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Information Systems Management and Sustainable Urban Development: A Case Study

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This is to certify that the doctoral dissertation by

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Walden University
2022

Abstract

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by

Endris Suraj

MA, Walden University, 2019

MA, EGST, 2011

Dissertation Submitted in Partial Fulfillment

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Abstract

Sustainable Urban Development of Ethiopia lacks strategies to implement information systems management (ISM). Lacking appropriate ISM implementation has influenced the government's plan on the four indicators of urban sustainability - Water, Air, Climate Change, and Population Growth. Grounded in the conceptual frameworks of Technology Acceptance Model (TAM) and Diffusion Of Innovation (DOI), the purpose of this qualitative single case study aims to explore ISM for sustainable urban development in Ethiopia. The participants were 12 Development Associates (DAs) who have been participating in implementing of ISM. Data was collected through a one-to-one interview, National documents, the Environmental Protection Office of Ethiopia, and United Nation publications and reports. Then, using Yin's five-steps of data analysis process, the data was analyzed. To explore the themes of implementing ISM for sustainable urban development, thematic analysis was used. Accordingly, three themes emerged: the need for adoptable model, applicable knowledge of integrating innovation and technology and resource re-allocation. The recommendation and its diverse implication have been forwarded to the leaders of Sustainable Urban Development to be used as a means of Positive Social Change. The positive social change implications of the research include its potential to promote sustainability, create employment opportunities, and enhance infrastructures in the host country. As intellectual product, the outcome of the research can be used by policy makers to shape the National Urban Sustainability Strategy of Ethiopia.

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Dedication

I want to dedicate my dissertation to my wife, Emebet Bibiso (Yenuyeto), the strongest, most committed, and faithful wife of this Century. She has been taking a double role in the family when I was lost in the world of academics. Here comes my love to my kids - Eserael Endris, Natnael Endris, and Dawit Endris, who tolerated the pain of not having their Dad when they wanted to play with him. Also, this moment reminds me of my Mom, Zemzem Woldekidan, who passed away before seeing my glorious days. She lost her strength while fighting for my bread and my five sisters' (Hadra Amedo, Lomita Amedo, Sofya Amedo, Shetaye Amedo, and Mekya Abdela). My brother Sultan Amedo accompanied my first day to school, and my extended family, Sebsebe Tariku and Aselefech Biru prayed for me. Both deserve my thanks.

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First, I want to thank my Lord Jesus Christ who is my Model, Pioneer and Perfecter of the faith who endured the cross, scorning its shame, and sat down at the right hand of the throne of God (Hebrews 12:2). Without his Grace, I would never have made it this far. I want to acknowledge my committee Chair, Dr. Richard Dool, for his extraordinary support and guidance during my dissertation journey. I am very grateful to my second committee member Dr. Mohammad M. Sharifzadeh and my Advisor Pamm Kemp. My unique thanks go to Ato Getacher and Endalkachew Gulma for their valuable support during my data collection.

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Chapter 1: Introduction to the Study

Since the commencement of the UN's 2015 sustainable development Goal 11 (Koch and Ahmad, 2018), making cities and human settlements inclusive and a technology center is becoming a global agenda (Koch and Ahmad, 2018). Following this decree, Venkatesh et al. (2021) examined how information systems can back up the UN 2030 Agenda of Sustainability. Endalamaw and Darr (2020) found out how climate service should start from combined knowledge systems and the basic strategy of incorporating diverse knowledge for the 2030 Agenda. Tumbo et al., 2018 presented the ever-progressing climate change and the need for approach and action-oriented information systems.

Not only will implementing ISM facilitate and support sustainable urban development but also it can contribute to positive social change. Enhancing to deal with civilization challenges like pollution level, scarcity of resources, implementation of ISM can help develop a broader support system and sustainable economic growth for a high quality of life (Machingura et al., 2018). Facilitating social involvement toward a productive and meaningful working life can benefit users in Ethiopia.

Consequently, helping to design and support administrative tasks, implementing ISM creates the capability to have input, storage, manipulation, and data analysis useful for planning, decision-making, and implementation (Ali, 2020). Previous studies on implementing information systems management for sustainable urban development have not considered the current computing world change (Berdik et al., 2021). As Cloud computing is becoming the third uprising of the ICT industry, studies show the need for

considering personal computing and the internet (Seyoum, 2020). Ethiopia's government uses data collected from the government and executive organs procedural and time-consuming. While cloud computing is becoming an integral element of SDGs implementation, Ethiopia's government's two manual data sources to attain the 2030 SDGs Agenda in many parts of the globe have compatibility issues (National Plan Commission, 2017).

There is a growing need for corrective research because there is no uniform and straightforward access to classified and defined information and lacking data inputs needed for official administrative reports. To find an answer to the research question, this chapter will discuss the Problem Statement, Purpose of the Study, Research Questions, Interview Questions, Significance to Social Change, and Summary and Transition.

Background of the Study

1. Castro (2021); (b) the researcher studied the global crisis and environmental complexity in lacking sustainable urban development measures. (c) After finding out the critical problems with the standard tools for social, spatial, and statistical analysis, they enhanced inclusive and sustainable urbanization to build on a participatory, integrated, and sustainable urban policy, including the smart city. (d) The study is significant as it shows the Global Crisis that later became a base for the UN Sustainability initiative of 2015.

2. Shen et al. (2017) (b) studied the current global sustainable urbanization actors: Brazil, Russia, India, China, and South Africa (BRICS). (c) The paper examined the

significant influence of BRICS in sustainable urban development. (d) This research provided a reference in searching for Global solutions to promote other sustainable urbanization practices, which serves as evidence for sustainability in its urgent form.

3. Rosa (2017); (b) The research studied the 2015 UN Sustainable Development Goals (SDGs) that is based on the early analogy of how the Short-term economic development has led to limited actions of unsustainable resource management and degraded ecosystems. (c) The research provided valuable input and suggestions for 2030 Sustainable development goals. Identifying urban sustainability inequity and encouraging action to address the crisis, the research lined a Conservation of Nature and Natural Resources Foundation. (d) The study lays significant strategies to tackle urban environmental health problems in cities worldwide and suggests sensible policies that integrate appropriate sanitation, poverty, and education policies.

4. Nikulina et al. (2018); (b) They studied the role of identifying ways to use information as decision support and building appropriate capacity and skills critical factors in achieving the 2015 UN Sustainable Development Goals (SDGs). (c) The research laid the ground for minimizing energy-related greenhouse gas emissions (GHG) concerning the transportation sector. (d) As the paper serves as a foundation for addressing Goal 11m ti, it can help identify the increasing worldwide demand for transportation services.

5. Ketema et al., (2020); (b) Ethiopia adopted Goal 11 of the 2015 SDGs to affordable, reliable, sustainable, and modern energy in cities by 2030 (Koch & Ahmad, 2018). (c) the research made a foundation on how Ethiopia accepted the need for electricity to the towns and the people in developing and transitional countries. (c) The researchers have foreseen that a large part of this energy should come from renewables, including geothermal energy. (d) As a capacity-building that is a critical enabler in accelerating geothermal energy utilization in Ethiopia, the research serves as a reliable document of Ethiopia's determination to adopt Goal 11 of the 2015 SDGs.

6. Adam (2019); (b) studied how Ethiopia started executing urban sustainable development planning and delivery methods. (c) The search populated the alternative means of mitigating its challenges. (d) the research is significant because it indicates how Ethiopia's government has applied urban sustainability.

7. Abebe (2018); (b) DAs play key responsibility of natural resource conservation, community training, and advice users in Ethiopia. in addition to Collecting feedback from the government bodies about natural resource conservation, the DAs are serving as the physical and strategic inventories of the environment. (c) According to the research, using their community-based social chains, DAs are expected to facilitate skill and knowledge adaptation of new and improved technologies to increase production and productivity. (d) The research is helpful evidence that the DAs' skills were to be used to realize the Transfer of Technology (TOT), identify development alternatives, communicate socio-economic feedback, and serve as a point of contact between the government and the community.

8. Abo (2018); (b) The researcher investigated the Job Performance level of development agents and the factors influencing their Job Performance. (c) The researchers interviewed 120 development agents to measure the performance level of DAs. It is found that lack of better pay structure, enhanced recognition, over responsibility, under perceived job security, and the wrong perception about work itself is some of the critical challenges DAs. The research paper is significant because it helps identify what shapes the attitude of development agents towards their job, motivating them to perform the organization's goal.

9 Worku, H. (2017); (b) According to this research, despite the Ethiopian government's effort to tackle the four indicators of sustainable urban development, there is a problem of Water, Air, Climate Change, and Population Growth in Ethiopia. Following drinking water pollution and human exposure to dangerous chemicals, increasing water supply and water quality problems are causing health concerns in Addis Ababa. Moreover, air pollution is becoming one of the most critical contributors to damage human health for heart and respiratory issues in Addis Ababa. (d) The research paper is significant because it shows how climate change and the ever-increasing population growth result in volume and flooding change in the environment.

10. Denbu and Kim (2019); (b) Government in developing countries like Ethiopia. (c) The researcher identified the lack of understanding in e-Government implementation as the main threat of implementing e-Government in Ethiopia. (d) his research is significant because it shows the role of culture, high resistance, weak private

sector, low-level collaboration/partnership between private and public sectors, creating a lack of understanding to implement IS for sustainable development.

Though the already mentioned literature approved the UN goal of sustainability, Ethiopia's government interest of urban sustainability interest, and the lack of understanding to implement information systems management in Ethiopia, none explained the implementation method. Therefore, this research explores how to implement information IS for sustainable development.

Problem Statement

Despite Ethiopia's government's effort of using development agents (DA) to implement information systems and bring about sustainable urban development, a search of the literature shows the shortcomings of the project in many ways. The lack of integrating technology to implement information systems management made the DAs collect and disseminate information in an outdated manner.

Because of this, the government's enforcement of the four indicators of urban sustainability - Water, Air, Climate Change, and Population Growth is becoming in question (National Academies of Sciences, 2016; Worku, H. (2017). After studying the urban sustainability indicators and the outdated information channels among the DAs, Mekuriaw et al. (2017) underlined the credibility of the "Guidelines the development agents have been using since 30 years ago. Moreover, Beyene et al. studied the challenge of regional and zonal bureaus and woreda (district) offices using the DAs to communicate policy and sustainability decisions (See Carruth & Freeman, 2021).

Therefore, as DAs' contribution to facilitating sustainable urban development is shrinking, the need to understand how to implement ISM for Sustainable urban development is becoming mandatory.

Although outdated information systems are common problems in most third-world countries, a lack of understanding of implementing ISM for Sustainable urban development has refrained Ethiopia's effort from the benefit of information and boosted the social problem (In Risso & In Testarmata, 2018). Information was supposed to serve as an essential part of sustainability planning and decision-making. Sewnet and Abebe (2018) found the primary role of input as implementing sustainable use and land resources management in Ethiopia. Muh and Tabet (2019) studied the need for information systems in providing access to off-grid renewable energy technologies. Also, emphasizing the significant role of data collection, processing, storing, and distribution, Ayele et al. (2018) underlined the need for appropriate manipulation of Information in Ethiopia. Accordingly, by exploring implementing ISM for sustainable development, this research study will address sustainability's social problems.

Purpose of the Study

This qualitative study aims to explore ISM for sustainable urban development. Through the one-to-one interview, Ethiopia's implementation of ISM for Sustainable urban development will be explored. In addition to this, using Documentation, the theoretical principles of implementing ISM for sustainable urban development will be studied. Once those understandings are gained, the research outcome can lay the ground

to attain the study's practical purpose. Policymakers can develop rules and regulations for implementing ISM to sustainable urban development. Using the research outcome, leaders can plan, implement, and execute information-oriented Sustainable urban development (Smardon et al., 2019). Consequently, serving as a strategic document that enhances Social Change, the research outcome can address community challenges. The form can serve as a change resource, especially in bringing about a meaningful impact in people's lives.

Research Questions

RQ1. What methods are currently used to implement information Systems Management (ISM) for Sustainable urban development?

RQ2. What factors contributed to the unsuccessful implementation of ISM for Sustainable urban development?

RQ3. What are the Development Associates' (DAs) perceptions of critical success factors for successful ISM implementation?

RQ4. How can the government of Ethiopia overcome factors that led to unsuccessful ISM implementation?

Conceptual Framework

In this paper, the technology acceptance model (TAM) will be used to explain and define the logical connections between information systems management (independent variable) and sustainable urban development (dependent variable). Following human behavior toward TAM, Davis (1989) introduced two variables called perceived usefulness (PU) and perceived ease of use (PEOU). Deokar et al. (2017) described PU as

a specific system that will increase productivity within a particular organizational context. PEOU can use a person's perception of enhancing job performance and a secondary determinant of using a specific technology. To apply TAM in Sustainable development, researchers have examined PU and PEOU as predictors of adoption and behavioral intentions toward information system use (Heeks, 2017).

TAM can be used as the conceptual framework for determining the influential factors of users' attitudes and behavior toward explaining the correlation between information systems and sustainable development, as presented in Fig: 1.

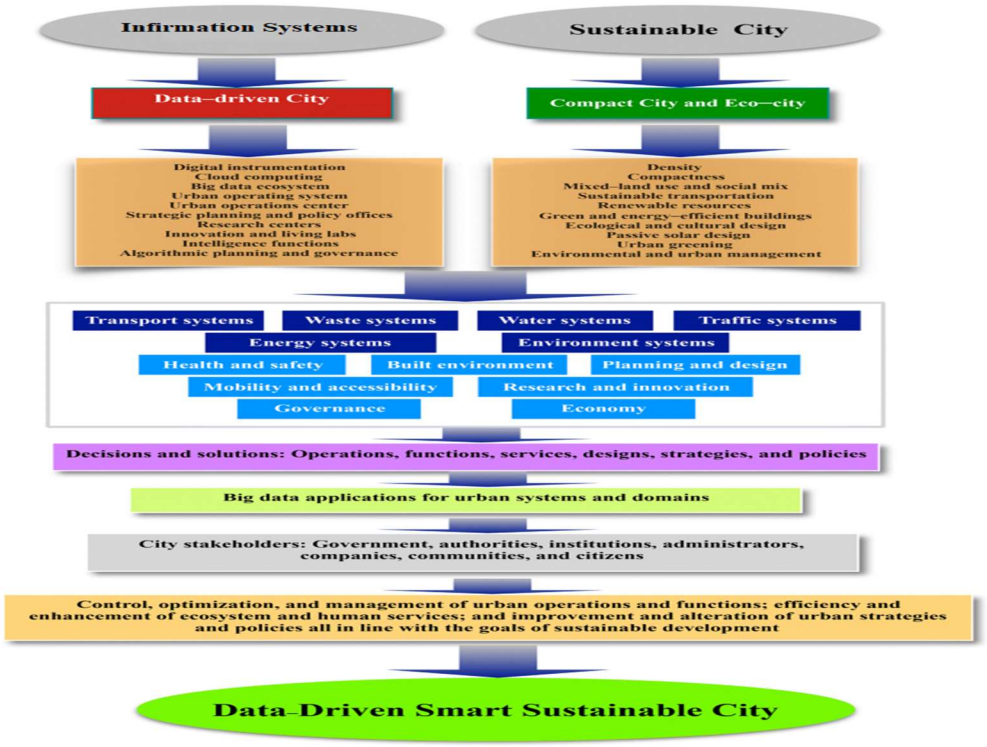

Fig 1: Bibri, S. E. (2019). The anatomy of the data-driven intelligent, sustainable city: instrumentation, datafication, computerization, and related applications. *Journal of Big Data, 6* (1), 1-43.

Moreover, as a comprehensive framework that proposes the most current thinking on the practice and theory of engagement, Rogers' Diffusion of Innovations Theory (DOI) can contribute to the diffusion of Information Systems with sustainable urban development principles in a diverse society, academic and professional communities (Gupta et al., 2018). DOI can outline, connect the present framework, and diffuse ISM and sustainable urban development principles. It serves as an appropriate and rigorous guide for implementing ISM on the six sustainable urban development areas (Masoumi and Genderen, 2019). The six areas are Conservation of the ecosystem, Development of a sustainable society, Conservation of biodiversity, Control of population growth, development of human resources, Promotion of public participation (Schoenmaker and Schramade, 2019). Accordingly, offering an insight into ISM's application for sustainable urban development, the conceptual framework can guide the research to answer the research questions (Thomas, 2017).

The research objective of this study is to explore the implementation of ISM for Sustainable urban development. Accordingly, the basic principles of DOI and TAM theories can explain the intrinsic and social system factors to understand decisions toward adopting. Moreover, as the construction of assumptions that tell how the phenomena should be studied, this conceptual framework can help organize this research's components in a scholarly manner (In Risso & In Testarmata, 2018). Therefore, providing evidence toward understanding the behavioral and cultural influences of implementing information systems management on sustainable urban development.

Nature of the Study

I will need to conduct a descriptive case study that uses one-to-one phone interviews and Documentation as definitive sources for my planned research design. A qualitative case study is appropriate for this research because it involves collecting rich, textured data drawn from participants' experiences, beliefs, perceptions, motivations, and intentions (Belcher, 2019). Moreover, this approach allows the study of phenomena without affecting the settings and or measuring instruments; the method facilitates collecting in-depth insights into the situation (Charney et al., 2017). As Patton said, using Explanatory case studies that use causal reasoning, it is possible to create a coherent view of implementing ISM for Sustainable urban development in Ethiopia.

Accordingly, from the 62,764 Development Agents (DA) population in Ethiopia, I will conduct 30- 45 minutes of one-to-one phone interviews with 12 – 15 individuals. I will be choosing the individuals through purposeful sampling. The DAs are selected because they are the Experts in Sustainable Urban Development. Once Walden University written permission is granted, it can be accessed through the phone. Having a primary role in executing the government's sustainable development plan, the DAs are the information interims between the community and the government (Karim et al., 2018).

Choosing the DAs through a purposeful sampling strategy allows this research process to focus on the subject matter in-depth and mainly explore information-rich areas. A phone interview on DAs will be conducted (Breaux, 2020). Development Agents (DAs) are government-assigned communication channels, advisories, and training service

providers in Ethiopia. Since they started operating in 2002, DAs have been engaged in Sustainable Urban Development in Urban areas, and Extension works in rural areas (Abo, 2018). Davis (1989)As the final step of interview preparation, I will complete preparing the interview questions in an absolute way and forward the forms for IRB approval. When the approval comes back, I will set up the interviews' time and place, prepare interview protocols and forward IRB consent forms. During the interview, ensuring that all technology works, I will finalize the completion of informed consent and permissions to record. During the phone interview, while Windows 10 voice recorder software will be used to record the phone conversation, the interviewee and participants will be given the option of having their names revealed or staying anonymous (Forte et al., 2017). Following the interview, skimming through the memos and written notes, categorizing, and data analysis of the responses will follow.

Thematic analysis is used to analyze the responses and emergent themes, and I have implemented the four Qualitative analysis stages in this research. The analysis stages are Comprehending, Synthesizing, Theorizing, and Recontextualizing (Ocampo, 2018):

1. Through the application of strategy, Qualitative Comprehending makes the content of the study understandable makes sense in real-life (Azagew & Worku, 2020).

2. Through Qualitative synthesizing, statistical and logical techniques will be applied to describe, illustrate, condense, recap, and evaluate data (Cooper et al., 2019).

3. Theorizing involves convincing inferences to explanations, induction, or abduction (WILSON, 2020).

4. Recontextualizing will be the process of interpreting meaning, looking for ways to make meaning of the data, and transforming the data into findings (Thomas & Jolivet-Jolivet, 2020).

As Documentation will be the second data source, document analysis will be on Public Records, Policy Manuals, Personal Documents, and Physical Evidence. The research helps to use Documentation as the second form of definitive sources. The study aids in generating additional data sources about the day-to-day activities attached to the phenomena and a better understanding of the subject matter (DePoy, & Gitlin, 2019). Methods of content analysis and thematic analysis will be applied to execute the analysis plan. Using Bowen's document skimming (superficial examination), reading (thorough examination), and interpretation, document analysis will be applied to understand how to implement ISM for sustainable urban development (Lytvyn et al., 2019).

Definitions

Information system Management

An information system management (ISM) is a systematic way of using information for decision-making after coordination, control, analysis, and visualization in an organization. The management field uses information systems to involve people, processes, and Technology in an organizational context. The management profession deals with the complete and classified approach into information monitoring, design methodology, development of system guidance, and storage systems (Setiawan et al., 2019).

Technology Acceptance Model

Technology Acceptance Model is a guideline that proposes and perceives simple use of and effective acceptance of Technology. It is the process of testing the various applications in tens of studies to become the most widely applied model of user acceptance and usage. It is good to work to deal with Technology behavior and acceptance of information systems and Technology by individual users (Granić & Marangunić, 2019).

Sustainable Urban development

Sustainable urban development is making cities economically powerful, socially significant, physically compatible, and environmentally friendly well-being without compromising the next generation's survival. It is a concept of starting to deal with the surrounding with a new path of humanity with the sense of human and nature co-existence (Camagni, 2017).

Implementation

Implementation is the act or instance of implementing something to make something active or effective following a policy/law. With the sense of bringing about a desired result or goal, it is the process of turning an idea or pre-defined rules and procedures into a reality. Implementation can also be defined because of practical action dealing with barriers to enforcing assigned principles (Torun, 2021).

Smart city

With the sense of increasing operational efficiency, sharing information with the residents, and improving the capability of government services and citizen welfare, a smart city is a municipality that uses information and communication technologies. As an extended form of developing an urban lifestyle that used to create sustainable economic development, it is a new form of integrating Technology for a high quality of life by excelling in multiple critical areas of the urban economy (Moura and de Abreu, 2019).

Assumptions

There are five assumptions made in carrying out this study.

1. To remain competitive, governments must adopt new information system management.
2. This research paper's primary assumption is that information derived from the participants would be honest and trustworthy.
3. The interviewees would give information that springs from the best of their knowledge and ability.
4. the assumption is that the participant's view can be taken as the population's outlooks from which they are drawn.
5. The final assumption is that the participants have enough experience regarding ISM and understand the interview questions.

Scope and Delimitations

This study focused on investigating the perception of Development Agents who have a primary role in executing the government's sustainable development plan. The Development Agents are the information interims between the community and the government and can easily understand the role of information in development. The government uses them to introduce new technology and policy dissemination among society. The DAs focus on this study because they are the key role players of policy development, government policy implementation, and government feedback sources.

Limitations

Limitations, challenges, and barriers are expected to come from government offices' willingness to open doors and become available to share information, fill inquiries, and welcome the research process. In some instances, the study's lack of organized knowledge, inadequate communication systems, and inappropriate information communication policy can be a significant contextual challenge. To deal with the issue, I hope to apply the following strategies. The plans include inquiring about formal letters of co-operation from Walden University, using every possible communication comprising writing emails, sending messages, making phone calls to reach out to the offices, and arranging a research visit to Ethiopia.

Significance of the Study

This study is significant because it improves the Practical and Theoretical understanding of information Systems Management and Sustainable urban development.

Significance to Practice

By helping to visualize the possibility of implementing information systems with the detailed scopes of sustainability requirements, the research outcome will have Practical Significance. That means the research outcome will have a meaningful impact on the real-life of multitudes of people affected by sustainable urban development. Using the findings of the research, policymakers can develop rules and regulations on how to implement Information Systems Management to bring about Sustainable development (Smardon et al., 2019). In other words, using the document, leaders can plan, implement, and execute information-centered Sustainable development. Serving as a strategic document that enhances Social Change, the research outcome will be significant in addressing community challenges because of unsustainable growth.

Significance to Theory

When the study is complete, the concept of implementing information Systems Management for Sustainable urban development will gain a new understanding. Creating awareness on how Information Resources will be used to sustain growth, the study will provide knowledge about information systems management's role in attaining Sustainable urban development (Adshead et al., 2019). That means generating an idea on how to support living systems' wellbeing through the implementation of the information system;

the research outcome creates an understanding of how information systems could tackle social problems. The study will also provide theoretical knowledge on how to solve the root social problems because of unsustainable urban development. The research outcome will have the theoretical significance of filling the gap between information systems management and sustainable urban development.

Significance to Social Change

Helping to understand sustainable urban development dynamics, Implementing ISM shows the transitions and inputs for positive social change. Using the information stored in the system, the Development Agents can make intelligent guesses about the behavior of specific dynamics that contribute to Sustainable Development. Helping to minimize environmental impacts and allocate resources promptly, Implementing ISM can change the negative development and apply appropriate planning principles. It is possible to bring about planned sustainable development, resource usage, and implementation to solve local prosperity and competitiveness.

Summary and Transition

In Chapter 1, I presented the objective of this qualitative exploratory case study to explore ISM for Sustainable urban development. In this chapter's problem of the study, the central research question, interview questions, conceptual framework, assumptions, limitations, delimitations, and the research approach, which includes a qualitative methodology with an exploratory case study design, have been discussed. Implementing information systems management (ISM) plays a prominent role in Ethiopia's sustainable

urban development function. This study will address how to implement Information Systems Management (ISM) on sustainable urban development in Ethiopia. The research question is finding out what methods are currently being used to implement information Systems Management (ISM) for Sustainable urban development.

The logical connections between the framework presented and my study's nature include the technology acceptance model (TAM) and Rogers' Theory Of Diffusion of Innovations (DOI) for Sustainable urban development. Since its innovation, the technology acceptance model (TAM) and Rogers' Diffusion Innovations Theory (DOI) have been used to adopt principles within and between organizations and social systems (Rogers, 2003). The technology acceptance model (TAM) and DOI Theory provide a framework for dealing with users' attitudes in implementing ideas, explaining the significant factors that affect the implementation of innovations into the social system. The theory can be used as an essential tool for understanding and explaining factors that affect ISM design and implementation for Sustainable urban development. Users' attitudes affect behavioral intent to use new technology and are critical to successful IMIS implementation. Using behavioral control in theory, it is possible to effectively predict users' acceptance of new technologies and adoption models with the broadest use and performance. I will need to conduct a descriptive case study that uses one-to-one phone Interviews and Documentation as definitive sources for my planned research design. This research paper's primary assumption is that information derived from the participants would be honest and trustworthy. This study is significant because it

improves the Practical and Theoretical understanding of information Systems Management and Sustainable urban development.

Chapter 2 is a literature review about implementing Information Systems Management for sustainable urban development. In the coming Chapter 2, review of the literature on the TAM and DOI theories related to factors that influence the attitude and practice of implementing ISM to sustainable urban development will be discussed. Discussing the research design, data collection methods, analysis plans, sampling techniques, and procedures for contacting and interviewing participants occurs in Chapter 3. While in Chapter 4, the study's findings will be revealed, in Chapter 5, conclusions, implications, and recommendations will be presented.

Chapter 2: Literature Review

Despite Ethiopia's government's effort to implement sustainable urban development for the last three decades, a search of related literature shows that Water, Air, Climate Change, and Population Growth are becoming a challenge in Ethiopia's urban development (Olgwu, 2019). This qualitative study aims to understand how to implement ISM for Sustainable urban development in Ethiopia. Finding out what methods are currently being used to implement ISM for Sustainable urban development by Ethiopia's government, I have included the discussion and synthesis of current literature about ISM's concept and implementation.

Literature Search Strategy

Since the subject matter demands incorporating a broader aspect of sustainable urban development and ISM, a comprehensive search and review of relevant articles and literature reviews have been made. While the search helped to incorporate adequate and relevant literature in this paper, the study formulated the right research questions that shaped the data collection, interpretation, and presentation. In the search process, Information Systems Management, Sustainable Urban Development in Ethiopia, and a Case Study have been used as keywords for exploring the major scholarly databases. The database includes Google Scholar, SAGE Journals, Elton Bryson Stephens Company (EBSCO), and Walden University. Thus, the search on professional and peer-reviewed articles written and published between 2000 and 2020 helped present a comprehensive review and foundation for the review process.

A literature review was made to classify and evaluate the articles from implementing ISM for Sustainable urban development in Ethiopia. Significant ideas and inputs have been found from the study of titles, abstracts, research conclusions, and further research suggestions. The literature review is liable to provide information on what methods could be used. With the assumption leading to answering the research question raised in this research, the studies are presented in the coming chapters.

.

Conceptual Framework

To explore ISM implementation for Sustainable urban development, the basic principles of the Technology Acceptance Model (TAM) and Diffusion Of Innovation (DOI) theories will explain the intrinsic and social system factors to understand decisions toward adopting. As the construction of assumptions that tell how the phenomena should be studied, TAM and DOI can help organize this research's components in a scholarly manner. Guiding how the research questions could be answered, the conceptual framework can set the standard of interrelation between the significant concepts of ISM and sustainable development application (Choudrie et al., 2018). Therefore, the framework will be used to provide a piece of evidence toward understanding the behavioral and cultural influences of implementing information systems management on sustainable urban development.

In this paper, the technology acceptance model (TAM) will be used to explain and define the logical connections between information systems management (independent variable) and sustainable urban development (dependent variable). Following human behavior toward TAM, Davis (1989) introduced two variables called perceived usefulness (PU) and perceived ease of use (PEOU). PEOU can use a person's perception of a strategy to enhance job performance and a secondary determinant of using a particular technology. To apply TAM in Sustainable development, researchers have examined PU and PEOU as predictors of adoption and behavioral intentions toward information system use (Heeks, 2017). Information and communication technology for development (ICT4D). TAM can be used as the conceptual framework for determining

the influential factors of users' attitudes and behavior toward adopting information systems.

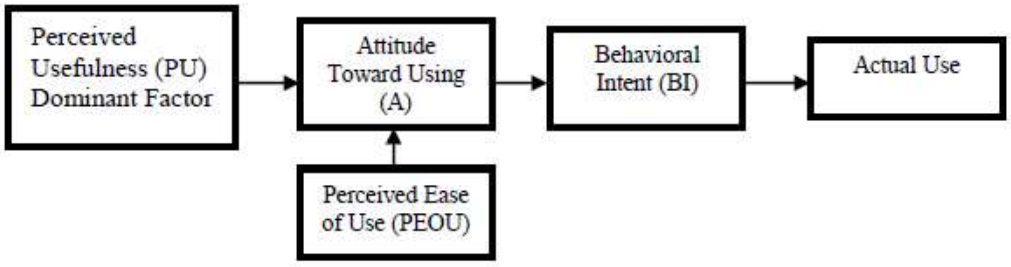

Figure 2. Technology acceptance model (TAM) with PU as the dominant factor. Adapted from "Theory Development in Nursing and Healthcare Informatics: A Model Explaining and Predicting Information and Communication Technology Acceptance by Healthcare Consumers," by J. Y. An, L. I. Hayman, T. Panniers, and B. Carty, 2007, Advances in Nursing Science, 30, E37-E49. Copyright 2007 by Wolters Kluwer Health/Lippincott Williams & Wilkins. Reprinted with permission (see Appendix B).

Diffusion Of Innovation (DOI) in information technology brought about the enlightenment of applying sustainable urban development theory. Welch and Yates (2018) explained how Sustainable Development is globally acknowledged as a powerful change driver. Underlining the role of DOI in empowering learners, the research has emphasized making decisions and taking action. Presenting DOE through the Lens of sustainable development, the implementation can provide a comprehensive approach to understanding sustainability differently. Bibri (2019) also suggested how the principles, planning practices & interlinked theory of DOI can support sustainable urbanization and

bring about innovative solutions. Helping to focus on the creation, diffusion, and utilization of knowledge, DOI can impact various aspects of Sustainable Development.

Moreover, as a comprehensive framework that proposes the most current thinking on the practice and theory of engagement, Rogers' Diffusion of Innovations Theory (DOI) can contribute to the diffusion of Information Systems with sustainable urban development principles in a diverse society, academic and professional communities (Gupta, et al., 2018). DOI can outline, connect the present framework, and diffuse ISM and sustainable urban development principles. It serves as an appropriate and rigorous guide for implementing ISM on the six sustainable urban development areas (Ravitch & Riggan, 2017). The six areas are Conservation of the ecosystem, Development of a sustainable society, Conservation of biodiversity, Control of population growth, development of human resources, Promotion of public participation (Schoenmaker & Schramade, 2019). Accordingly, offering an insight into ISM's application for sustainable urban development, the conceptual framework can guide the research process to answer the raised research question and address the research gap. As Gonzalez said, DOI can navigate through the implementation of ISM to meet the present's needs without compromising future generations' ability to survive.

To explain how an idea or technology can be implemented in society, E.M Rogers developed the Diffusion of Innovation (DOI) Theory in 1962. Guiding users to adopt a new idea, behavior, or product in a specific population or social system, Rogers showed how a group of people or people could do something differently (Van et al., 2018). That is, by facilitating the practice of perceiving an idea, behavior, or product, DOI guides

how customers can develop a new perspective towards a new product acquire and perform a new behavior. For multiple reasons, Roger's Theory of Diffusion of Innovation (DOI) can be used as a model of implementation among Development Agents, technology users, and Ethiopia's community.

By explaining how, why, and at what rate new ideas and technology could be implemented, Rogers' Theory of Diffusion of Innovation (2003) has an entire adaptation process. As one of the oldest social science theories has been used widely, the conceptual framework has been used for various studies on adopting innovation (Singh, 2019). The model has been explored and applied from diverse perspectives. Becoming a valuable framework for social change, Rogers's five stages of the innovation-decision process have been serving as a comprehensive volume that offers the most current thinking on the practice and theory of engagement (Johnston & Taylor, 2018).

Roger coined five stages of innovation as (1) Discovering an innovation's existence and function, (2) convincing people to embrace the invention, (3) The decision to adopt or reject (4) Implementation of the new idea, (5) Communicating the scenario using different channels. Since their discovery, the five stages of the innovation-decision process have been used in health, education, information technology, and hospitality (Abu et al., 2017) and confirmation to reinforce or reverse the innovation-decision. Typically following each other, people learn the type and technology's existence at the knowledge state of the innovation-decision process. Since adaptation does not happen simultaneously in a social system, the innovation-decision process will guide the community in a typical manner (Hill & Thompson-Hayes, 2017).

Rogers (2003) indicated the three types of knowledge: what innovation is, how it works, and why it works. The diffusion process of innovation functions four elements: innovation, communication channels, time, and social system (Scott and McGuire, 2017). Awareness-knowledge happens when people are exposed to the existence of creation. Awareness-knowledge motivates individuals to seek out how-to and principles-knowledge. For Roger, awareness is not an endpoint, not a beginning, in the states of adaptation. Knowledge happens when customers get information regarding using an innovation properly and principles-knowledge underlying how innovation works.

As the process that helps to communicate, multiple professions have been embarrassing DOI for different purposes. Magnifying the significant role of DOI in predicting implementation, Abu et al. (2017) applied the theory in health, education, information technology, and hospitality. DOI has been used in Technological and organizational innovations to explain and understand the adoption and diffusion of ideas, practices, or objects perceived (Vargo et al., 2020). Information Resources Management Association (2019) has reported how DOI could be applied in communication, education, business, and political science.

There are many reasons the current study will benefit from applying Roger's DOI theory (2003). DOI can help implement the idea, information, program, practice, object, and information systems management technology for Sustainable urban development (Mohammadi et al., 2018). That means DOI principles of communicating through diverse channels can disseminate information among individuals, groups, or social units. Accordingly, DOI can help predict the rate of understanding how soon the

implementation of ISM for Sustainable urban development can happen. Having a well-established and widely used theory, DOI can sketch how to implement ISM in the community of Development Agents of Ethiopia (Vargo et al., 2020).

In 2003, Roger redefined the Diffusion of Innovation (DOI) theory as the process by which an innovation is communicated through specific channels over time among the members of a social system (Abu et al., 2017). In his theory, he explained the three types of diffusion: simple diffusion, osmosis, and facilitated diffusion (Prykhodko et al., 2018). Helping to examine why innovations are successful, Roger experimented with how diffusion of innovation operates through the four main interacting elements: innovation, communication channels, the period, and community (Gabriel et al., 2017). In addition to this, Roger clarified the four diffusion models: the Innovation Diffusion Theory, Concerns-based The Chocolate Model, Adoption Model, and Technology Acceptance Model (Rogers, 2003). Rogers DOI uses Awareness, Interest, Evaluation, Trial, and Adoption as the process by which adaptation can occur.

Literature Review

Technology and implementing Smart Information Systems

The role of technology in implementing Smart Information Systems (SIS) to address Sustainable Development Goals (SDGs) is becoming a discussion point among scholars. Sharma et al. (2021) explored the relationship between Technology and Smart Information Systems (SIS), underlining how technologies could facilitate Sustainable Development Goals (SDGs). According to this research, technology can build big data analytics, machine learning, acceptable and desirable societal wellbeing. If technology

could be applied in an acceptable way of balancing predictable advantages and disadvantages, the implementation can help avoid asymmetries and facilitate surveillance.

Researchers have sought the value of technology in implementing Smart Information Systems implementing information systems management for the sustainability of market products. To examine the primary utilization of information for sustainable development, Štor (2019) found out how sustainable Development of Information Systems for Logistics could be used as a Tool to Strengthen the Competitive Ability of Global Markets. Using IBM SPSS Statistics 19, they processed the data that were collected from 60 managers via email. Then, evaluating managers' satisfaction concerning the information support to logistics, the study concluded a need for adequate funds to create appropriate information systems for sustainable development. While this study can be taken as a significant step in integrating the IS market with sustainability, further analysis needs to be done on how sustainability correlates with a society's financial wellbeing.

Multi-dimensions of urban sustainability

Attributing information systems with multi-dimensions of urban sustainability, some researchers have been conducting about implementing Information Systems in different countries and aspects and of sustainability. Zeng et al. (2020) presented how information systems could be applied with a competitive advantage, environmental sustainability, and sustainable online social communities. Using 132 articles that discuss

IS discipline, the Qualitative study forwarded the possibility of IS in developing countries and building information infrastructures. The research paper pointed to improving firms' competitive advantages and environmental sustainability. The study concluded that integrating IS with other resources is of most significance, and it proposes Green IS initiatives as the central figure of ecological sustainability.

Dealing with cities' social and economic dimensions, some researchers manifested the possibility of implementing Information systems to solve different problems. Masoumi and Genderen (2019) studied using IS to deal with the ever-increasing problems with the development of the cities and population growth. Relating the value of sustainable urban development concerning social, economic, and environmental perspectives, the study identified the possibility of dealing with land-use planning, physical limitations, and environmental issues. The researchers applied ten criteria to collect expert opinions to determine how suitable lands can be used for future developments. The data that were collected from experts were used to extract analytical information on hierarchical process AHP, geographical information system GIS, TOPSIS, and MADM methods. The research outcome shows that technology plays a significant role in identifying the amount and size of land usage.

Atlas Information System (AIS) for sustainable urban development

Atlas Information System (AIS) can develop spatial information and cartographical information in multimedia form. In recent years, AIS-generated information is becoming a useful way of adopting agro-ecological zones and efficiently

creating accessible, sustainable development (Ogun, 2020). Accordingly, geographic information systems, specialists, and agricultural researchers can develop farming systems, livelihood patterns, development pathways, infrastructure, and policy in urban development. Thus, AIS can reduce poverty and promote more sustainable land use in urban areas by providing contents, appearance, and visualization parameters by simple manipulations.

Diverse approaches of handling the problem of implementing ISM

Shorabeh et al. (2020) developed a multi-attribute decision-making (MADM) method and geographical information system (GIS) as an ideal urban development solution. With its suggestion of utilizing suitable lands, the solution was seen as a prominent figure for city development. In response to high-risk natural hazards and limitations of urban development, Saghafi (2018) investigated hydrogeomorphological restrictions of Birjand city. By applying Geomorphological and GIS software, the researchers collected information about hydrogeomorphological physical development restrictions and classified the study areas. They concluded the significant role of information in organizing urban areas' risk rate and development limits using the data.

Some researchers approached the problem of implementing information systems for sustainable urban development from the attitude change of beneficiaries. Sykianakis et al. (2019) examined the role of people's changed mindsets towards active mobility and implementing information systems for sustainable development. By creating awareness strategies, they introduced how changing attitudes requires time to go through knowledge, persuasion, decision, implementation, and confirmation. They finalized their

study by suggesting a reinforced ICT strategy with specific time intervals during the implementation of the information systems.

An information system can be used for urban dairy livestock implementation to meet the preconditions for sustainable development. By dividing the total costs for the production volume, Radko and Svynous (2020) designed a methodological and technological basis to introduce a unified information system. The study served to meet the national and international cattle identification and registration requirements. Proposing to create a system that can assist in the development and implementation, the study showed how IS's application could be used to centralize the national system of registration and data maintenance.

Information mapping and implementing information systems

As the peculiarities of natural and climatic conditions, using information mapping to acquire geographic information is becoming a helpful Technology. Kuznetsova et al. (2018) underlined that geographic information could be organized so that human activities would not overload nature's capacity from sustaining the coming generation. Shaping the objectives, actions, and human behaviors concerning the environment, Kuznetsova et al. lined out the ecological effect of applying the research to handle possible emergencies of different nature. The paper outlined how remote sensing data can be used to minimize the impacts of unsustainable development, impacting the social, economic, and ecological importance of information mapping (In Wongla, 2019). At the same time, the research work of Kumar et al. (2019) developed a scientific knowledge base on spatial information technology to communicate the United Nations'

Sustainable Development Goals (SDGs). Extract information for planning purposes, advance spatial data management techniques and analysis and discuss the methodology.

Ryan et al. (2020) explored the possibility of applying Information mapping and Smart Information Systems (SIS) to support Sustainable Development Goals (SDGs). Also, Adshead et al.'s (2019) publication identified the role of digital infrastructure in achieving educational, employment, agricultural sustainability, food security, and spatial inequality goals. The research paper has discussed how SIS techniques such as machine learning can be integrated with SDGs to bring about efficient profits & contribute to societal wellbeing. Having the potential to exacerbate inequality and further entrench, SIS can provide a way of assessing the forecast, planning, implementation, and evaluation of SDGs. As a desirable goal designed by 193 member states, SDGs can benefit from the application of SIS.

Studies related to implementing ISM and Environmental sustainability

The study made by Zikargae (2018) examined the Environmental sustainability issues and adversely affected areas by the environmental crisis in Ethiopia. Having controversial and needs for further studies, the research made analysis and causes of climate change. Justifying how the drought has been the significant outcome of the natural crisis, the paper underpinned information communication's significance in minimizing the problem. While lack of participation, the problem of awareness creation through communications, and the weak public dialogue are mentioned, research-based solutions have not been proposed. Though future research indicators and background for

further studies have not been explained solitarily, the qualitative descriptive case study concluded the need for environmental information systems.

Since the 2015 UN Sustainable Development meeting, the IS academic community has started responding to the need for environmental Information Systems. The rise of sustainability is followed by the increasing concept of national information systems that provide sufficient detail and robust measures (Mensah, 2019). As many corporations and Information Systems units understand the centrality of information, they started proposing ways to develop environmentally sustainable business practices (Gupta, et al., 2018). In addition to advocating a research plan to establish a new subfield of energy informatics, many started applying information systems thinking and skills to increase energy efficiency. The move enabled environmental sustainability as an underlying foundation policy decision to embrace ecological sustainability in their core principles and foster changes.

A review and synthesis of studies related to implementing ISM

Implementing ISM and Environmental sustainability

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Methods that are being used to implement information Systems Management (ISM) for Sustainable urban development

Information systems management can be applied for cities facing emerging issues of tourism. Using smart tourism, city managers can empower a town by creating urban spaces that residents and visitors can enjoy together (Beneicke et al., 2019). The study presented a conceptual approach to defining smart tourism, the smart city, and its components; it described and contrasted the use of information with intelligent tourism and its members (YUAN, 2020). Examining in light of several pioneering examples of

smart tourism cities and their vital roles in the age of sustainable development, the paper addressed the full spectrum of related and potential for sustainable products.

The research found the interests of locals and tourists' context and the roles of 'smart' government leadership to researchers and practitioners.

Li et al. (2017) studied the application of information systems to handle complex structures through the street network's spatial logic. Axial and visibility graph analysis models and GIS and Space Syntax can be used to study the corresponding relationship between street networks and specific city life (Telega and Telega, 2020). To maintain the vitality, preserve diversity, continuity, integrity, finally archive holistically of urban space, the researchers used a quantitative analysis (D'Acci & Batty, 2019). The result indicated that specific correlations among these parameters present changing patterns; Hankou's street network gives a multi-hierarchical structure and spatial wholeness. Turning out that community-scale street network performs a positive role in keeping neighborhoods alive, research proposed that a good street network is critical for carrying forward sustainable urban development (Webb et al., 2018). Therefore, planning a hierarchically synergetic planning strategy based on the analysis, city sustainable development planners should pay dual attention to the street network.

Moreno et al. (2020) used Geographic Information System to deal with pollution, health problems, stress, and other troubles. Geographic Information System can generate friendly cities with planned development, analyze the quality of the vegetation and define the quality of the urban green areas allowing the connection (Maarseveen et al., 2018). They are using the Geographic Information System and the multispectral images to find

forestry ecosystem samples and define the quality of the urban green areas. Also, evaluating the potential that urban forests could have, the research found that the green places possess good quality vegetation, establish sanity, and vegetal cover (Moreno et al., 2020). Consequently, the results demonstrate that these combined methodologies of forestry ecology and geospatial tools, Geographic Information System, is an excellent possibility to generate continuous monitoring and follow-up system of public areas. Hence, they will allow those cities to be sustainable and provide a better life quality for their population.

Venom et al. (n.d.) used Liveable City Index (LCI) with the integration of Geographic Information System (GIS) techniques to address the complexity and diversity of livability standards. LCI can tell how well or how poor we were doing compared with other large cities, attractive urban green spaces, and evaluate the social quality of the community (Thomas, 2017). Using the instruments, they considered nine significant factors (Safety, Economy, Environment, Education, Health, Transportation, Recreation, Population Density, and Public Utility). Using the LCI map, it was found the high liveable city levels and economic factors that make the city more reliable and comfortable for living. In addition to proposing a method that could be applied to another area, the research paper showed support for the integration of residents,' participation in assessing a city's livability, and universal principles.

Olgun (2020) used GIS-based information systems management for urban transportation systems and, in particular, the increase in the number of motor vehicles. While the rise in the number of motor vehicles leads to many problems (air pollution,

traffic congestion, carbon gas emission, Etc.), the researchers believed that unless the issues are dealt with soon, they can be a stumbling block of the city. Researchers develop a sustainable bike path proposal for cities through GIS-based multi-criteria decision-making analysis (Loidl et al., 2019). Integrating physical, environmental, and visual factors for medium-sized cities, developing a sustainable bike path proposal for cities through GIS-based multi-criteria decision-making analysis is possible. Thus, using the physical, environmental, and visual factors of medium-sized cities, many researchers and decision-makers state that sustainable transportation systems should be used (Olgun, 2020). The research concluded that GIS-based multi-criteria decision-making analysis and a sustainable bike path proposal could be used as sustainable urban development instruments.

Pedro et al. (2019) studied how Geographic Information Systems can be used as a decision-to support tool for sustainable urban planning. Helping to plan and handle spatial data with its limited capacities for representing choice and priority among the conflicting objectives, Geographical Information Systems (GIS) can be used for sustainable urban planning (Masser, 2019). Using urban sustainability assessment systems, the researchers chose sustainable measures to identify priority intervention locations.

As the previous tools partially address the problem, the research paper was written to bridge the gap between urban sustainability assessment and spatial analysis. While the results identify potential priority intervention areas for sustainable development in the city, the research outcome could enhance local, sustainable growth.

Furthermore, as an urban planning instrument, the tool can select measurements and prioritize intervention areas within cities. Therefore, using the research outcome, it is possible to plan intervention areas, implement energy efficiency strategies, and assign green spaces.

Muvuna et al. (2020) studied the application of information systems to handle air pollution emitted by vehicles that can be removed by considering information related to air pollution reduction. Traditional city systems can transform into innovative city systems to benefit from the concept of smart city and associated implementation challenges. As a new trend that can answer challenging issues related to urban development, applying information systems to pollution meant improving the quality of life for its people and their way of living, environment, economy, transport, and governance (Opp et al., 2018). The researchers observed that a transformation that uses city systems would entertain city subsystems' interaction and bring about an environmentally friendly urban environment. Emphasizing a city system's systematic view proposes a novel method of smart city system integration, smart city environment, and ecosystem services valorized (Komninos et al., 2019). Therefore, with an integrated information system, information outputs can entertain travel decisions and practical smart city system applications.

To bring about sustainable development and organize land-use planning, Masoumi & Genderen (2019) investigated how Zanjan city can attain sustainable urban development without affecting the city's social, economic, and environmental status. The

researchers used experts' opinions and a hierarchical analytical process (AHP) to determine the land criteria.

Then, yielding the weights as a criterion of enforcing geographical information system (GIS), the researchers classified three groups: social, economic, and environmental through spatial analyses. To address the limitations and environmental issues that need precise planning, the technique for preference by similarity to ideal solution (TOPSIS) was utilized (Zavadskas et al. 2016). Comparing the TOPSIS outcomes with the weighted sum model (WSM) approach, the study was concluded by locating the most suitable lands for future developments and the percent of city development for more than a decade.

The strengths and weakness of inherent studies of implementing ISM for Sustainable urban development

Though Corbett and Mellouli's (2017) work has superior strength, the approach has applicability in developing countries. The research outlined the contribution of Smart cities in achieving the UN's 2030 sustainable development goals. An organized system to improve, advance, and maintain sustainability contributes to sustainability and can help overcome city-related challenges and the kind of and analyzed (Bibri, 2019). Information-centered intelligent cities can create a way forward to build a sustainable world. Kilicay-Ergin and Barb (2020) remarked on the significant role of developing Smart Sustainable Cities to provide enough detail of priorities and create the integration

between objectives and programs. Therefore, since cities significantly contribute to achieving national growth, they need to work with their peripheries.

Pan and Zhang (2020) brought an innovative idea of using temporary challenges to address underlined situations like the outbreak of the COVID-19 to implement Information Systems for Sustainable Urban Development. Nevertheless, the research paper has overlooked the effect of the disease on the whole social system. While the world is an open ground for implementing information systems for Sustainable Urban development, communication issues are often critical to implementing any project (Ionel, 2018). Issues related to epidemiology usually affect every aspect of human life, including hospital beds, health insurance, and health policy (Sydnor and Perl, 2011).

Ryan et al.'s (2020) underlying design of implementing technologies to facilitate Sustainable Development Goals (SDGs) can be seen as one of the groundbreaking works in the area. However, the literature review shows an ever-increasing significance of trained minds that has been overlooked in this study (In Bonder & In Dal, 2018). Providing instructions regarding the repair and maintenance of a technology play an essential role in identifying the appropriate technology, training trustworthy persons in using it, and providing follow-up support. IS as important as implementing the Technology (Pan and Zhang, 2020). There has to be a strategy of training the workforce, using science technology, and using technology effectively to implement IS for sustainable development.

The analysis and interpretation of Zeng et al. (2020) brought about presenting information systems with a competitive advantage, environmental sustainability, and

sustainable online social communities. While research is one of the great works in the profession, the study needs to have practical steps of turning the findings into practice. Gelinas et al. (2018) suggested that a successful acquisition and implementation of information systems has significant works of purchased system, configuring the software, converting data, training users, and performing other practical tasks. As Boiko et al. (2019) underlined since implementing IS should be an entire designing process, the functional requirements should be designed with many stages and models. Hence, this research paper will be a platform for implementing information system management for sustainable development.

Implementing Geographical Information Systems (GIS) for Decision Support of Sustainable Urban development

Flowing drinking water sources and human exposure to dangerous chemicals, Magill and Benedict (2019) reported the increasing water supply and water quality problems causing health concerns of Addis Ababa city. Psaltoglou and Vakali (2021) said the Water management practices of Addis Ababa remain potentially dominated by traditional, natural, and gray infrastructure. Air pollution is becoming one of the most critical contributors to damage human health for people suffering from respiratory and cardiovascular diseases in Addis Ababa. While the informal street traders in Addis Ababa are blamed for their impacts in causing an air decline, the air is filled with sand and dust from nearby light rail and road construction sites, adding to the air pollution from fumes of traffic and lousy smell (In Mugambwa & In Katusiimeh, 2018). Climate Change and

lack of information to mitigate and adapt to these changes in a social, economic, and environmental sustainable matter of Addis Ababa result in volume and flooding peak change in the environment (In Melesse et al., 2019). Weldu and Edo (2020) announced how population growth affects the world around them or automatically worsens problems and health degradation to the population in Ethiopia's urban areas.

Remote sensing, landscape ecological analysis, and geographic information system should be combined to provide helpful information in the Conservation of natural resources to sustain localities (Wu and Raghupathi, 2018). GIS can facilitate sustainable urban development by making water, air pollution, climate change adaption, and population growth information (Sturiale and Scuderi, 2019). GIS indicates increasing sustainability-related activities for cities with local communities and non-governmental organizations to disseminate sustainability knowledge and practices at all locations (Mahat et al., 2018). Planning the sites in areas with various land-use types is complicated and essential; GIS provides extensive knowledge of natural and social conditions (Tomi, 2018). GIS implementation can facilitate the presentation of result-based sustainable operation and follow-up urban sustainability indicators planning and managing various functions (Yu et al., 2019). As information is considered to be essential for sustainable urban development, the following chapters explore how Geographic information systems can be implemented to trace water, air pollution, climate change adaption, and population growth.

Implementing Geographical Information Systems for Water

As an instrument that can be used in planning, preserving, and managing natural habitats in highly pressured urban areas, GIS techniques can be considered an essential part of the water reservation in Ethiopia's urban areas. Gourbesville (2019) underlined how GIS could manage water uses that request to harmonize demands and needs, getting more and more complex and sophisticated. To produce an analysis of a current situation and generate the forecast, the DSS systems model must be implemented for hydrology, hydraulics, and water quality (Raseman et al., 2017). Standing alone as products that can be used for sustainable management of water for urban areas, DSS combines the river basin trade market with the water trading market and emission trade market. That will optimize the distribution of water resources in a sustainable way (Wang et al., 2018). By organizing and collecting information regarding pollution, concentration, and basin water system speed.

According to Tsihrintzis et al. (1996), the three water-resource information system implementation steps are:

1. Geodatabase Design and Implementation
2. Generation of indirect information through simulation
3. Dissemination of information through GIS server

While implementing the Hydrologic Information System component is a logical response to meet the various line departments' specific information technology needs (Braud et al., 2020). The GIS database can analyze, visualize, and model the data expressed in a pictorial form. With its features, a Geographic Information System (GIS)

can be the most suitable tool to aid in managing available hydric resources of urban areas. To explain the GIS water explanation chart (Calera et al., 1999) named the chart's most components: spatial consumption analysis, consumption map, Land use classification, and remote sensing.

Implementing GIS to Map Air Pollution in Urban Areas

According to Maarseveen et al. (2018), implementing the Geographical Information System (GIS) structure for sustainable urban development starts from the Survey-the-study-area-of-different-locations. In turn, the Survey-the-study-area-of-different-locations relays on the Air sampling will be determined by assessing air pollutants (Reche et al., 2020). Traffic characteristics, road characteristics, and Vehicle characteristics depend on Dispersion modeling, traffic flow modeling, and traffic emission model to provide air pollutants information ((Xu et al., 2019). In turn, the Dispersion modeling, traffic flow modeling, and traffic emission model depend on 1. Metrology and topography 2. Road length, Delay Event, Traffic density 3. Vehicle age, Fuel types, Engine types, rate of pollutants emission (Wang et al., 2018). As the central part of the Geographical Information System, Dispersion model, Traffic Flow Model, and Traffic Emission Model, together with Concentration mapping, Traffic flow mapping, and Emission mapping, make the survey's button line (Yang et al., 2019).

Using the geographic information system (GIS) as a framework, many data types from spatial locations will be gathered (Jia et al., 2017). The sites may include different air pollution monitoring stations, meteorological centers, different types of pollutants,

and their concentrations assessment places (He et al., 2018). The data collected from other sources need to investigate the functional relationship between air quality and air pollution. The data will be classified into emission factors and meteorological parameters by delineating the effects of ozone and other harmful airborne pollutants on plant and human life (Wang et al., 2019). The spatial data can be integrated into an integrated analysis environment using the classified and other various types and resolutions (Fischer, 2019). Integrating, analyzing, and organizing layers of information into visualizations, it is possible to highlight the impact of traffic volume and composition on the air (Nghiem et al., 2021).

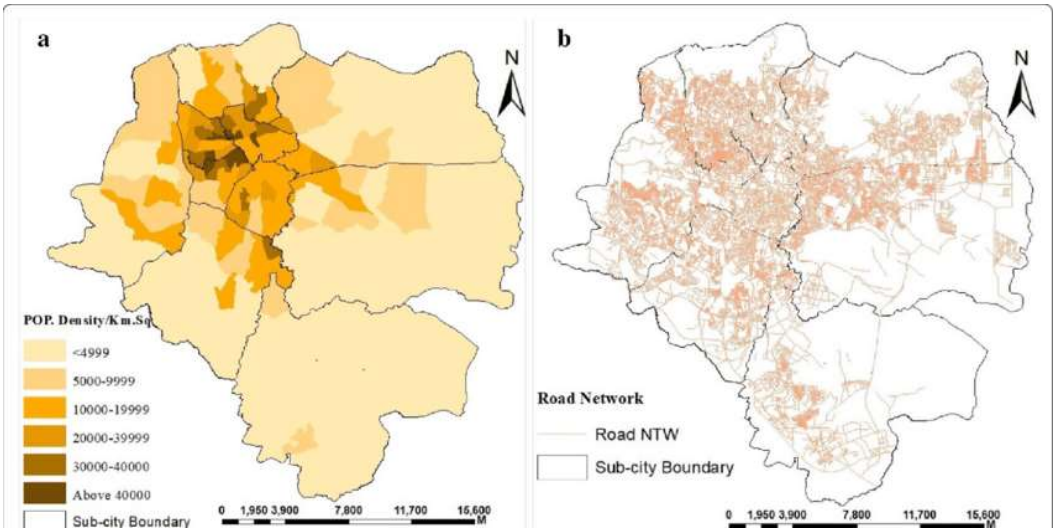
Implementing GIS to Map Climate Change

The GIS-based framework can help mitigate, understand, and adapt to social, economic, and environmental sustainability. Implementation of GIS-based can facilitate modeling geographical variability in both climate and asset vulnerability within a country (Frigerio et al., 2018). As climate change unequivocally impacts various aspects of the natural and built environment, GIS can help countries understand critical infrastructure vulnerability to current and future climate-related threats (Hawchar et al., 2020). Identifying high-level vulnerability or risk assessments of climate change permits identifying hotspots across a range of critical infrastructure sectors. While identifying multi-sectoral risk ranking maps can highlight the urban areas as climate change risk hotspots, it helps develop effective climate adaptation strategies (Byers et al., n.d.).

Starting from setting up the computer hardware and operating systems, King et al. (2018) listed the seven steps of implementing GIS to Climate Change. While system setting is a very significant aspect of the process, installing the software, as the second step, helps identify learning the concepts, capabilities limitations, and interface of GIS software (Radan et al., 2017). A spatial analysis platform that provides spatial interpolation buffering and overlay operations and network analysis will be prepared. Spatial analysis and modeling integrated into a GIS environment can understand reality better and give rise to more informed and, thus, improved planning (Rocha & Tenedório, 2018). If data collection, integration, management, and analysis procedures are done appropriately, the GIS provides a pictorial climate change presentation (Hanberry & Fraser, 2019).

Implementing GIS to Map Population Growth in Urban Areas

Using the past and current spatial dynamics of population growth with GIS, planners and decision-makers can predict population growth and urban expansion (Ketema et al., 2020). To better understand and successfully plan, it is possible to explore the population growth characteristics in an urban setting (Liang et al., 2019). Studying the land use/land cover, GIS can picture the built-up areas during a specific period and predict further expansion by percentage (Liping et al., 2018). Identifying the significant development of the built-up area by these dates predicting the primary causes of the high rate of population growth and other socio-economic changes is possible.



Fig, 3 Azagew and Worku (2020). Accessibility of urban green infrastructure in Addis-Ababa city, Ethiopia: current status and future challenge. Environmental Systems Research, 9(1), 1-20.

As Lidicker (n.d) underlined, helping to trace the rapid population growth that fuels suburban growth and home developments, GIS helps to understand the rate of housing density change and potential environmental impacts. Moreover, the GIS-based model can help trace infrastructure growth rate variables, density, population centers, and recreational amenity locations (Ketema et al., 2020). While results may be used for land planning and decision-making concerning residential economic development, the information can help manage rural population growth (Singh, 2019). In addition to understanding the high pressure on the water resources and air quality in the area, the GIS information can help trace climate change with increased temperature and changed precipitation towards the environment (Rosa, 2017).

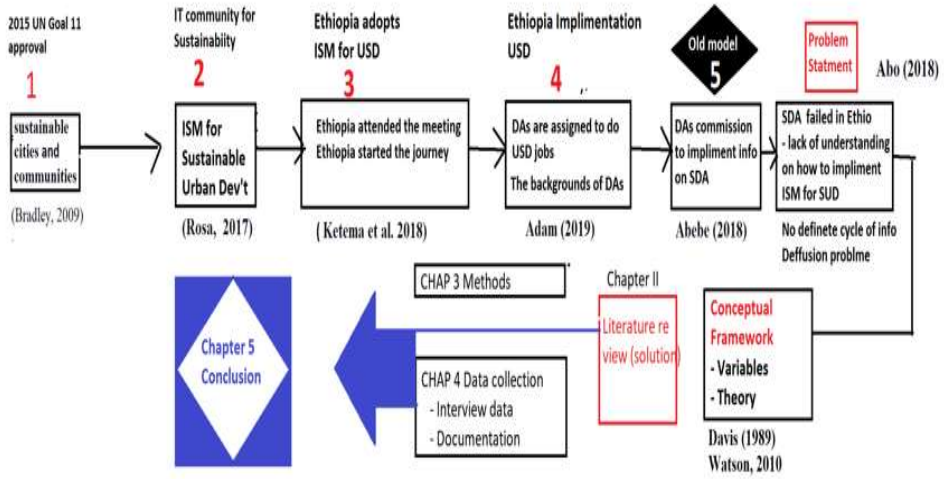
Summary and Conclusions

Many things have been discussed in this research paper to answer what methods are currently being used to implement information Systems Management (ISM) for Sustainable urban development. Using the basic principles of the Technology Acceptance Model (TAM) and Diffusion Of Innovation (DOI) theories as a conceptual framework, the diverse approaches to implementing ISM the possibility have been overviewed. While reviewing how the intellectual world has responded to the research questions, we discussed how a change of perspectives, information mapping, and the 2015 UN sustainable urban development goals concerning Water, Air, Climate change, and population growth had been discussed. After reviewing the role of technology and implementing Smart Information Systems with multi-dimensions of urban sustainability, the paper focused on discussing the implementation of Geographical Information Systems on Water, Air, Climate change, and population growth have been discussed in detail.

Chapter 3: Research Method

Since the development of UN Sustainable developed Goal 11 in 2015 (Koch and Ahmad, 2018), the issue of striving for "sustainable cities and communities" by the year 2030 has become a global agenda (Bradley, 2009). Shen et al. (2017) provided a reference on how the IT community responded to this inquiry by promoting Information Systems for sustainable urbanization practices. Rosa (2017) tossed the idea of integrating information to tackle urban environmental health problems and suggested sensible policies that integrate appropriate sanitation, poverty, and education policies. Nikulina et

al. (2018) further researched the role of transportation information in addressing Goal 11. Ketema et al. (2018) underlined how Ethiopia joined the Urban Sustainability movement by adopting Goal 11 of the 2015 SDGs. Adam (2019) indicated Ethiopia's government's extra effort into implementing IS for urban sustainability. Abebe (2018) explored how Development Associates (DAs) skills were to be used to implement the Transfer of Technology (TOT), identify development alternatives, and implement among the Urban Community of Ethiopia. After interviewing hundreds of DAs, Abo (2018) found out DAs lack understanding of implementing IS and Technology for sustainable urban development. Worku (2017) studied how climate change and the ever-increasing population growth result in volume and flooding peak change in Addis Ababa's environment. Although Lemma et al. (2019) identified the consequence of a lack of understanding to implement IS for sustainable development in Ethiopia, the knowledge gap continues to happen unto this moment.



Thus, this qualitative study aims to explore Information Systems Management (ISM) for sustainable urban development. Using one-to-one interviews and Documentation, the theoretical principles of implementing ISM for sustainable urban development will be explored. The documents include Public Records, Policy Manuals, Organizational Documents, and E-documents on Ethiopian government websites. The research outcome can bring about a meaningful impact in the lives of multitudes of people affected by sustainable urban development.

Policymakers may be able to use the research to develop ISM rules and regulations to bring about Sustainable urban development (Smardon et al., 2019). In other words, using this study, leaders may be able to plan, implement, and execute information-oriented, Sustainable urban development. Consequently, serving as a strategic document that enhances social change, this research outcome may address community challenges because of unsustainable urban development.

Research Design and Rationale

Exploring the implementation of information systems management for sustainable urban development is the purpose of this qualitative exploratory case study. The study population is 12 – 15 Development Agents (DA) from 62,764 Experts of Sustainable Urban Development in Addis Ababa, Ethiopia. I will be selecting the individuals through purposeful sampling. Implementing ISM may facilitate and support sustainable urban development that contributes to positive social change. Enhancing to deal with civilization challenges like pollution level, scarcity of resources, implementation of ISM

may help develop a broader support system and sustainable economic growth for a high quality of life (Abramowicz & Corchuelo, 2019).

Role of the Researcher

In addition to forming a working relationship with participants, the researcher's qualitative research role is to eliminate internal biases (Mackieson et al., 2019). While avoiding bias allows the researcher to be an active learner, it can add to approaching the subject matter with an open mind (Levitt et al., 2017). In addition to this, researchers must have the responsibility of having an independent, honest, and critical mindset throughout the research process (Matthews, 2019). To establish trust with the participants, I will be approaching potential participants to understand their distrust of both researchers and data collection (Manzo et al., 2020). Second, I will build rapport and trust with reluctant participants, skeptical of the researchers' intentions and the benefits of the research being conducted (Washington et al., 2020).

My relationship with the topic goes back to 30 years of residence in Addis Ababa and serving as a Social Worker, Program facilitator, and Project Director in Addis Ababa. I have witnessed urban development outcomes that lack sustainability during my residential and professional life. Despite the government's efforts to maintain the cities' life cycle, there is a visible lack of implementing information systems management for sustainable development. Lacking the implementation plan skill, I have witnessed how development planners, executive leaders, and professionals adopt a new system. From my experience, I learned that development workers' vagueness comes from observing a clear picture of how IT systems demonstrate process improvement. Accordingly, the

overarching question I tried to answer was what methods are currently being used to implement information Systems Management (ISM) for Sustainable urban development. I designed this case study to explore ISM's successful implementation strategies for sustainable development.

To maintain the research quality, I will ensure the credibility, dependability, conformability, transferability, and authenticity of the research process (Van and Struwig, 2017). Researchers must use interview protocol and scrutinize the research outcome in the interview preparation phase, organization, and reporting (Young et al., 2018). To avoid personal bias and keep the focus of the interview, I will not be asking leading questions and using an interview protocol to perform member checking with the interview data. To change or remove anything that is not compatible with the interviewee's main idea and alleviate personal bias During the member, I will be checking interviews and asking for feedback on the data collected.

Methodology

Participant Selection Logic

From Ethiopia's 62,764 Development Agents (DA) population, I will conduct 30-45 minutes of one-to-one phone interviews on 12 – 15 individuals. The DAs are selected because they are the Experts in Sustainable Urban Development in Ethiopia (Tarekegne et al., 2017). Once Walden University IRB's written permission is granted, it can be accessed through the phone. Having a primary role in executing the government's sustainable development plan, the DAs have been the information-interims between the

community and the government (Karim et al., 2018). As the critical actors in serving the community and serving knowledge, skill, and attitude, the DA can serve as a channel of making informed decisions, dissemination, and bringing up-to-date information (Tarekegne et al., 2017).

I will be choosing the individuals through purposeful sampling. Choosing the DAs through a calculated sampling strategy allows this research process to focus on the subject matter in-depth and mainly explore information-rich areas (Moser and Korstjens, 2018). As qualitative methods intend to achieve a depth of understanding, this research will follow Snowball Strategy. Snowball Strategy helps identify interest cases from sampling people (Kirchherr & Charles, 2018). As developed by Kitheka et al. (2021), the consideration will be asking key informants or well-situated people, "Who knows a lot about the phenomena under study." In this research, purposeful sampling can help facilitate, compare, and integrate the research findings (Grunow, 2017). As Shaheen and Pradhan (2019) explained, purposeful sampling can help identify and select limited resources. Moreover, the strategy helps to explore the values using the availability, willingness, and ability to communicate individuals' experiences and opinions in an articulate, expressive, and reflective manner (Mousazadeh et al., 2019). Hence, by minimizing the potential for an influence of known and unknown confounders, purposeful sampling will ensure the generalizability of the DAs' findings.

The first criterion on which participant selection is based will be on the participants' willingness to share their knowledge, experience, and information toward the phenomena under study (Chen et al., 2018). In addition to ensuring that the

knowledgeable participants can provide substantive data for the research, the second criteria are the availability and accessibility of participants in the government's network (Khirikoekkong et al., 2020). As most development workers are connected through the mobile web, they must be accessible for a phone interview. In addition to these, the participants need to have a tangible experience with information routes and sustainable urban development. Since person-to-person interaction is one of the most significant parts of qualitative data collection (Heath et al., 2018), I will be looking for participants willing to speak about their experiences.

When the data collection begins with legal permission to conduct interviews with the DAs will be followed. The standard license can be found when a written inquiry clearly defines the research involvement's extent and the purpose is issued. Contacting the DAs to execute the pre-interview screening is possible once the legal process has been completed. The pre-interview screening is needed to ensure that participants will meet the recruitment criterion and identify the participants to shape the participants' anticipation, willingness, and interest. In addition to the one-to-one interview of 12- 15 participants, the Documentation process will be executed to bring about data saturation.

Issues of Trustworthiness

Maintaining this qualitative study's trustworthiness reflects a participant's experiences, ideas, and reality. That includes noticing participants' appropriate expressions retaining the interviewee's voices. This qualitative study will maintain its

trustworthiness by applying reasonable credibility, confirmability, dependability, and transferability measures.

Credibility

By maintaining Triangulation, prolonged contact, member checks, saturation, and reflexivity of this research, there is a possibility of preserving research credibility (Koch and Ahmad, 2018). To bring about Triangulation, interview data about the implementation of information systems management for sustainable urban development published data from different sources, and unpublished data sources will be incorporated (Carruth & Freeman, 2021). Member checks will be maintained by highlighting the accumulated data, following appropriate forms of content analysis and participant sampling (Shakman et al., 2017). Moreover, to maintain data saturation that signs no new information is discovered in data analysis, appropriate searches will be done on every central database.

Strategies will yield a fuller description of the qualitative design that will be used in this research. Accordingly, the invention will be described to demonstrate an understanding of the design and the research question. Third, the designed data collection methods and procedures will have conversed in detail (In Bonder & In Dal, 2018). Fourthly, data analysis methods, measures, and the analytical techniques' sustainability will have discoursed. Fifth, the process of the findings with the presentation will be provided in detail and an organized manner. As a researcher, my awareness of the subject matter and standpoints on the research will be presented in as much detail as possible.

Transferability

To make sure that research finds this research will be applied to similar situations, an explanatory model of the research factors will be provided (Schoenmaker and Schramade, 2019). In the research, key knowledge and essential insights will be presented so that policymakers and end-users can become active users. To fill the transferability gap, the framework of the digital platforms will be redefined. The framework prevents the exploitation of potential opportunities and exploitable solutions. As the study's content is comparable to generalization principles in quantitative research, the knowledge gained in this context applies to another task (Levitt, 2021). Since the concepts have evolved from the general principles of information systems management and sustainable urban development, the experience can be transferred to other developing countries like Ethiopia. The research is designed to incorporate suggestions and verify transferability to help communicate the interview's fracture toughness (Qin & Lu, 2019). Flowing the indispensable segments of the research procedures and the implementation principles, the methodologies, and general aspects of the process will widen the possibility of this research's Transferability.

Dependability

As a qualitative strategy, an audit trail will be established to depend on this research. In addition to illustrating the participants' narratives, audit trail principles will be used as a means of showing data collection and analysis transparency (Carcary, 2020). As it is a key step to establishing credibility rigor and creating its structures and

processes, the date and the institution in which the interview occurred will be explained (Johnson & Rasulova, 2017). Furthermore, the event log, participants' ID, event initiator, and the results will be recorded. With its effective trustworthiness techniques, audit trails will be used to establish this research's dependability and confirmability (Muñoz et al., 2019).

In this research, Triangulation techniques that serve as an opportunity to reinforce the research's credibility and dependability will be used (Lemon & Hayes, 2020). Lemon and Hayes (2020) defined Triangulation as a qualitative research strategy to test validity by applying information from different sources. Some of the critical points will be investigated from different dissimilar and autonomous sources. To identify inconsistencies, reduce systematic bias, and improve the evaluation of the findings, Triangulation will be used to reinforce the credibility and dependability of the study (Decrop, 1999).

Confirmability

As the last criterion of Trustworthiness, Confirmability is the process of implementing a measure that has to do with the level of confidence (Daniel, 2019). To build the conviction that the research study's findings are based on the participants' narratives and words rather than potential researcher bias, the principles of confirmability will be applied. To confirm the data's neutrality and objectivity, trace the sources of the data will be established. While the path through which the research process has concluded will be incorporated in this research document, basic concepts of the research and their

explanations will be conducted under the dissertation supervisory committee. The supervisor committee will have the possibility of ensuring that both the gathering process and the data comply with the research question and purpose. By following up on the research process to enhance credibility, this qualitative research is expected to combat bias and build credibility.

Ethical Procedures

Any form of data collection will begin after approval is secured from Institutional Review Board (IRB). Before the interview starts, participants will review the study's purpose, assurance of confidentiality, and sign an informed consent form. The consent form will explain that no compensation will be rendered for research participation. Moreover, I will inform the participants of their right to withdraw from the study at any time without any magnitudes. Using a very secure locker place of my office while the data will be made available for five years, I will destroy the information and any notes after the period.

Institutional Permissions

After its completion, I will present the Institutional Review Board proposal to obtain data collection permission. In addition to the ethical procedures, goals and the study population intended for the investigation will be presented. While the moral and research procedures will be followed firmly, I will remain open to further recommendations and suggestions to add safety measures for the participants.

Throughout the research and after the research, the identities of the participants will be kept confidential.

Relevant Information Collected About the Participants

As detailed information about participants as possible, including names, gender, age, and education levels, will be recorded and saved securely. The participants will also be informed of the study's objectives, method, and significance. Following the suitable protocols, the advance request will be sent to the participants. Accordingly, the study's objectives that required their involvement will be to explore information systems management's implementation for sustainable urban development. The request letter will encompass as detailed information as possible, including the study's preferred participants' purpose and particulars. While their views will not be taken as a measure of their intellect, only their expense and willingness to share their perceptions concerning phenomena understudy will be considered. Before the beginning of the data collection, I will inquire the participants if there is any legal issue that may keep them from participating in the research.

Ethical Concerns Related to Recruitment Materials

The research process will be compromised of requesting, obtaining permissions, and conducting the investigation. Accordingly, I will document and record the entire research process not to miss the conversation's whole point. I will vest appropriate attention to grasp the conditions at which the interviewees reached interpretation and how they experienced it. To substantiate the data collection with more evidence, if any significant

recordings and stored Documentation are found, the materials will be incorporated in the research. To produce as firsthand information as possible, after they are compared and contrasted with the interview data, supporting documents will be included in the process of Documentation. Through the application of Interviews and Documentation will be possible to guarantee that every questionable piece of data shown will be the findings of this research. I also identified the study's effects to enhance adequate management of the consequences and ensure a swift process. I needed to create a list of the effects posed by ethical misconduct.

Anonymity

With the sense that a person is non-identifiable, unreachable, or untraceable, Anonymity can be defined as a circumstance where the acting person's identity is unknown (Padfied, 2019). There is a potential advantage for community, responsibility, free expression, political participation, and personal. As a researcher, having appropriate regard to the discretion of the participants' information is mandatory. According to Douglas, K. M. (2019), Anonymity can be used to produce a deindividuation cover for behavior that would not otherwise be made.

To maintain this Anonymity, while the data will be presented without associating with any individual, their ideas will be expressed as accurately as possible. As long as the deindividuation entertains participants to share ideas without limit, I will be using codenames to represent the different participants instead. Application of codenames will be used to prevent participants from withdrawing in the early stages or before the

completion of the research. By notifying participants about the confidentiality of the data and the protection of their identity, it is possible to minimize the chances of withdrawal and be classified against in their professional occupation. If the participants decide to withdraw at an early stage, their names will be dropped automatically.

One way of building participants' confidence will be sending a copy of their transcript for evaluation, authentication, checking the accuracy, corrections, minimizing inaccuracies and providing clarifications (Lancaster, 2017). Within the framework of maintaining Anonymity, sending a copy of the transcript helps build a degree of control over the data and trust in the research outcome. In addition to this, participants will be reminded of the option to follow up on their transcript development process. To maintain trust if participants express concern, I will also offer them the opportunity to 'flag' particular units of their record as theoretically sensitive for my information. While the information provided will also be published, participants will be given a chance to determine if any particular part of the conversation and idea from data to be excluded from the study.

I will take appropriate measures to make sure that the information provided by the respondents is kept in safe storage. The responses to the questionnaire need protection in the best way manageable. While the collected data will be held in my password-protected personal computer, I will always have a backup of the documents in my SanDisk hard drive. I will keep the movement in my locked drawer. The cautions will save from identifying a specific person and making them available for five years. The documents will be available to both the participants and me until the end of that period.

Confidentiality

I will take appropriate measures to make sure that the information provided by the respondents is kept in safe storage. The responses to the questionnaire need protection in the best way manageable. While the collected data will be held in my password-protected personal computer, I will always have a backup of the documents in my SanDisk hard drive. I will keep the movement in my locked drawer. The cautions will save from identifying a specific person and making them available for five years. The documents will be available to both the participants and me until the end of that period.

Summary

Implementation of Information Systems Management for Sustainable urban development in Ethiopia is explored by this qualitative case study. The situation or issue that prompted me was searching for the related literature noted on the four indicators of urban sustainability indicators - Water, Air, Climate Change, and Population Growth in Ethiopia (Worku, 2017). This study will address how to implement Information Systems Management (ISM) on sustainable urban development in Ethiopia. Sewnet and Abebe (2018) found out the growing need for information, which is essential for planners and decision-makers to implement sustainable use and land resources management. The technology acceptance model (TAM) will be used to explain and define the logical connections between information systems management (independent variable) and sustainable urban development (dependent variable). Following human behavior toward TAM, Davis (1989) introduced two variables called perceived usefulness (PU) and perceived ease of use (PEOU). Moreover, as a comprehensive framework that proposes

the most current thinking on the practice and theory of engagement, Rogers' Diffusion of Innovations Theory (DOI) can contribute to the diffusion of Information Systems with sustainable urban development principles in a diverse society, academic and professional communities (Gupta, et al., 2018).

The data to be collected from Data obtained from this study may contribute towards Implementing ISM that will facilitate and support sustainable urban development for a positive social change. Enhancing to deal with civilization challenges like pollution level, scarcity of resources, implementation of ISM can help develop broader support. System and sustainable economic growth for a high quality of life (Purcell et al., 2019). Facilitating social involvement toward a productive and meaningful working life can benefit Ethiopian users. Consequently, helping to design and support administrative tasks, implementing ISM creates the capability to have input, storage, manipulation, and data analysis useful for planning, decision-making, and implementation (Gargiulo and Zoppi, 2019). A qualitative research approach is designed to explore the participants' exposure to implementing information systems management for sustainable urban development.

Both Data collection and recruitment never begin without the Institutional Review Board (IRB). When the data collection starts, 12 – 15 Women Development Armies (WDA) will be chosen from 62,764 Experts of Sustainable Urban Development in Addis Ababa, Ethiopia. I conducted 30- 45 minutes of one-to-one phone interviews with 12 individuals. The phone interview is expected to be truthful means of exploring the participants' experiences, ideas, and reality. Documentation is used as a source of data.

The collected data was coded and organized so that can be used to develop themes from words, phrases, ideas, or categories with powerful functionalities. Excel sheet was used to organize, categorize, classify, label, and store the patterns or themes of data derived from the transcript's analysis and summary. In addition to this, using documentation, the theoretical principles of implementing ISM for sustainable urban development has been studied. Once those understandings are gained, the research outcome can lay the ground to attain the study's practical purpose. Policymakers can develop rules and regulations for implementing ISM to bring about sustainable urban development.

Using the research outcome, leaders can plan, implement, and execute information-oriented Sustainable urban development (Štor, 2019). Consequently, serving as a strategic document that enhances Social Change, the research outcome can address community challenges. Especially in bringing about meaningful impact in people's lives, the form can serve as a change resource.

Chapter 4: Results

To address the problem of implementing IS for Sustainable urban development, Naseem & Naseem (2018) underlined the role of the Information Systems community in providing IS-enabled solutions. To prevent further deterioration of the climate system, reduce carbon emissions and reverse the negative impacts of human behavior on the environment, Naseem & Naseem suggested that IS community provide information on the basic aspects of environmental actors. Purchasing energy from renewable sources, driving low or no-carbon emitting vehicles, using public transport, installing home power

generation capacity through solar panels, recycling water, installing smart-home technology to monitor, and managing energy consumption are urban sustainability actors (La et al., 2017). In reducing carbon emissions, the IS community can do broader research and inform businesses, governments, communities, individuals, and organizations to take informed actions. Accordingly, in addition to facilitating individual and collective responsibilities, the IS community can commentate action ns and develop a system of supporting cities and local organizations to address their identified sustainability requirements (Russell & Taylor, 2019). The research concluded by forwarding why the IS community needs to consider asking the responses to environmental sustainability challenges; the world requires IS-enabled solutions. Using the following research questions that include the following, a search has been executed contemporary ideas including how cities employ sustainable cloud computing and technologies that can attract researchers' significant attention in information systems. The research questions are:

Intending to explore the implementation of information systems management for sustainable urban development, this qualitative study uses a case study. To find out the critical factors contributing to the success or failure of prior implementation efforts, the following questions were used to examine Development Associates' (DAs) experiences with the implementation process.

RQ1. What methods are currently used to implement information Systems Management (ISM) for Sustainable urban development?

RQ2. What factors contributed to the unsuccessful implementation of ISM for Sustainable urban development?

RQ3. What are the Development Associates' (DAs) perceptions of critical success factors for successful ISM implementation?

RQ4. How can the government of Ethiopia overcome factors that led to unsuccessful ISM implementation?

Following the research questions, the research findings are presented as set out in the methodology chapter. As the results are presented to understand ISM's implementation for sustainable development, the factors that influenced interviewees' experiences during the time of study are also included for appropriate consideration. In addition to this, the participants' demographic analysis and the evidence of trustworthiness are included in this chapter. Under four primary research questions and themes the findings are presented.

Research Setting

From the 62,764 Development Agents (DA) population in Ethiopia, 12 individuals were chosen through purposeful sampling to conduct 30- 45 minutes of one-to-one phone interviews. The individuals were chosen with their professional expense and expertise of Sustainable Urban Development in Addis Ababa. I was able to access the individuals through the phone after I was granted Walden University written permission through the IRB (Institutional Review Board). To explore DA's experience of

serving as the information-interims between the community and the government (Karim, 2018), I gave them the opportunity to express themselves freely. The interviews that lasted between 30mm – 45 mm were recorded by either the Sony audio recorder or Window 10 laptop for further transcription.

The figures were collected from a one-to-one phone interview with 12 individuals who have been employed as Development Agents in Addis Ababa. Even if all of them had been participating in implementing ISM, in providing credible perceptions about the challenges and opportunities of the phenomena, I explained the purpose of the interview and the interview questions' highlight. While the questions were designed in line with the research question and objective, I tried to forward my confidentiality statement about their responses and demanded their consent at the beginning of the interview. After encouraging the respondents to communicate their feelings and impressions as openly as possible, I started forwarding all the interview questions without interrupting the flow of ideas and mood of the conversation.

During the interview process, while every conversation was audio recorded for subsequent transcription and analysis, the answer of every interviewee was taken as a note. Overall, helping to refine and explore the information, the notes were useful means of recording theme ideas of the conversation and a means of restarting the conversation when they paused. Meanwhile, having a note trace revived the realization of data transcription within 48 hours (about two days) from the interview (Chepurenko (2019). Thus, using content analysis that included reading the transcripts recurrently and classifying words and phrases, I tried to find the responses' themes and interpret the

findings. Then, after picking different citations from the responses, the data analysis went through standardization and detailed process mapping. In the first place, while process mapping was used as a significant step of keeping the professional voicing (Tracy et al., 2020), it was a means of survival during the following identified internal and external challenges.

The most widely noticed internal challenge was not-providing concise answers for some questions. There was a tendency to focus on minor issues rather than giving a direct answer to some questions. On the other hand, some participants lack any interest in discussing some issues while wanting to talk about things that have nothing to do with the research questions. I observed some participants want to use the interview cession to report their complaints against the government, their office leaders, and co-workers. To deal with these challenges, I used the method of forwarding explanatory questions, making calls during their time of convenience, and redirecting the attention of the interview by rephrasing the questions' main ideas. Also, raising the key questions following the mood of the conversation helped me to find answers to most of the questions I need an answer to (Kim et al., 2019).

The first external challenge happened with the poor network that caused continuous disconnection breakdown and inaccessibility. Including in areas that were supposed to have a better connection, individuals were having the problem of through the phone. In addition to calling at various times, I had to switch my calling between different software that includes Skype, What Upp, Telegram, and Viber. In the long run,

while this became helpful means of supporting the communication, still great challenges were coming from the time difference between the Ethio-US.

The time gap and the social crisis that happened because of COVID-19 are two of the most significant external challenge. To deal with the time gap, in addition to sending TXTs to my research contact in Addis Ababa, I was forced to send more emails and leave messages to keep the research process intact. After continuous effort, not only did they start to respond, but also more people became cooperative and supportive of tolerating the time discrepancies. Because of this, after passing through the challenges, I not only found the participants being active but also had a rich source of information that became great input. In addition to this, since safety issues were hindrances of participation flexibility, I had to develop a safety measure of finding the participants on a one-to-one basis.

Demographics

The demographics of the participants from whom the data collection was made can be explained from different perspectives. Coincidentally, to demonstrate the real picture of the data collection process and to meet the institutional criteria, adequate efforts have been imposed to meet the gender, age, Job position, and data collection criteria.

Gender

In the process of recording the gender identity of participants, while 12 people identified themselves as women, none of them claimed to be men. From the participants, none of them indented his/herself in any other type of gender identity.

Age

Because of legal issues and to maintain the research quality, none of the participants were less than 18. None of the participants were above 60, as well. Since the percipients were legally employed by the government, most of them were between 30 and 40 and were active in the day-to-day activity of the community.

Job Position

When they were given a chance to express themselves, the participants identified themselves Women Development Army. That means, while their self-identification as "Women Development Army" can be taken as an indication of their commitment, it demonstrates their self-image and authenticity to the Data that is being collected from them. As a result, Women Development Army is the professional job position of the participants. Since the research participants have an equal role in responding to the major question of the research, for the sake of privacy, they will be named as participants P1, P2, P3, P4, P5, or P12.

Data Collection

Using the times between January 02, 2022, and February 10, 2022, I was able to visit Ethiopia to the process of explaining the study to the participants about the interview to be conducted through the phone, Skype, or WhatsApp interview. The documents were for the purpose of Triangulation. But the interview was conducted between February 15, 2022, and March 1, 2022. During these times, I was able to contact the participants at least two times. The first was for introduction that lasted 5 -10 minutes, while every main

interview took 40 – 45 minutes. The data collection started from recruiting participants based on their involvement and role by the organizational representative.

The representative is limited to providing me with contact information of the participants prepared in accordance with the inclusion criteria of Purposeful Sampling. The representative also forwarded the invitation and the informed consent that had been sent to him through email. The Participant informed me that the consent procedure was made voluntarily, and they understood the information given to them. To make sure that the participants got the informed consent form, I asked if they understood the withdrawal procedure and the availability of incentives. After the participants were asked if they understood the study well enough, they indicated their consent by saying, "I consent that I have understood the study well enough."

Before the interview, I informed the participants that their personal information would not be used for anything except this research, and their names would not be included in a way someone could identify them. During the phone, Skype, or WhatsApp interview, the participants have been given the opportunity to choose the time. After making sure that they were using their private place, I gave them the chance to express themselves freely. Finally, using the interview questions as a framework, I started to guide the participants through the questions and collect the interview data.

According to the recorded interview audio, the estimated number of minutes required to complete the interview participant was up to 45 minutes. The follow-up calls and ensuing accuracy of narratives for specific questions were made through Skype, WhatsApp, & telephone. As stated in the consent form, there no direct benefits were

given to the individual who participated in the interview. The electronic data and the interview transcripts that will be available for five years are encrypted and stored in a password-protected personal computer. Together with the Electronics files, the Hard copies will be locked for five years. The information and the materials will be destroyed after five years.

To increase the dependability of the transcriptions process, I have compared the recorded Data, the figures in the note, and transcribed data. I have repeatedly heard the audio interview recording to check the accuracy of the collected information and grasp the general sense of the conversation (see Nakanishi et al., 2018). As soon as I confirmed that the transcribed information was in line with the recorded interviews, I sent the transcriptions to participants. While sending the copies helped me to give the opportunity for the participants to verify the content of the transcriptions, that was a chance if they wanted to add thoughts and experiences that were not captured in a way they wanted (Roberts, 2020). Accordingly, all participants affirmed that their experiences and opinions were captured perfectly. Meanwhile, having a note trace revived the realization of data transcription within 48 hours (about two days) from the interview (Chepurenko (2019).

Data Analysis

As a Qualitative case study, this research has in tune to perform data analysis that followed with in-depth analysis. Before implementing Yin's (2018) five steps of data analysis (compiling, disassembling, reassembling, interpreting, and conclusions), this Case study acquired rich data sources. I have followed appropriate steps of participants'

compliance, assurance, reliability, tangible, empathy, and responsiveness and about the Phenomena (Khamis and AbRashid, 2018). Incorporating data from multiple sources and materials, Data triangulation is used to understand the phenomenon (Jentoft & Olsen, 2019; Moon, 2019). Following the process of combining two qualitative data sources, Triangulation served as a means of providing a deeper of handling the subject matter. As qualitative researchers, to refine the data and develop trustworthiness of the data, this research has touched multiple perspectives that allow the integration (Musa et al.,2021; Lemon et al.,2020; Renz et al., 2018).

To ensure the overall validity of the data and the potential to improve data quality, I have applied Methodological Triangulation that led to the substantive findings across interview data and documentation (Liu et al., 2021; Nielsen et al., 2020). To follow the inferences drawn by validating the data, I used Yin's five-step of data analysis method. Table 1 shows Participants and Their details as the process is presented to meet the goal of implementing information systems management for sustainable urban development.

Table 1

Participants and Their details

Name	Age	Position	Participation	Family Status
Participant 1	28-year-old	Lead WDA	Since 2017	Single
Participant 2	32-year-old	WDA	Since 2016	Married & have two children
Participant 3	35-year-old	WDA	Since 2017	Married & have No children
Participant 4	55-year-old	WDA	Since 2017	Single
Participant 5	40 years old	WDA	Since 2016	Married & have three children
Participant 6	43-year-old	WDA	Since 2016	Married & have two children
Participant 7	50-year-old	Lead WDA	Since 2017	Single
Participant 8	51 years old	WDA	Since 2018	Single & mother one child
Participant 9	50 years old	WDA	Since 2016	Married & mother of Four children
Participant 10	45-year-old	WDA	Since 2016	Married & a mother of one child.
Participant 11	55-year-old	Lead WDA	Since 2017	Single
Participant 12	40 years old	WDA	Since 2016	Single

Compiling Data

As the first step to finding meaningful answers to my research questions, I compelled the data into a useable form (Castleberry & Nolen, 2018). Transcribing the data so that I can easily see the data, I organized the data by examining the interviews, government reports, and different documents using Microsoft Word and Excel. To ensure accuracy, I have been contacting the Research participants both in member checking and forwarding the summary of the interview responses. To provide the opportunities for participants to think independently about the researcher's topic and critically appraise the

views, I have used Member checking to ensure the accurate portrayal of participants' voices (Brear, 2019; Candela, 2019). The member checking allowed the participants to have the opportunity to confirm or deny the accuracy of the compiled materials.

Disassembling Data

To understand the emerging themes, I disassembled the Data that involved taking the data apart and gradually converting them into usable data through disassembling Data(Castleberry & Nolen, 2018). To code themes that should be the final 'outcome' of data coding and iterative theme development, I disassembled the data and started evaluating themes of the phenomenon. Finally, using breaking down and coding data, I was able to reduce and eliminate invariant themes. Then to operationalize thematic analysis of the interview and the documentation data, I used bottom-up open coding (Cascio et al., 2019). By categorization the codes and themes, I was able to involve identify the significant information in the data and come up with a list of codes and major patterns (Adu, 2019).

Reassembling Data

To resume regrouping the data into themes, I performed Disassembling of the data that involves taking the data apart and creating meaningful groupings. As it has been noted by Tao et al. (2021), the meaning that "emerges from the data" is often first seen as the Data is disassembled. Helping to relate data together to reveal codes, categories, and subcategories ground within participants' voices the collected Data, I used reassembling to identify common analytic trajectories.

Interpreting Data

Following the compiling, Disassembling, and Reassembling of Data, I started interpreting the data. During Interpreting Data, in addition to giving meaning to the coded data, identifying the patterns and interpretations of the findings became possible. To conduct, maintain and present the results in a comfortable and fruitful interaction between the themes, I tried to be as neutral and objective as possible (Johnson et al., 2020). The understanding and interpreting data helped me to give meaning to the coded data and correlate the findings with the literature review and the documentation. To use sources that emerged from the study and reach the data-driven conclusion, I used coded data triangulation. For the purpose of Credibility, validity of research findings and to develop trustworthiness and interpretation of Data, Triangulation has been used.

As it is presented in Table 2, the study can accurately reflect the ideas being investigated in the first four steps appropriately. Following those foundations, identification of the major themes and patterns that lead to conclusions was becoming a reality (Castleberry & Nolen, 2018). Therefore, using the data from the interview, operational documents, and government reports, I was able to establish concluding remarks that emerged from the facts in the research. While the visible processes in this research paper can testify that the conclusions were driven, the major steps followed in the analysis show the Data is given a chance to speak with its own voice (Campbell, 2020).

Table 2

Factors Affecting the Implementation of Information Systems

Factor	Percentage
1. Lack of user input	12.8%
2. Incomplete requirements & specifications	12.3%
3. Changing requirements & specifications	11.8%
4. Lack of executive support	7.5%
5. Technological incompetence	7.0%
6. Lack of resources	6.4%
7. Unrealistic expectations	5.9%
8. Unclear objectives	5.3%
9. Unrealistic timeframes	4.3%
10. New technology	3.7%
11. Others	23.0%

Note. Alkaabi, M. H. (2018). *Educational Manager Perceptions Towards Integrated Management Information System Implementation in Yemen* (Doctoral dissertation, Walden University). Retrieved from https://www.proquest.com/openview/edf6232ffbb2ed5a7e7d0f5be9aad56f/1?pq-origsite=gscholar&cbl=18750

Participants and Their Job Positions

Participant	Job Position
Participant 1	Lead Women Development Associate (WDA)
Participant 2	Women Development Associate (WDA)
Participant 3	Women Development Associate (WDA)
Participant 4	Women Development Associate (WDA)
Participant 5	Women Development Associate (WDA)
Participant 6	Women Development Associate (WDA)
Participant 7	Lead Women Development Associate (WDA)
Participant 8	Women Development Associate (WDA)
Participant 9	Women Development Associate (WDA)
Participant 10	Women Development Associate (WDA)
Participant 11	Women Development Associate (WDA)
Participant 12	Women Development Associate (WDA)

Evidence of Trustworthiness

Credibility

To maintain Triangulation and establish Credibility, prolonged contact, member checks, saturation, and reflexivity of the research have been done (Koch and Ahmad, 2018). Especially with the purpose of establishing Credibility, data from different sources

have been incorporated (Carruth & Freeman, 2021). Using the accumulated Data, I was able to do appropriate forms of content analysis, participant sampling, and member checks (Shakman et al., 2017). An extensive analysis of the different sources was one of the significant steps towards making sure that no new information was being added to the data analysis; appropriate saturation was maintained.

As has been planned earlier, strategies are yielded with a fuller description of the qualitative design, while the invention is described as a demonstration and understanding of the design and the research question. Similarly, the designed data collection methods and procedures were explored as detailed as possible (In Bonder & In Dal, 2018). Simultaneously, data analysis methods, measures, and the analytical techniques' sustainability were maintained. Finally, the process of the findings with the presentation is provided in detail and in an organized manner. Wherefore, as a researcher, my awareness of the subject matter and standpoints on the research is presented in as much detail as possible.

Transferability

To make sure that research finds could be applied to similar situations, an explanatory model of the research factors has been provided (Schoenmaker and Schramade, 2019). In the research, key knowledge and essential insights are presented so that policymakers and end-users can become active users. To fill the transferability gap, the framework of the digital platforms has been redefined. Moreover, with the goal of developing a framework that prevents the exploitation of potential opportunities, all

solutions have been explored. With attention to developing content that is comparable to generalization principles of quantitative research, the knowledge was developed in a context that can be applied to any setting (Levitt, 2021). Especially since the concepts have evolved from the general principles of information systems management and sustainable urban development, the experience can be transferred to any other developing country like Ethiopia. As the whole content of the research has incorporated suggestions and verification of the participants, the content of the research can be transferable to real-world situations (Qin & Lu, 2019). To summarize, the indispensable segments of the research procedures, the principles upon which the research has been founded, the methodologies, and the general aspects of the process have widened the possibility of the research's Transferability.

Dependability

As a qualitative strategy, an audit trail has been established to extend the dependability of this research paper. By illustrating the participants' narratives, audit trail principles serve as a means of showing data collection and analysis transparency (Carcary, 2020). As it is a key step to establishing credibility rigor and creating its structures and processes, audit trails have been guiding data collection and the interview process upon which the research has been founded (Johnson & Rasulova, 2017). Furthermore, for the sake of back-ups, the event log, participants' ID, event initiator, and the results have been archived. With its effective trustworthiness techniques, audit trails are used to establish this research's dependability (Muñoz et al., 2019).

For the most part, the research document is the outcome of consistent and accurate academic research and the feedback that was gained from the research ground. Because of this, consistent adaptation and adjustments have been made in the application of the semi-structured interview questions and journaling. In addition to the Triangulation techniques that serve as an opportunity to reinforce the research's Credibility and dependability, constant comparison and evaluation have been applied in the process of data collection (Lemon & Hayes, 2020). In this case, as a document that has applied information from various sources and Inquiry audited masterpiece, the outcome of the research can be dependable.

Confirmability

Executing the criterion of Trustworthiness, Confirmability has been established by implementing a measure of confidence (Daniel, 2019). Following the data reports as strictly as possible, I have tried to avoid preconceptions and assumptions. The trace of the sources has been set as a standard of conviction that based itself on the participants' narratives and words. To confirm the Data's neutrality and objectivity, I have followed the themes that have been encrypted from the interview. As the basic concepts of the research and their explanations will be conducted under the dissertation supervisory committee, thoughtful measures have been taken to develop a reliable report. Particularly, the research questions have been used as a lamp to follow the theme to ensure the data collection credibility and transparency of the entire process. Thus, to avoid bias and make

the conclusions emerging from the literature review, I have followed all the academic principles so that the data gathered from the interview.

For diverse reasons, the path through which the research process has arrived at a conclusion is incorporated in this research document. One of these reasons is to leave a footprint so that the supervisor committee will have the possibility of ensuring that both the gathering process and the data so comply with the research question and purpose. Accordingly, to enhance Credibility and research accountability, I have written down my thoughts as notes and avoided any assumptions to achieve neutrality and objectivity of the data. Following the research process, this qualitative research is expected to combat bias build Credibility and Data reports.

Study Results

RQ1. What methods are currently used to implementing information Systems Management (ISM) for Sustainable urban development?

According to the Participant 1 said, the manual information systems management method that uses three types of information collection and dissemination has been in use for the last three decades. The Central Statistics Agency of Ethiopia (CSA) is assigned to collect the information from different convers of the country (Abay et al., 2018). Using the information, in addition to its annual report, CSA releases permanent reports to dissimilate its products to interested users and beneficiaries. The information is used by most governmental offices for decision-making and semi-annual evaluation purposes. As one of the four sectorial offices in Ethiopia, Area Development

and Sustainable Development has implemented information Systems Management for the business they are involved in.

First, conducting formal and informal meetings is one of the most widely used models of information dissimilation and gathering in the program of Urban Sustainability. Like the Hierarchal form, after meeting with the group members under their domain, group leaders will collect any feedback from here members and disseminate important announcements from their supervisors. Then, As Participant, ….. said, we start the process of data collection that usually takes place in an office set up or within a community.

A participant said during our weekly meeting, the small group updates the leader who will be participating in the regional monthly meeting. In the monthly regional office meeting, everyone shares the information he/she has got from their group meeting. Then, the chairman who attends the regional meeting of 15 leaders shares his information to the attendants and the leaders who attend the Zonal meeting. The Zonal leaders who gathered the pieces of information will let the regional government officials have an awareness about the multiple issues. The information that has been gathered by the WDAs about the seemingly intractable problems of unsustainability that include extreme poverty and environmental degradation, immediate issues will be sent to the central office of statistics.

In speaking about this, Participant 2 said, skimming through the obstacles that realized the unsuccessful implementation of our activities, participants usually forward ideas about how to adequate planning, monitoring, and evaluation the plans. As

Participant 5, 9, 1 elaborated, while both formal and informal meeting is used to identify and develop historic day-to-day information, the implementation of hierarchical information has been given dual attention. According to the participants, in addition to guiding the mission of employment, an appropriate planning document could be used as a reference wherever confusion happens. Participant 5 said, guiding the gathering of information and usage of resources, the method is used in place of document-based planning of resource allocation and management. Participants 12 identified meeting as means of creating a common understanding among implementers, guide to plan inventories needed for the process, incorporating research needs of the project.

Filling of forms is the second most important information dissimilation and gathering in the program of Urban Sustainability of Ethiopia. Participant 4 said, following the official form that was prepared by the government office many years ago. Users are provided with sufficient training and practical exposure before they are assigned to deal with on job challenges. Participant 5 responded following the type and the size of information to be disseminated; the WDAs can use the office resources as the backbone of implementation and tool of marinating the process. For the sake of progress in project assessment and evaluation, there is a need for adequately monitored and effective assigned manual and resource allocation as a key to implementation.

Participant 2 underlined the role of human effort and efficacy in preparation, development, and implementation in dealing with some uncertainties that can happen in the process of filling forms. Counting the number of hours that could be wasted every week, Participant 9 sees the issue of supplies and materials as an indispensable factor in

the execution of form-based information systems implementation. For Participant 5 office that does not have an assigned budget to cover extra expenses, Lack of stationaries can become a stumbling block of activities.

Participant 6 debriefed, saying although using designed and developed forms to fill out information, users need continuous training whenever an item is added or updated in order and in sequence. In summary, while there are mandatory activities in the participants and implementation of paper-based information systems, the participants raised significant setbacks of implementing information systems in this regard.

A participant explained how the social network had been used as the most significant part of information systems of Ethiopia after the government sought the significant role of information in the process of urban development. Participant 2 said informal social networks had been used in solving challenges, Lack of motivation, cleaning confusion during and even after the execution of project implementation. For Participants 3 and 4, social networks have been used to solve the confusion and fill the gaps that are happening between the implementation office and the community. According to Participants 11 and 12, whenever information and technology questions raise even before they reach the office, people in the social network used to deal with it.

A lot of participants also explained the dangers of using social networks from different angles. For Participant 6, unless certainty about the new change and helping users to familiarize themselves, the social network can be a stumbling block about moving from a manual way of doing to technological advancement.

As Participant 7 underlined, just as interesting as it is, having the knowledge and skill of explaining and introducing an idea can be disseminated in a wrong way. While it can play be an important actor in the Successful Implementation of any project, misinformation can be a reason for impacting the quality of the information and the involvement of the participants. Participant 9 said unless social network members couldn't be empowered with the explanation about the relationship between the ISM and sustainable urban development, there would be a challenge of dispersing the skill and the vision among the community of users.

Meanwhile, as the conviction of the research participants about the methods that are currently used to implement information Systems Management (ISM) for Sustainable urban development, in summary, here are the basic points. According to the participants, the movement is using formal meetings, form filling, and social networks as important channels of disseminating and acquiring information. Simultaneously, many participants were outraged by the noticeable setbacks of the manual-based information that is becoming a challenge to data-based decision and information assessment. Without hesitating the need for some change, the users have discussed the impact of manual-based information systems in impacting the best value of information in decision making.

RQ2. What factors contributed to the unsuccessful implementation of ISM for Sustainable urban development?

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hesitating the need for some change, the users have discussed the impact of manual-based information systems in impacting the best value of information in decision making.

Table 3

Participant's summaries of Factors Contributing to Unsuccessful implementation

Participant	**Lead Women Development Associate (WDA)**
Participant 1	Using Informal meetings to make spontaneous
Participant 2	Filling form as a chain of communications
Participant 3	Using Independent Small groups as a decision body
Participant 4	Using contingent planning as a common ground
Participant 5	Low level of adoption.
Participant 6	Not enough training and education
Participant 7	Paperless implementation
Participant 8	Emergency time frames
Participant 9	Inconsistent and resilient planning
Participant 10	Unassigned budget approach
Participant 11	Decentralize resources manipulation
Participant 12	Incomplete instructions of implementation and supervision

Participant 11 exclaimed by saying, many of the WDAs I have been working together do not have the full picture about the information routs. Not in a way they can define the logical connections between information systems management and sustainable urban development. Even if the need for critical integration of information is an obvious idea, in

the general sense both the WDAs as well as the people group not used to have adequate knowledge about the role of informing in sustainable development. Participant 12 testified that some WDAs attached "Computerization" as a luxury and extra activity that has nothing to do with sustainable development. Because of this, while most of them did not pay adequate attention to the implementation project a great deal of them do not have adequate preparation to come over the challenges of implementation. Almost every one of the Participants have complained the poor involvement of the leading team to provide appropriate strategy of convincing people in different levels. The Participants 7 said, "May be the intellectual team, policy developers, and the university graduates may understate the whole picture and the significance of the project, but not everyone. Participants 8 added, they were supposed to take time to analyses the information, prepare good scenario to explain the logical connection between having information systems and staying with the old ways. Since they failed from explaining it in a way it should make sense, Table 4 lists the Emerging Themes on Factors Contributing to Unsuccessful ISM implementation.

Table 4

Emerging Themes on Factors Contributing to Unsuccessful ISM implementation

No	Factors contributing to unsuccessful ISM implementations
1	lacking the knowledge to explain the connection
2	Lack of knowledge to introduce the use of technology
3	Lack of resources
4	The issue of safety made using paper-based systems
5	Not having the full picture of the process

RQ3. What are the Development Associates (DAs) perceptions of critical success factors for Successful ISM implementation?

Many ideas have been forwarded by the Participants who discussed the need to explore Information Systems Management for Sustainable Urban Development in Ethiopia. Explaining the impact of the information and technological gap between Ethiopia and the rest of the world, Participant 2 assumed the Lack of authentic study is one of the reasons for Ethiopia's lowest rates of Internet access compared to an average of Africa. According to the Participants, to have updated data, there is a need for a very clear awareness about the subject matter and a definition of the logical connections between information systems management and sustainable urban development are critical issues in Ethiopia. For Participants 3 & 4, having authentic research in the area can help Ethiopia to have adoptable guidance that can be used as a framework. For them, the outdated manual way of information manipulation system has dominated with its vague ideas, behavior, and product among the urban population. The old manual has been an obstacle to adopting the six principles of sustainable urban development areas within an urban community.

As Participant 3 suggested, we need to have a very clear-cut knowledge about the connection between the variables. Participants 10 said, in addition to facilitating social perception of using the concept of information systems and behavior, the process of implementation-defined knowledge. Participant 6 said that having adaptational perspective and behavior towards new information systems technology adequate knowledge would answer critical questions. Participants 8 said, like how, why, and at

what rate new ideas and technological innovation could be implemented in a society in the context of Ethiopia. As it is presented in Table 5, unless the principles of communicating through diverse channels could be applied, there can be no possibility of using WDA's perceived factors for successful ISM implementation. Talking about the need for innovation, social conviction, the process of decision support, implementation of the new idea, Participant 6 suggested that only knowledge that emerges from an authentic study can help how to communicate ideas using different channels.

Table 5

WDAs perceived factors for successful ISM implementation

No	Manager perceived factors for successful ISM implementation
1.	Authentic study
2.	Adoptable guidance / Model
3.	A need for clear-cut knowledge
4.	Answer critical questions
5.	knowledge
6.	Communicating through diverse channels
7.	Timely access to weather and other information
8.	The economic policy of the Ethiopia has
9.	Solution for unique alphabetical latter

Asking why urban sustainability goal has not been perceived as an economically significant part of society; Participant 10 underlined the need to set up timely and

accessible information systems management for everyone. Listing the challenges and opportunities of information and communication, Participant 10 explained the critical ingredient to improving access and manipulation of resources. According to this Participant, Lack of simple access to weather forecasts and early disaster warning of information have affected the right to value addition and markets of products knowhow. Sometimes the community members are forced to travel long distances to access the networks even amid dangerous situations and challenges. Accordingly, regardless of the potential benefits of Information systems for List Developed Cities like Addis Ababa, not setting approporate acces to informtion is one of the multi tackels of urban transformation. Participants 10, 4, and 5 interpreted that the economic policy of Ethiopia has been focusing on agricultural technologies and food security that internal communications and infrastructure are not developed in the past decades of the economic plan.

In fact, this is particularly so, given the unique position of Ethiopia as one of the least-developed ICT environments in the world. Moreover, Ethiopia has a unique alphabetical latter which makes it even more difficult to adopt ICT and whether there are any future developments that could change the ICT development focus. As part of the ongoing research activity that could help improve the ICT environment in Ethiopia, participants highlighted the factors that can lead to an information integrated sustainable development environment.

RQ4. How can the government of Ethiopia overcome factors that led to unsuccessful ISM Implementation?

Table 6 how Managers Can Overcome an Unsuccessful IMIS Implementation. Participants 6, 7, 10, and 12 said preparation and system rearrangements are the very key factor in the process of implementation. Areas that include conservation of the ecosystem development of a sustainable society, conservation of biodiversity, and control of population growth demand preparation. Development of human resources, promotion of public participation, and rearrangement, the system needs compatible preparation of implementation. Participant 8 added, "To win limitations peculiarities and conditions that are not in place in any other country, there is a need for preparation for creating the sustainability of endangered species and increase wild forest products. Participant 1 explained how preparation and system rearrangements information systems could be applied to sustainable urban development projects. According to this participant, preparation and rearrangements can be used to minimize risks to increase forest value and enhance sustainable forest livelihoods. Participant 2 also added, "If Ethiopia's government wants to implement different information systems strategies, preparation should include creating access to information, harvesting the products on time, storage, and market creation." That means, as one of the most significant investments and knowledgeable products, effective preparation and system rearrangements of long-term and flexible approaches is a significant step in countries like Ethiopia. By integrating practical and organizational preparation and system rearrangements towards information, the government can deal with factors that led to unsuccessful ISM Implementation.

Table 6

How Managers Can Overcome an Unsuccessful IMIS Implementation

No.	How managers can overcome an unsuccessful IMIS implementation
1	Allocation of sufficient resources
2	Compatibility of IMIs systems with organizational vision
3	Efficient communicable knowledge and collaboration
4	Organizational supports
5	Education and training of staff and stakeholders
6	Identification of barriers

Participants forwarded the idea of Modeling to convince Collaboration, ideation, implementation, and Ideation. For instance, according to Participant 8, models are not only good for implementation and Value Creation but for collaboration of innovation. Especially in the process of bringing together a concerned group of researchers, Modeling can be used as a practical tool that aims to enhance the creative capacities of future innovators, such as creativity training techniques for innovation (Participants 3, 7, & 9). Having the concern how good Modeling can facilitate the process of designing small experiments, Participant 6 highlighted an acceptable model to explain the contribution of information for sustainable urban development. According to him, in addition to helping people to imagine the positive role of information systems on sustainable urban development, the model could fill the gap in human behavior. As participant 9 put it, to show that the implementation process will be a very promising process of innovation, there is a need for the development of Modeling and use critical thinking skills.

Summary

Technology diffusion principles and methods

Participants associated the need for the presence of step-by-step guiding principles and methods during the process of implementation, innovative ideas, and technologies. For instance, Participant 7 identified that depending upon the degree of changes among components; the already existing system establishes a new without affecting the relationship with the other aspects of a system. Participant 1 analyzed the role of having well-defined principles and methods in stabilizing a modular innovation that can be used among the agrarian community like Ethiopia. Participant 2 sees how Woreda 6 needs a revolutionary breakthrough against the old way of doing things and a tremendously beneficial innovation that leans forward to the area's economy. For this participant, using a radical innovation, it is possible to create among the disintegrated components of the community firms, utilize the resources and adopt sustainable development technologies. Participant 8 added, "Adequate information classification, conviction creation, plan evaluation, implementation evaluation, and confirmation can be easy when there is dissemination plan. Whether we are following incremental, modular, radical, or architectural plans, principles, and methods can help us to introduce and implement innovations in the context of Ethiopia.

Resource re-allocation has been identified as one of the major issues that impact the implementation of information systems for sustainable urban development. According to Participants 4, 6, and 12, for projects to meet the criteria of having the relative advantage and maintain compatibility, resource allocation is very indispensable.

Participant 7 added by saying, "In the process of dealing with social complexity, maintaining public trainability, and noticeability, assigning the right resource is very crucial. As Participants 4, 7, and 12 explained, influencing the community's attitudes towards information systems and presenting the innovation as better than an idea, program, or product needs a well-assigned resource. As Participant 10 implied, in a financially struggling community like Ethiopia, appropriate resources will present the compatibility of the innovation with the potential adopters' values, experiences, and needs. Accordingly, to show that the innovation and the program would be to their advantage, and innovation results are visible to the degree to which an idea can experiment, there is a need for resource allocation.

In the process of explaining and discussing information systems management and Sustainable urban development, the12 Participants have discussed the status, the opportunity, and Challenges of the implementation. Accordingly, speaking about the methods that are currently used, the factors that can contribute to the unsuccessful implementation, naming the critical factors for successful implementation, and ways to overcome the challenges that can lead to unsuccessful implementation, the participants raised the following points.

Depending upon our discussions, the manual information systems management method that uses three types of information collection and dissemination systems has been in use for the last three decades. During the interview, the participants lined out the advantages and the disadvantage of using the manual information that has stayed for centuries in use. First, conducting formal and informal meetings is one of the most widely

used models of information dissimilation and gathering in the program of Urban Sustainability. The advantage of this system is since everything depends on Oral communication, it is fast enough to disseminate ideas and information quickly. On top of this, this type of communication is open to human limitations, like omission, emotion, and exaggeration. Since most information cannot be documented fully, there is always the possibility of missing the original content of the message.

Second, filling of forms is the second most valuable information dissimilation and gathering in the program of Urban Sustainability of Ethiopia. Forms have the advantage of capturing formal information that can be stored in the information archive easily. Since forms are prepared considering most ordinary situations, they do not have room for creativity, handling a unique atmosphere, and handling uncertainties. Therefore, to use such forms, the forms need usual updating while integrating the new findings cycle of information systems. In the context of Ethiopia, this is almost impossible. That is because doing so requires working through a whole cycle that comprises of the Feasibility or Requirements Analysis Stage, Design and Prototyping Stage, Software Development Stage, Software Testing Stage, Implementation and Integration, and Operations and Maintenance (Cooper et al., 2018).

Thirdly, after the government sought the significant role of information in the process of urban development, the social network has been used as an information system of Ethiopia. This system is amazingly effective in areas where people are economically interdependent there is a binding interim that keeps the members altogether. In such type of situation, the social network can be used to employ people as an agent of change and

stewards of information dissemination channels. But the disadvantage of this type of information system is that the quality and the possibility of information channel depends on the group and person-to-person relationship of the people. Sometimes, information can be abused, altered, or overused in areas where there is an abnormal relationship between the group members. Whenever there is a relationship crack-down, an information channel can be used as a vessel of distraction and control the group members against organizational purposes.

CHAPTER 5

Discussion, Conclusions, and Recommendations

Exploring ISM for sustainable urban development is the purpose of this qualitative study. Through the one-to-one phone interview, Ethiopia's implementation of ISM for Sustainable urban development has been explored. In addition to this, using documentation as the theoretical principles of implementing ISM for sustainable urban development, an additional study has been made. To enable Policymakers to develop, plan, implement, and execute information-oriented Sustainable urban development strategies strategic document that enhances Social Change, the research outcome can address community challenges. With the need to implement information and sustainable urban development in Ethiopia, a review and synthesis of studies related to the methods have been discussed. Accordingly, the strengths and weaknesses of inherent studies of implementing ISM for Sustainable urban development have proposed major key points.

Interpretation of Findings

First, the literature review and the one-to-one interview have established the idea of using Geographical Information Systems (GIS) as a major form of data collection. In speaking about this, González-Baheza & Arizpe (2018) commented that using GIS facilitates the evaluations and monitoring aspect of sustainable urban development. In the process of formulating environmental policies, GIS facilitates conducting evaluations and monitoring the physical, environmental, and socio-economic indicators. GIS plays significant role in combating vulnerability of the biotic, natural landscape, and socio-economic challenges (González-Baheza & Arizpe, 2018). In the most contemporary world, GIS can help to formulate environmental policies guide decision-makers to understand the significant elements of environmental models.

Second, the research found out the role of the interactive central database in the process of avoiding fragility, pressure, and vulnerability. When access to an interactive central database is instituted, the information workers will get the possibility of effectively operating in an interactive atmosphere and live environment. Etingoff (2017) specified the need for the development of an interactive central database in executing environmental policy instruments and adaptation of sustainable development measures. Studying through the application of the Urban Residential land development and redevelopment intensity (LDR) act, Islam et al. (2020) underlined the need for a central database in having appropriate land usage. As the factors influencing urban sustainability vary in nature, having direct access to central database Impacts real estate development and the city's overall housing situation.

Third, to incorporate rich statistical inputs into urban sustainability and development, applying mobile-based information collection has been suggested by some interviewees. Especially in the process of bringing about form free and dynamic atmosphere, the application of mobile technology brings about a meaningful impact on the life of people lives. As the rules and regulations for implementing ISM for sustainable urban development expound application of mobile can serve as a change resource. Thus, using the three driving factors - GIS, Central Database, and Mobile Technology, this research shows that there is a possibility of helping investors and policymakers in the process and development of decision-making.

Literature reviews the different methods that can be implemented for information Systems Management (ISM) and their advantages and disadvantages. Presenting a conceptual approach to defining information in relation to sustainable development, Yuan (2020) described the use of GIS for intelligent tourism and its members. They are examining and considering a few pioneering examples of smart cities and the role of GIS's vital role of using GIS in the age of sustainable development. The paper addressed the full spectrum of related sustainable products. There is a growing interest in using GIS bout in locals and non-territorial contexts.

Olgun (2020) indicated how GIS could be used for urban to deal with Air and Water pollution that emanates from transportation systems and the increase in the number of motor vehicles. While the rise in the number of motor vehicles leads to many problems (air pollution, traffic congestion, carbon gas emission, Etc.), the researchers believed that unless the issues are dealt with soon, they can be a stumbling block of the future.

Researchers have developed a sustainable bike path proposal for cities through GIS-based multi-criteria decision-making analysis (Loidl et al., 2019). Integrating physical, environmental, and visual factors for medium-sized cities, it is possible to develop a sustainable bike path proposal for cities through GIS-based multi-criteria decision-making analysis. In some areas, suitable physical, environmental, and visual factors are the outcomes of research-based decisions that emerged from better use of those technologies (Olgun, 2020). A literature review has proved the GIS-based multi-criteria decision-making analysis and a sustainable bike path proposal could be used as sustainable urban development instruments.

On the other hand, data collected from the interview shows that the Government of Ethiopia uses the only manual (form-based) method to execute Information Systems for Sustainable urban development. Most research participants see paper-based information systems as backward and time-consuming. While the paper-based systems are affecting the decision-making frequency, as one of the interviewees Sayed, using manual method has limited capacities for representing choice and priority. In addition to affecting sustainable urban Planning, the method is negatively impacting measures to identify priority intervention locations.

Searching through the manual system that does only address the problem fully, this research paper found out that there is a gap between urban sustainability planning and performance analysis. Priority of adopting better options must be given for sustainable development in the city so that they could be used to enhance local,

sustainable growth. Furthermore, as an urban planning instrument, appropriate tools need to be implemented in cities.

The Verbal communication method that the country is trying to implement is one of the most remote methods. Especially, applying verbal information systems to control air pollution makes the air pollution reduction instead complicated and too human. In the highly complicated world of air and water pollution, applying the human communication method cannot benefit. It is better to review the associated challenges of implementation and develop a better strategy. Instead of applying a traditional system of handling city challenges, there is a need to undergo a transformational approach for an innovative city system. Otherwise, the trend can neither answer challenging issues that are related to urban development nor can improve the main problems of application. To improve the quality of living, environment, economy, transport, and governance, an integrated information system should be implemented for positive decisions outcomes and great city life.

First, a literature review has shown how not integrating technology can affect the process of implementing any system. Showing how simple technologies like GIS can be used to define and explain how techniques could be considered as an essential part of Water information can impact the overall process of Water information. Accordingly, instead of providing the whole picture of the implementation process, not using technology undermined what could be used to plan, preserve, and manage natural resources. Lack of technological usage minimized the possibility of minimizing both the effort and its outcome in urban areas. The Literature review has outlined how the quality

of effort has been affected the air, water natural resources quality issues. In addition to helping to rate water quality, GIS can be a useful tool to assess spatial and temporal changes in groundwater quality (Yang et al., 2020).

Second, a lack of thoughtfulness on how to implement information systems management can affect the response and acceptance among the users and the implementors. Calculating the water quality among users, some researchers have shown how lack of understanding can affect the overall groundwater quality (Rawat et al., 2019). According to Kumar et al. (2018), appropriate understanding is very significant to implement the Geographical Information System (GIS) structure for sustainable urban development. Doing a Survey-the-study-area-of-different-locations (Yang et al., 2019) has shown how air sampling has been affected appropriate knowledge of assessing air pollutants (Xu et al., 2019; Halsey, 2017). As it has been examined by different researchers, unless the implementation of groundwater as air pollution prevention systems could be approached in a knowledgeable manner, it is impossible to deal with further contamination.

Some interviewees indicated the outcome of not integrating technology that brought about manual or paper-based information systems. Not only this slowed the process of implementation, it made the information systems face the outcome of human limitations. From the perspective of local governments, lack of technology became a reason for not letting cities take prominent role in the achievement of UN 201s goals. The participants commented on the role of technology in the development of every community and individual. Accordingly, technology should be used to build smart,

sustainable cities that are compatible with the context of the cities. As Participant 10 commented, the development of a compatible model should be enhanced with sequences of actions. Henceforth, as a combined information ecosystem that realizes collaboration between individuals, there is a need for integrating technology that affects the administrative and sustainability units of information systems management.

Table 7

Obstacles of IMIM Implementation

Humanistic factors	**Environmental factors**	**Organizational factors**
1. Inadequate information on the needs of the users and managers	Lack of quality criterion of the existing information systems	Inadequate conditions for participation and collaboration of the managers, users and system directors
2. Lack of effectively defined goals.	Lack of suitable consultants for designing and implementing the system and software	Complexity of the existing manual for implementing the systems
3. Inadequate or lack of lack of participation of the managers and users during system design and implementation	Lack of procedures and methodology to guide successful implementation.	Lack of existing systems and methods analysis before the system design
4. Management's lack of understanding of the system and how it should be implemented.	Lack of evaluation of environmental aspects in management information systems	Inadequate resources such as Lack of human computer and other required specializations
5. Lack of acceptance those implementing the system and resistance against the change.	Inappropriate culture of using computer and information systems.	Inadequate user education
6 Inconsistencies and lacking accuracy in the the data collected	Inadequate training opportunities for system implementation within colleges and universities	Unsuitable implementation of system

Note. Adapted from "The challenges, Barriers and advantages of management of information systems development: comprehensive Review" by Alawamleh et al., (2021)

The data collected from the interview indicated how lack of appropriate technical knowledge brought about failures of information systems management implementation. Some interviewees indicated that not having a framework that can help to mitigate, understand, and adapt to social, economic, and environmental, lack understanding brought about frustration among users. Not using an implementation strategy that could facilitate modeling geographical variability has brought about a lack of both climate and asset vulnerability within the country. Participant 8 forwarded, the project failed to use the past and current spatial dynamics of a population that could help planners and decision-makers to predict population growth and urban expansion. To better understand and succeed, there is a need to explore the possibility of implementing information systems management.

The DAs think that to avoid further setbacks, introducing and applying supporting technologies models will impact the process of implementing the system. Some of the research participants explained that using information technologies could fill the most neglected gap of the implementation. By simplifying the process, it helps the participants to recognize the importance of integrating technology into the day-to-day activities of users. As the previous implementation had been challenged by both external and internal impediments, there is a need for a good technology model that can provide the idea of adjustments and compatibility. Accordingly, having a model can provide a picture of adjustment between internal and external barriers.

For this reason, although internal barriers can be handled with adequate preparation, extra efforts always need technologies that can have a good model. As part

of the feedback that has been obtained from the DAs shows, strategies must be developed to introduce and apply supporting technologies.

As some participants highlighted, implementation of technology that can impact urban sustainability needs to have a well-defined and clear principle of implementation. While the diversity of contexts is very common from place to place, there is a need for a clear principle of implementation that can be evaluated and used to measure the implementation status of the project. In the process of evaluating the principles and the models, the overall model of implementation groups gets awareness about the underlying relationships between the variables. Following the results from this analysis, it is possible to describe the major factors as well as answer questions that may emerge in the process of implementation.

Second, the presence of a proper understanding of how to implement information systems among the users has been referred to as the issues that can affect the acceptance of the technology and the systems among the users and the implementors. Having an appropriate understanding of the implementation of information systems will accelerate the growth, deployments, and production of reliable, economically sustainable, and socially fair systems. Impacting the interest of users against confusion and uncertainties, clear understanding would help implementors to explain the knowledge as a technological skill that needs to be responded to against challenges from the community, the knowledge, and the skill can be used to dissimilate the new idea among the community. As the implementation of information systems for sustainable development

research continues to mount among users, the transformative knowledge can be leveraged to create an informative strategy.

Table 8

Barriers and Critical Success Factors in IMIS Implementation

Organizational Factors	Operational Inputs
Assigning competent personnel	Communication and accountability
Preparation and system rearrangements	Human and material resources
Assigning enough resources	Assigning both
Skilled management	Enough time assignment.
Providing clear knowledge and skill	Preparation of the materials
Assigning right amount of budget	Communicating
Assigning the right combination of people	Having the right model,
Awareness creation and good implementation	Having the right model
Assigning adequate training and education	Advance training

Alkaabi, M. H. (2018). *Educational Manager Perceptions Towards Integrated Management Information System Implementation in Yemen* (Doctoral dissertation, Walden University).

Limitations of the Study

The limitations, challenges, and barriers did not come from government offices' willingness to open doors and become available to share information. The offices were rather willing to facilitate the research process. But, lack of organized knowledge, inadequate communication systems, and inappropriate information communication policy

in Ethiopia made the government offices do not get involved in the research process in an extensive manner. Since the offices do not have access to or organized system and policy and they were unable to provide an extra contribution to the research, I was forced to execute the strategy that was assigned was listed on the approved proposal.

Accordingly, using the formal letter of co-operation and invitation that was released from Walden University, I was able to realize the interview process. The latter not only helped to execute the interview process, but it was also used to introduce myself with the system of communication, the background of my study, and the goal I am trying to achieve. Thus, using the already lined-up system of communication, I was writing an email to the representative of the researching organization, sending messages, making phone calls to reach out to the offices.

Second, except assuring that all measures have been taken to maintain the accuracy of data collected from the participants,' there is no way of ascertaining that all provided information was truthful. Unable to verify if the information provided was accurate, I had to use common senses to judge what seemed right and not. Not to lose the opportunity of using the participants who showed up as scheduled, I had to use Triangulation to ensure the data accuracy. Triangulation is a method of checking data accuracy is used to check the quality of data that was getting into this research system so that the conclusions can reflect the real nature of the research problem.

Third, as most of the participants are involved in different responsibilities of the urban sustainability program, assigning an interview time was not as easy as I

thought. Some of them hesitated to participate in the study because there were no openly promised negotiable payments. After explaining the significance of the research and how it may affect the profession, many of them were able to participate in the study. Thus, by collecting data to understand the perceptions perception of the subject matter, I was able to collect data from the interview and finalize the research process in its due time.

Recommendations for System Executors and Other Stakeholders Following their own expertise and the outcome of this research, implementors should use the following and other recommendations in the implementation process. As research has touched the ground, it is with great boldness I speak that implementors must understand the criticality of Information systems Management in relation to the Sustainable Development goals as the evidence from the interview shows that strategies that are used to deal with the barriers of implementation, it is significant to understand the role of the factors in the life of any project. The concerns include the managerial failures to facilitate and support with resources that could support the implementation process knowledge-based and experience-oriented support. Summarizing the basic findings of the research, here I have listed considerable recommendations for every one of the major research questions that were raised in this research.

According to this research, using technology is one of the most important factors that can affect the successful implementation of Information Systems Management for Sustainable Urban Development. Based on the literature review and the participant's perception, not using technology is one of the greatest obstacles to system implementation. Some participants highlighted that despite the identified efforts by the

ministry personnel as well as supervisors, inadequate technology and not understanding the technologies have been affecting the operation. Lack of material resources along with lack of management support and thoughtfulness, among other factors for successful critical implementation. Accordingly, lack of technology, knowledge, and resource have been affecting the acceptance among the users and the implementation of information systems management.

Despite their different nature and complexities, assigning resources must be handled in an appropriate manner. Using careful consideration of the factors, the implementation team must define design-specific goals of the implementation and integrate them with the national resources of the Nation. Evaluating the Technological acceptance and the Diffusion of Innovation models that have been presented in this research, the implementing team has to disseminate the possibility of both technology and resource manipulation. For appropriate results and promissory outcomes, the implementation team and the governmental stakeholders should ensure that sufficient TAM and DOI principles are followed. The models can help both the environmental aspects in ISM and Sustainable Urban Development as a major barrier,

Budget is one of the most important factors in the implementation process of information systems for sustainable urban development. To integrate and promote the appropriate pace of the implementation, assigning a budget within the organization reduces drainage among the users. When an appropriate budget is assigned throughout the institutions and the empowerment process, the passion for adopting and accepting the new system would be improved considerably. Further, leaving the trace, easy

identification of the people involved in the operations, and appropriate integration of the stakeholders who are involved directly with the implementation can happen when an appropriate budget is assigned.

Recommendation on how the government of Ethiopia can overcome factors that led to unsuccessful ISM implementation. For successful project implementation, the government of Ethiopia should provide a series of pieces of training that are to be presented at a critical point in the project life. When they are managed in conjunction with the performance of the team members, such pieces of training would be an effective way of practical communications. Using Planning and assigning responsible people for this goal helps to implement visible changes and training that can impact the performance of the team in many ways. As both the literature review and the data collected from the interview can show, many of the project implementation confusions can be solved through either meetings or pieces of training. As the implementing phase demands analysis of different parts of the processes, mapping of the implementation processes from different angles, and relating the process with appropriate training helps to conduct practical training that impacts the goal. If doing early assessment and development of protocols, boosting team functions that are integrated with the performance of the project team can be the immediate purpose of the training. Supporting the project personnel to identify the factors that are different both the work and the project implementation, training helps to create an interactive atmosphere located on the electronic platform. By enforcing certain organizational rules executive procedures and developing positive

environmental culture, training can be used to build strong stakeholders' contributions, description of the organizational purpose, contribute to the engagement of users.

Following the basic principles of system adoption would add significant value to the implementation process. To help knowledge and specialization transfer and deal with the challenges and mitigation mechanisms, the government must follow the adaptation procedures. Lack of adoptable knowledge brought about failures of information systems management implementation. Effective training of those involved in the adaptation process is essential in reducing resistance and raising understanding and collaboration during the process of implementation. Molding the acceptance of this innovation significantly depends on the adoption of well-defined procedures that are presented in this research paper. To bring forth the desired outcomes, implementors must ensure effective knowledge, procedures, and methods are followed. By integrating the training with system adaptation, it might be possible to reduce the change resistances critically and enhance great performance.

As it is presented in the literature review and the qualitative interview that has been done in this research, to overcome unsuccessful ISM implementation, the government should assign bring about human and material resources assignments. Even though obstacles to implementation are of different nature and complexities, I recommend careful consideration of each factor, and designing an effective response for each one can be an effective way of minimizing the risk. Accordingly, while the implementing team should comprehensively adopt the procedures of the implementation,

the managers must align them with the objectives of the implementation and the general procedures.

Some factors as significant obstacles to successful implementation. As defined in this research, to deal with extra project challenges and maintain the planning, implementation, and outcomes, appropriate actions that compromise the basic values and principles of adaptation are anticipated.

Implications

Implications for Information System Management Practitioners

Following the conclusions that have already been discussed, here are the implications and suggestions I would like to forward:

First, setting appropriate evaluation and role determinations to both the team of supervisors and subordinates helps to avoid role confusion and responsibility overlaps. While appropriate evaluation enables the employees with a lower power to believe that power should be shared by both parties (Lin et al., 2019), role determination has positive impacts. The interview data indicated that most participants who participated in the research suggest that role determination is one of the means of prioritizing assignments and responsibilities. Especially as a key to smooth project implementation and effectiveness of communication, role determination is the unique way to appropriate decision-making process. Charoensukmongkol and Phungsoonthorn (2021) also found out that because of many reasons, leaders of project implementation are demanded to engage in training opportunities for users and implementors.

Second, appropriate evaluation and role determinations can be a means of correlating a smooth connection of implementation between the subordinate and supervisor team. With a very clear involvement of a role change from individual contributors, the appropriate evaluation will play a role in organizational decisions to emulate or reject abusive supervision. Accordingly, creating a free environment that promotes subordinates' personal initiative and appropriate self-determination evaluation promotes the intrinsic of both the supervisor and their subordinates. That means by reconciling the intent of the followers and their supervisors; critical evaluation provides employees with sincere care in relation to work and institutional issues. In a broader sense, creating autonomy in the workplace through clear evaluation encourages employees to initiate tasks with a sense of accountability.

Third, appropriate evaluation and role determinations help to attach value to the work behaviors. In the process of system implementation, explaining and promoting behavioral issues can be a means of initiating a sense of self-determination and appropriate model. Without blaming employees for their mistakes, evaluation and self-determination can be used to empower workers and the organizations to which they are assigned for. In an organization where employees increasingly expect managers to play a dominant role in supporting and facilitating basic need satisfaction, appropriate evaluation and role determinations can be a useful means of shaping behaviors. As the evaluation of recurrent studies is continuously adding a little to the initial evaluation, the method is being used to assume the development of the required expertise. That means, in both information systems and sustainable urban development, only evaluation of

Extending the possibility of a positive outcome of organizational interaction, evaluation, and role determination have shown the fact that definitive determination is the means of appropriate actions. In some areas, the development of appropriate experimental procedures for recovery and determination of limited procedures is necessary to evaluate the role of every individual. Using various models of evaluation and role determinations to compare existing information system management, it is possible to drive out conflicting ideas of implementation. Consequently, as Bratton and Watson (2018) argued that implementation acts and decisions taken by managers could ensure actual performance as long as duties and responsibilities are embodied inappropriate evaluation and role determinations.

Forth, every one of the participants of information systems implementation should understand the many values of advanced preparation in successful implementation projects. Preparation enables team members to design appropriate mechanisms of handling uncertainties, while it is the keyway to creating awareness. Successfully completed projects were not successful because there were no challenges and uncertainties. It is because their leaders have decided to take appropriate and timely actions with highly proactive and quick thinking. As the world is moving to a crucial time where technology is becoming a day-to-day reality, preparation of implementation plays an increasing chance of implementation success. Even if technology integration related to the process of preparation needs an effort of articulating key supported considerations, projects that are designed in such a manner are a great way of handling uncertainties.

Granting the implementors the freedom to select their own style and adopt a type of technology that is compatible with their need, handling uncertainties in the implementation builds the future workforce with a strong foundation.

Recommendations for practice

Preparation enables team members to design appropriate resource allocation. As the significant step of handling project stacks that are happening because of economic and supplies issues, preparation saves projects between the world that are facing many barriers. While the provision of adequate resources is crucial in any one of the projects, unless project managers and stakeholders take resource allocation in an apocopate manner can enhance the understanding and appreciation of innovations. It is integrating the implementation process with a measure of resource allocation discrete the steps of initiating and motivating participants for maximizing project success. With planning and preparation activities, it is possible to provide accurate, consistent, and timely information that is critical to decision-making processes. While system implementation should make every effort for advance preparation, engaging both the leadership and users is the key resource allocation. Preparation is the key to training and assigning competent human resources that can impact project performance.

Both literature review and data collection indicate assigning appropriate impacts on the relationship between organizational performance and the chances for a successful commission. By establishing a team that has clear knowledge about the implementation levels, models, and strategies, it is possible to extend the implementation level that

engages trained people of higher thinking. As one of the major factors that can make implementation efforts relatable and successful, taking special steps to prepare, and assign competent serves as an appropriate way of dealing with challenges involved in the successful implementation. Assigning competent human resources is not only a way of introducing a high level of expectation into the new team but also is a strategy of identifying those critical issues that impact successful implementation.

As it has been discussed, while setting appropriate evaluation and role determinations are a significant way of avoiding role confusion and responsibility-overlaps, it is a means of correlating smooth connection of implementation. On top of this, appropriate evaluation and role determinations help to attach value to the work behaviors. Designing appropriate resource allocation to train and assign competent human resources can impact project performance. Accordingly, by incorporating the already mentioned points, stakeholders and implementation executors can have better knowledge, attitudes, and perceptions about the overall picture of implementation and refrain from negatively impacting the implementation process.

The potential impact for positive social change

Yu (2020) studied implementing information Systems to prevent ecological environment deterioration in Qin-Ling Mountains, China. To address resource starvation, sustain the decreasing levels of biodiversity environmental pollution, and sustain the ecological environment, the researchers proposed the idea of urban spatial development evaluation (Blesh et al., 2019). Simultaneously, the basic concept of system coupling is

introduced to implement the process, urban space area elements are extracted, and the sustainable evaluation process of urban spatial development is proposed (Bibri, 2019). Showing how the proportion of industrial land can be used for sustainable urban spatial development, the research paper pointed out how the rest of the index factors and per capita green land area can be used (Simwanda and Murayama, 2018). Total industrial dust emission density, the proportion of cultivated area, and average volume fraction of residential areas are the secondary influencing factors of sustainable urban spatial development that have been applied (Yu et al., 2020). The research concluded with the introduction of the three aspects of "green coordination," "green development," and "green sustainability" of sustainability. As a useful reference that can be used for urban spatial development planning for underdeveloped China's ecological capital areas, the research provided a theoretical basis for information Systems management and control policy of sustainable urban spatial development.

This study is significant because it improves the Practical and Theoretical understanding of information Systems Management and Sustainable urban development. Also, by helping to visualize the possibility of implementing information systems with the detailed scopes of sustainability requirements, the research outcome will have Practical Significance. When the study is complete, the concept of implementing information Systems Management for Sustainable urban development will gain a new understanding. Implementing ISM will facilitate and support sustainable urban development that contributes to positive social change. The coming Chapter 3 discussion will be on the Feasibility or Requirements Analysis Stage, Design and Prototyping Stage,

Software Development Stage, Software Testing Stage, Implementation and Integration, and Operations and maintenance.

Conclusions

In relation to implementing ISM and sustainable urban development in Ethiopia, a review and synthesis of studies related to methods used have been discussed. Evaluating the strengths and weaknesses of inherent studies of implementing ISM for Sustainable urban development, the research has highlighted how implementing Geographical Information Systems (GIS) can be an effective instrument of Decision Support of Sustainable Urban development.

First, a literature review has shown how Gourbesville (2019) explained the use of GIS techniques that could be considered an essential part of Water reservation in Ethiopia's urban areas. The research underlined how that could be used to plan, preserve, and manage natural habitats in highly pressured urban areas. Using groundwater quality should be regularly monitored to cope with drinking water quality issues. In addition to helping to rate water quality, GIS can be a useful tool to assess spatial and temporal changes in groundwater quality (Yang et al., 2020).

Once the water quality index is calculated, the overall groundwater quality can be determined to see whether the groundwater of the area needs a degree of treatment before consumption and needs to be protected from further contamination (Rawat et al., 2019). Second, implementing the Geographical Information System (GIS) structure for sustainable urban development starts from the Survey-the-study-area-of-different-

locations (Yang et al., 2019). In turn, the Survey-the-study-area-of-different-locations relays on the Air sampling will be determined by assessing air pollutants (Xu et al., 2019; Halsey, 2017). Third, The GIS-based framework can help mitigate, understand, and adapt to social, economic, and environmental (Fernández & Wu, 2018). Implementation of GIS-based can facilitate modeling geographical variability in both climate and asset vulnerability within a country (Byers et al., n.d; Hawchar et al., 2020). Forth, using the past and current spatial dynamics of population growth with GIS, planners and decision-makers can predict population growth and urban expansion (Khawaldah et al., 2020). To better understand and succeed in Planning, it is possible to explore the population growth characteristics in an urban setting (Liping, 2018; Fernández & Wu, 2018).

Different researchers took the business of implementing information systems with sustainable urban development from the point of view of local governments. Corbett and Mellouli (2017) studied how cities can play a prominent role in the achievement of UN 2015 goals. The researchers commented on the role of every community and individuals in becoming part of information systems. Accordingly, explaining how information systems could be used to build smart, sustainable cities, they developed a model and enhanced sequences of actions taken by local leaders and individuals. Their model can be used as a combined information ecosystem that realizes collaboration between individuals in administrative, political, and sustainability units.

While the outbreak of the COVID-19 pandemic has been taken as a significant threat to healthy lives worldwide, credible research is underlining the opportunity of

using the happening with local government's plan of development. Pan & Zhang (2020) studied the opportunity that might be available as the world begins to emerge from economic isolation and enters an extraordinary state of defenselessness. According to him, while the COVID-19 pandemic has been a challenge, the virtual experience has created a way forward to contribute to building a sustainable world. Arguing the wonderful opportunity coronavirus pandemic has presented in ecosystem restoration, they challenged that the human family must come together to turn this crisis into an impetus to achieve the United Nations (UN) Sustainable Development Goals (SDG).

Some studies have been done about the impact of research and information in Ethiopia's rangeland pastoralism Environment. Meshesha (2020) suggested developing a method for forecasting forage biomass and quantifying the production of and spatial variation in forage from satellite information. Katsigiannis et al. (2019) researched integrating cheap, ubiquitous sensors into information systems that can accelerate the growth of deployments and produce reliable, economically sustainable, and socially fair solutions. Impacting the primary source of livelihoods against the Ethiopian Somali region's drought-prone regions drought-prone, information systems management would help pastoralists access the scientific and technological skills to respond to challenges like climate change. As the implementation of information systems for sustainable development research continues to demonstrate, the transformative power of IS can be used to create an ecologically sustainable society.

To address the problem of implementing IS for Sustainable urban development, Benbya et al. (2020) underlined the role of the Information Systems community in providing IS-enabled solutions. To prevent further deterioration of the climate system, reduce carbon emissions and reverse the negative impacts of human behavior on the environment, Naseem & Naseem suggested that IS community provide information on the basic aspects of environmental actors. Purchasing energy from renewable sources, driving low or no-carbon emitting vehicles, using public transport, installing home power generation capacity through solar panels, recycling water, installing smart-home technology to monitor, and managing energy consumption are urban sustainability actors (He et al., 2018). In reducing carbon emissions, the IS community can do broader research and inform businesses, governments, communities, individuals, and organizations to take informed actions. Accordingly, in addition to facilitating individual and collective responsibilities, the IS community can commentate action ns and develop a system of supporting cities and local organizations to address their identified sustainability requirements (Russell & Taylor, 2019). The research concluded by forwarding why the IS community needs to consider asking the responses to environmental sustainability challenges; the world requires IS-enabled solutions. How can the IS community contribute most effectively, and should it be done urgently and globally?

To address the need for implementing IS for sustainable urban development, some researchers suggested the concept and proactive of smart cities that can deliver to many of the US sustainable development goals. For instance, Russell & Taylor (2019)

coined the idea of smart cities using information and communication technologies to improve the quality of life for its citizens, the local economy, and transport. The studies provided valuable synthesis from an information systems perspective in Spain, the USA, India, the UK, and Italy (Shirowzhan & In Zhang 2020). The study focused on smart cities' alignments on smart mobility, smart living, smart environment, smart citizens, smart government, and elegant architecture (Bibri, 2019). Smart cities employ sustainable cloud computing and technologies that can attract researchers' significant attention in information systems.

González-Baheza and Arizpe (2018) suggested using evaluations, and monitoring vulnerability models to address implementing IS for sustainable urban development in coastal area cities. Helping formulate environmental policies and guiding decision-makers, evaluations, and monitoring the vulnerability model helps analyze the physical, environmental, and socio-economic indicators. González-Baheza and Arizpe (2018) discussed the vulnerability assessment on the biotic, natural landscape, and socio-economic factors of Baja California Sur (BCS). The research helped classify high and very high fragility, high and high pressure, and high and very high vulnerability. Coastal areas can help formulate environmental policies and guide decision-makers, underlining the significance of evaluations and monitoring vulnerability models.

Etingoff (2017) indicated the need to focus on environmental policy instruments' efforts and implement adaptation measures for sustainable development in cities. Through the application of the Urban Residential land development and

redevelopment intensity (LDR) act, Islam et al. (2020) addressed implementing information systems for land usage. As the understanding of the factors influencing this residential LDR has great importance in real estate development and the city's overall housing situation, the Information Systems was designed to address the demand for land in Rajshahi city. The researchers used Relative Operating Characteristics (ROC) to identify the internal drivers, explored Geostatistics, applied Geographic Information System (GIS), and SPSS regression analysis. After analyzing the correlation between LDR and the driving factors, the researchers explored the spatial characteristics of LDR and understood the spatial distribution of residential LDR. The research was completed by exploring the distance to Central Business District (CBD) from the residential land and displaying the research paper's significance for investors and policymakers in their development decision-making processes.

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Interview Questions

The following are open-ended interview questions to help address the research question:

1. What was your involvement in the implementation of ISM for Sustainable Urban Development?
2. What were the most significant challenges you faced in implementing an ISM for Sustainable Urban Development?
3. What strategies were considered successful when implementing ISM for Sustainable Urban Development?
4. What strategies were considered unsuccessful when implementing an ISM related to Sustainable Urban Development?
5. What have been the key challenges to implementing the ISM related to Sustainable Urban Development?
6. What are some of the system functionalities related to Sustainable Urban Development that would influence your strategies to adopt an ISM.
7. How do attitudes and perceptions of other Development Workers influence your Decision-making strategies toward implementing or rejecting an ISM?
8. What strategies are influenced by your perception of the usefulness of ISM, the technology associated with Sustainable Urban Development.
9. What strategies are influenced by your perception of the ease of use of ISM the technology associated with medical device recalls.
10. What other issues associated with an ISM and Sustainable Urban Development would you like to add to this discussion?

Addis Ababa City Government
Kirkos Sub -City, Woreda 7
EP $ G.DOV'T Office

No k/sub/w/7/env/p/20/2021
Date: 12/ 09/ 2021

Letter of Cooperation from a Research Partner

Dear Endris Suraj,

Based on my review of your research proposal, I give permission for you to conduct the study entitled information systems management for sustainable urban development within the Kirkos sub city Woreda seven environmental protection and green development office. As part of this study, I authorize you to interview environmental protection and green development office workers for data collection, access to published data, and results dissemination activities. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include providing list and contact information of staff members fulfilling the inclusion criteria who will participate in the interview, rooms, resources, and supervision that the partner will provide. We reserve the right to withdraw from the study at any time if our circumstances change.

I understand that the student will not be naming our organization and staff names in the doctoral project report that is published in Proquest.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,

Walden University policy on electronic signatures: An electronic signature is just as valid as a written signature if both parties have agreed to conduct the transaction electronically. Electronic signatures are regulated by the Uniform Electronic Transactions Act. Electronic signatures are only valid when the signer is either (a) the sender of the email, or (b) copied on the email containing the signed document. Legally an "electronic signature" can be the person's typed name, their email address, or any other identifying marker. Walden University staff verifies any electronic signatures that do not originate from a password-protected source (i.e., an email address officially on file with Walden).