The COVID-19 pandemic shows the necessity of government policies and regional collaboration that encourage and enable public and private sector innovation and access to vital technologies. It provides unique policy and developmental discourse

in support of post-COVID-19 reconstruction to prioritize investment in R&D, manufacturing, and local health institutions (Nwaka, 2021).

Despite apparent circular economy benefits, Africa's digital adoption to enable circular economy practices could be better. Strong public leadership and comprehensive policies that support innovation and digital technologies can help reset economic structures, create jobs, and enhance productivity. Technology diffusion must be accompanied by investments in physical infrastructure, energy access, education, and sound regulation, including access to finance for entrepreneurs to innovate, experiment, and incubate circular economy concepts and challenge the current linear system.

Implications for Theory

Scholars have identified a gap in the literature about technology readiness and effective technology diffusion to support a transition to a circular economy in West and East African nations. This research was crucial to the research community because its results will fill a gap in the theoretical and empirical literature by informing sub-Saharan African leaders on the knowledge needed to enable technology readiness and technology diffusion for a successful transition to a circular economy (Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021). The leadership and sustainability literature needs to provide more guidance on successfully impacting technology diffusion to promote a transition to a circular economy in sub-Saharan Africa (Chunguang & Quayson, 2022; Jayaram et al., 2021).

Since the study's overarching goal is to provide an original theoretical or conceptual framework contribution, I used a multiple-case-study methodology that allows

for a more in-depth understanding of the research question and ensures its trustworthiness, mitigating the qualitative research limitation and ensuring that the research findings are credible, transferable, dependable, and confirmable (Stahl & King, 2020). Systems based on enabling technologies are necessary for circular economy transition (Magnusson et al., 2022). Critical to the CE transformation are Africa's technological improvement and broadband internet access needs (Signé, 2020). Scholars have repeatedly documented that any advancement in digital technology innovation and industrial process modifications would help reduce environmental emissions in emerging economies, notably sub-Sahara Africa (Tachega et al., 2021; Wang, 2021; Wanke et al., 2021).

Findings from studies on circular economy leadership and sustainability topics can inform the development of a conceptual model and build theory (Grafström & Aasma, 2021; Dosso, Nwankwo & Travaly, 2021). This research design strategy is supported by extending knowledge within my conceptual framework to explicitly relate the outcomes (i.e., the knowledge needed to implement policies on technology diffusion to enable circular economy) to national framework strategies. That ensures circularity across initiatives, including the diversity of socio-economic circumstances, and resolves to address it directly (Andriamahefazafy & Failler, 2021). The extension of theoretical knowledge of complex factors and context dimensions creates an interdependence between the technology diffusion needed for a successful transition to a circular economy and sub-Saharan African leaders' challenges with enabling technology readiness (Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021).

Adopting technological innovation that enables circular economy practices is vital to achieving economic and environmental sustainability in various countries, especially emerging economies. This study was framed by two key concepts that focus on aligning with the purpose of the study, which was to describe African public leadership experts' views on technology readiness and the technology diffusion needed for a successful transition to a circular economy in sub-Saharan Africa: 1) Rogers's (1995) concept of diffusion of innovations, and 2) Grafström and Aasma's (2021) concept of the circular economy, that can be incorporated into research designs with the open nature of expert interviews (Littig & Pöchhacker, 2014).

I analyzed the data using the multiple case study design during the study, often used to establish or extend theory (Eisenhardt & Graebner, 2007). The multiple case study methodology is an inductive research method that enables themes to emerge from the data. It allows the data and the perspective of African public leadership experts to drive recommendations for future theoretical research (see Yin, 2017). The outcome of my study contributes to theory extension by highlighting vital attributes that enable sub-Saharan African leaders to implement circular economy action plans across national and regional-level sector-specific location initiatives.

Conclusions

This research addressed a gap in the literature about sub-Saharan African leaders' challenges related to the knowledge required to implement policies on technology diffusion needed to enable a transition to a circular economy. This study's participants provided valuable input into understanding the technology readiness and the technology

diffusion needed for successful circular economy transition initiatives among sub-Saharan African leaders in the post-implementation stage. The study participants provided insight regarding the knowledge required to implement policies on technology readiness and the technology diffusion needed for a successful transition to a circular economy to improve sub-Saharan Africa's socioeconomic development.

The expert's insight can inform sub-Saharan African leaders' actionable strategies for instituting found components and addressing prevalent challenges related to the knowledge required to implement policies on technology diffusion needed to enable a transition to a circular economy. Such insight can assist sub-Saharan Africa leaders with in-depth knowledge of enabling technology readiness and the technology diffusion needed for a successful transition to a circular economy to support their nation's long-term sustainable development (Bouchene et al., 2021; Dosso, Nwankwo & Travaly, 2021; Grafström & Aasma, 2021).

In circular economy administration, transition governance and policy experimentation can improve social learning, challenge prevailing values, attract new actors, and promote accelerated advancement into revolutionary technological frontiers. That creates the enabling environment, including diffusion of Digital and Green-Tech solutions and socioeconomic development aligned with the 2030 sustainable development goals (SDGs) needed (see Bai et al., 2022; Ma & Zhu, 2022; Obobisa et al., 2022). During circular economy implementation, quality standards, effective policy communication, and a skilled labor force are persistent challenges in the transitioning of many African nations; nevertheless, public education can help to address these issues

(Antwi & Ley, 2021). Further, to overcome these challenges, systemic circular economy transition activities require collaborations with multiple stakeholders, and technological innovation has become a vital tool for promoting the transition to a circular economy for green industrialization.

To strengthen circular economy adoption in emerging economies, multi-stakeholder collaboration for systemic change, regulatory reforms, institutional restructuring, and a public leadership role that enforces the necessary policies are prerequisites for executing circular economy initiatives. Scholars advocated for a range of strategies, such as top-down (legislation and policy, support infrastructure, and societal awareness) and bottom-up (participation of stakeholders) approaches (Dagilien et al., 2021). The African continent requires a digital revolution, and public sector leadership in co-developing innovative solutions for circularity and utilizing their convening authority to facilitate cross-sector collaboration is vital (Ddiba et al., 2020).

The study participants' viewpoints offered recommendations for support of continuing education and training for public leaders. This intervention included ongoing training to upskill and reskill the labor force, particularly for public leadership, to pave the way for circular economy future leaders through comprehensive professional development curriculums, research, innovation, and collaborative efforts. Africa's circular economy "readiness" should be seen from a sustainable development perspective, which includes global concerns on, poverty alleviation, climate change, sustainable natural resource management, and biodiversity protection (Agrawal, Wankhede, Kumar, Upadhyay & Garza-Reyes, 2022).

It is necessary to recognize the public leadership roles as crucial enablers in providing proper governance, centralized yet inclusive, and regulation to enable technology readiness and the technology diffusion needed to transition to a national circular economy framework. Furthermore, education and training advance practitioner knowledge toward sustaining a circular economy system that can encourage socioeconomic development. While preserving and protecting the environment, all of which can benefit the transition to a net zero economy. In the post-COVID-19 era, African public leadership must adopt modern technology as the foundation for integrating circular economy initiatives with public policy, clean energy access, institutional leadership capacity to support recovery, the implementation of innovative new products and services and financing, supply chain circularity, and the role of academic institutions and enhanced private sector competitive advantage (Nwaka, 2021).

Future research may include an exploration of an analysis pertinent to expert knowledge supporting Africa's public leadership social-cultural inertia barrier to the implementation of circular economy policies and how leapfrogging technological development stages can support the achievement of sub-Saharan Africa's circular economy transition and SDGs (Grafström & Aasma, 2021). Future research can also expand the conceptual model to explore other key stakeholder groups within the circular economy ecosystem that need to be considered during the planning and implementation to enable successful public-private dialogue and network governance in an African context (Cramer, 2022; Desmond & Asamba, 2019). Furthermore, researchers are

implored to replicate this study's findings using quantitative methods to validate them in comparative or distinct contexts (Harkiolakis, 2017).

Public leadership in sub-Saharan Africa must bridge a massive circular economy infrastructure and knowledge gap by introducing systemic reforms by deploying climate-smart integrative infrastructure for mobility and transportation, connectivity, clean energy access, green built environment, and climate-smart agribusiness as a new set of guiding principles for economic development. For the successful national implementation of a circular economy transition plan to stimulate growth. A better understanding of how the contextual factor can guide African public leaders to take advantage of the opportunity to acquire underpinning cutting-edge technology capabilities, develop innovative financial products, engage multiple stakeholders, and establish strong institutions is crucial.

Due to the significance and potential of the public sector in implementing circular economy, the findings of this study are significant to the theory extension and practical knowledge required to drive positive social change in sub-Saharan Africa. With this newly gained knowledge, sub-Saharan African leaders can focus on the identified key attributes that enable the implementation of circular economy action plans across national and regional-level sector-specific initiatives toward achieving the UN Sustainable Development Goals (SDGs).

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Appendix A: Recruitment Letter

Hello,

I am a doctoral student at Walden University, and I invite you to participate in my research study.

This study explores how public leaders in sub-Saharan African nations may effectively enact policies to support their technology readiness and technology diffusion needed to enable a circular economy transition in support of their nation's sustainable development goals (SDGs) and secure the long-term livelihoods of sub-Saharan Africans.

The purpose of this qualitative, multiple case study is to describe African public leadership experts' views on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy. I believe that your experience would be a significant contribution to the study.

The study is important as the findings may inform African public leaders to support their technology readiness, enabling technology diffusion and gaining the practical knowledge needed to enact policies to drive the circular economy transition. Finally, the social change impact of this study may potentially drive positive social change in sub-Saharan Africa by informing African public leaders on the knowledge needed to enact policies on technology diffusion needed to support a circular economy transition to support their nation's sustainable development.

If you are interested in participating in this study, please review and return the signed consent form attached. If you want additional information, you may reply to this email. Thank you in advance for your consideration.

Respectfully,

Evans Jakpa-Johns (Researcher)

Ph.D. Candidate – Walden University

Appendix B: The Interview Protocol

Researcher to Participants Prologue:

Thank you so much for agreeing to participate in this study. I will begin the interview by asking the demographic question to ensure you qualify to participate in the study. In the interview, I will ask you about your experience as an African leader from the public sector with how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy.

Periodically I may ask clarifying questions or encourage you to describe in more detail. You are invited to elaborate on where you feel comfortable and decline to do so when you do not have additional information.

If you need clarification from me, please ask. I am interested in knowing your experiences as an expert in African public leadership and the transition of sub-Saharan African nations to a circular economy model, and I want you to feel comfortable during this process.

Demographics will only be used for statistical purposes in aggregate form

Number identifier: _____

Age: _____

Gender:_____

Nationality:_____

Highest level of education_____

Years' experience in African Public Leadership _____

Years' experience as a subject matter expert on the future circular economy in sub-Saharan African nations _____

From Research to Participants: *As a prologue to my questions and so that you may gain greater clarity on the nature of my study, I would like to define some commonly used premises and terms you will hear in the interview questions.*

Transitioning to net-zero via a circular economy model by 2050 will likely secure the livelihoods of sub-Saharan Africans in the long term (Signé, 2020). While authors have recently noted that systemic CE transition efforts require engagements with multiple stakeholders (Salvioni & Almici, 2020), there is little practitioner knowledge or theoretical research on how African public leaders may diffuse the needed technology for a transition to a circular economy within sub-Saharan African countries (Zoogah, 2022). The outcome of such a study may drive positive social change in sub-Saharan Africa by informing African public leaders on the knowledge needed to enact policies on technology diffusion needed to support a circular economy transition to support their nation's sustainable development.

Circular economy: This term refers to an economic system that is restorative or regenerative by design, addressing global challenges (climate change, pollution, biodiversity loss, and waste) to prevent resource depletion, closing energy and material loops, and facilitating innovative and sustainable transitions (Ellen MacArthur Foundation, 2021).

Circularity principles: This term refers to a strategy to rethink current development methods, reroute the development path, and establish positive commitments that are directed by market systems and networks defined by intrinsic values and patterns of collaboration that are dependent on the interaction between institutional and material conditions, future technologies, and spatial economic transformation (Henrysson & Nuur, 2021).

Technology readiness: The term refers to people's willingness to accept and use new technology in their personal and professional lives, determined by a gestalt of mental facilitators and inhibitors that affect their proclivity to use new technology (Bakırtaş, 2017).

Technology diffusion: The term refers to the concept that the diffusion of information about a new technology innovation takes place within an ecosystem of stakeholders, institutions, and networks, as a co-evolving and multidimensional process that is influenced by both the social structure of the adopters and their degree of assortativity (Gruenhagen et Al., 2021; Guerzoni et Al., 2018; Magnusson et al., 2022).

Are we ready to begin?

1. Let us begin with your most important responsibility as a leader in a public organization in your nation; what are your most significant tasks?
2. How do you contribute to transforming your organization's community into a circular economy model?
3. What infrastructure platforms and possibilities have your organization developed to facilitate the technological readiness necessary for a successful transition to a circular economy in your nation?
4. What obstacles have you encountered in launching the emerging technologies required to shift from a linear to a circular economy model? How were the challenges overcome? Or why do they persist?
5. What prospective policy implementation may help promote the diffusion of digital technology necessary to achieve circularity that enhances the sustainable development goals of your organization?
6. What are some of the organization's possible initiatives for engaging diverse stakeholders in the diffusion of the necessary technologies to transition to a circular economy in an African context?
7. If I may inquire, what is the organization's current plan for enhancing sustainable development toward circularity? Tell me more about it?

8. As a subject matter expert on the circular economy, and an African public sector leader, what would be your one piece of valuable advice on how sub-Saharan African leaders can enable technology readiness and the technology diffusion needed for a successful transition to a circular economy?

For researcher only:

Probes to facilitate conversations around the facts:
 "Can you give me an example of that?"
 "Please tell me more about that."

Researcher to Participant Epilogue:

I cannot thank you enough for your time and attention during this interview. I will be conducting interviews with African public leaders. You will receive a copy of your interview transcript to check for the accuracy of your narratives.

The answers of all participant interviews will be combined for analysis and report. Nothing you said will be ever identified with you personally.

Thank you for your participation.