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Chhatrapati Shahu Institute of Business Education & Research (CSIBER)
(An Autonomous Institute)
University Road, Kolhapur - 416004, Maharashtra State, India.
website : www.siberindia.edu.in
E-mail : editorsajmr@siberindia.edu.in

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E-mail : editorsajmr@siberindia.edu.in

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C O N T E N T S

The Status of Inter-Sectorial Physical Infrastructural Integration in Selected Sectors in Addis Ababa City, Ethiopia

Misiker Negash Bitew

Ethiopian Civil Service University, College of Finance, Management and Development, Ethiopia

Admassu Tesso Huluka

Associate Professor in Ethiopian Civil Service University, College of Finance, Management and Development, Ethiopia

Abstract

The inter-sectorial integration and provision of physical infrastructure and associated services has been affected by a lack of organized collaboration on multiple fronts, including, planning, implementation, and evaluation in the sectors of Addis Ababa city such as electric, road, telecom, and water sectors. The objective of this chapter is to investigate the status of inter-sectorial integration of these sectors at the planning, implementation, and evaluation stages in Addis Ababa City. To fulfill the stated objective this study has used a qualitative research approach.Finally, challenges in infrastructural integration in Addis Ababa during the planning, designing, implementation, and evaluation phases have been identified. Our result shows those different sectors and their departments responsible for various aspects of infrastructure often operate independently, leading to fragmented planning and implementation processes. We also found poor coordination between sectors often results in infrastructure projects being planned in isolation, without considering the interconnectedness of different systems or future needs; budget constraints and competing priorities hindering the implementation of comprehensive infrastructure projects that require collaboration across sectors; sectorial capacity limitation in terms of lack of technical expertise or resources to effectively plan and implement infrastructure projects, leading to delays and inefficiencies; complex bureaucratic procedures and overlapping jurisdiction among different sectors creating obstacles to integrated infrastructure development; insufficient involvement of community members and relevant stakeholders in the planning and evaluation phases resulting in infrastructure projects that do not adequately address local needs or concerns. Thus, addressing those challenges requires concerted efforts to improve coordination among government sectors, enhance institutional capacity, allocate adequate resources, streamline regulatory processes, and promote community engagement in the planning and evaluation of infrastructure projects.

Keywords: Inter-sectorial Coordination, Planning, Designing, Implementing, Evaluating.

Background of the Research

Urban physical infrastructures play a crucial role in facilitating the effective delivery of goods and services, thereby promoting prosperity, and growth, and contributing to an enhanced quality of life (Yilema, 2019). Furthermore, a growing consensus suggests that various forms of infrastructure integration have the potential to make networks smarter, more cost-effective, and environmentally friendly (Esubalew, 2017; McLean, 2017). Despite the widespread acknowledgment that integrated infrastructure thinking can enhance system efficiency and bring societal benefits, the processes of planning, decision-making, and policy assessment persist in separate and unconnected institutional entities.

Networked physical infrastructure systems, including telecommunications, energy, transportation, water, and waste management, are essential for modern society. They support non-networked social infrastructure, such as health, education, and community centers. Strong physical infrastructure boosts sustainability, economic growth, local business competitiveness, investment climate, worker productivity, and city attraction (Timilsina et al., 2021).

Scholars characterize infrastructure integration as the collaborative efforts of institutions involved in infrastructure planning, construction, maintenance, and rehabilitation. The concept is outlined through five distinct forms found by these scholars: organizational integration, technological integration, sectorial integration, geographic integration, and social integration. It's essential to note that these domains are not mutually exclusive; they exhibit overlap, mutual influence, and integration can manifest in ways beyond the specific definitions provided (Bobylev & Jefferson, 2014; Esubalew et al., 2017; McLean, 2017; Sánchez et al., 2013).

In this study, particular emphasis will be placed on the two significant infrastructure integrations widely employed: organizational and sectorial integration within the realm of physical infrastructure. There is a consensus that extending access to infrastructure services, such as electricity, road, telecom, and water, directly benefits individuals, families, and businesses. This expansion helps reduce costs and enhance the quality of health and education services, contributing to human development at both local and national levels (Amin, 2014).

Developed nations show stronger organizational, sectorial, institutional, geographical, and technical integration compared to developing countries. Despite concerted efforts, the average state of infrastructure and its integration in Sub-Saharan Africa stays below the desired standards, posing challenges to sustainable development and hindering the region's ability to meet the growing needs of its population. Some literatures indicated that the critical challenge happening in the cities of developing countries like in Ethiopia is demolition of one physical infrastructure by the other due tonon existence or poor integration.

In Addis Ababa City, electricity interruptions are commonly associated with road construction sites. Moreover, it is clear in the study area that pedestrian roads are often dismantled to accommodate the installation of electricity, water, sewerage, or telecom infrastructures. The research student assumes that the absence of an integrated plan and implementation for service infrastructure poses potential challenges to sustainable development. Overall this study aims to examine the level of inter-sectorial integration of physical infrastructure at the planning, implementation, and evaluation stages across the four sectors (electric, road, telecom, and water sectors) in Addis Ababa City

Theoretical Literature Review of the Study

Concepts

Different scholars like (Alemayehu, 2015; Amin, 2014; Arts et al., 2016; McLean, 2017; Mukwaya & Mold, 2018; Rode, Terrefe, et al., 2020)stated that inter-sectorial integration involves the cooperative efforts of institutions responsible for providing infrastructure in the planning, construction, maintenance, and rehabilitation phases. McLean, 2017; identified five forms of infrastructure integration: organizational, technical, sectorial, geographic, and social. These domains are interconnected and can influence each other, with integration manifesting in ways beyond the scope of these defined categories. The subsequent elucidation details these forms of infrastructure integration. This study gives more emphasis to sectorial, integration

The research on sectorial integration advocates for collaboration not only across infrastructure sectors (such as energy, road, telecommunications, and water) but also within specific sectors. In various sectors, advancements in technology facilitate increased decentralization, leading to extensive technological system transformations and a shift away from top-down governance toward bottom-up service provision. This shift is exemplified by the proliferation of distributed generation technologies, allowing individuals to generate and utilize their own energy. However, integrating these newly emerged small and isolated entities into broader networks may pose challenges. Modern national electricity grids, for instance, were not initially designed to handle the bidirectional energy flows associated with distributed generation (Alemayehu, 2015; Mukwaya & Mold, 2018).

The second type of integration involves horizontal collaboration potential across infrastructure sectors. An example is the growing body of research examining the intersections of energy, water, and food. This research aims to conceptualize interactions across these domains as a 'nexus' of interdependencies, tensions, and trade-offs. Nexus studies view infrastructures as highly interdependent sectors, acknowledging that resources are interconnected in a complex web of relationships where resource usage and availability are mutually exclusive (Rode, Terrefe, et al., 2020a; Woldesenbet, 2020)

Relevant Theories

This study investigates into the exploration of how the amalgamation of systems integration theory, stakeholder theory, network theory, and institutional theory, can furnish a comprehensive understanding of the practices and challenges related to infrastructure integration.

System integration theory emphasizes the importance of understanding the entire system, including its parts and how they work together. In the case of infrastructure integration in Addis Ababa, the system can be viewed as a complex network of interdependent systems that must be coordinated and integrated to achieve optimal performance (Alemayehu, 2015; Rajabalinejad et al., 2020; Siemiatycki, 2016)

Stakeholder theory can be used to analyze the interests and perspectives of different stakeholders in infrastructure integration, including government agencies, private companies, and communities. Stakeholder theory emphasizes the importance of engaging with all stakeholders and understanding their needs and expectations. This theory can be used to identify the challenges of stakeholder coordination in infrastructure integration in Addis Ababa.

Network theory emphasizes the importance of understanding the structure and dynamics of networks, including the relationships between nodes and how they influence each other (Bogale, 2005; Rode, Terrefe, et al., 2020a). In the context of infrastructure integration, understanding the relationships between government agencies, private companies, and communities, and how they influence infrastructure development and management.

Institutional Theory offers insights into the role of institutional arrangements and norms in shaping infrastructure integration processes. The researcher use this theory to interpret findings regarding the influence of regulations, policies, and organizational cultures on integration initiatives, as well as to understand how institutional factors facilitate or impede progress.

Empirical Review of the Literature

The study by Mulugeta (2011) assesses both intra and inter-sectorial integration of urban service planning in Addis Ababa's inner city, focusing on four institutions and related departments. With sixty-eight randomly selected respondents, the study reveals a perceived poor status of integration, though some rate intra-level integration as medium. Identified factors include institutional arrangement issues, lack of a strong controlling body, governance challenges, financial constraints, property issuance problems, and frequent plan changes. The limited efforts by utility providers and the road authority, along with regulatory oversight, contribute to the overall low integration. The study emphasizes the neglected importance of integration in both academic discourse and practical considerations, recommending measures like adopting multiple trenchless technologies, utility registration, improved institutional arrangements, and private sector involvement, with further investigations into policy issues and the impact of the city grand plan on utilities and roads.

Integrated Physical Infrastructure Implementation in Addis Ababa

Feyisa(2019)proposed the use of Design-Build (DB) and Design-Bid-Build (DBB) methodologies for the systematic and step-by-step planning and implementation of service-providing sectors. His research primarily addresses cooperation problems, particularly focusing on intra-organizational challenges. While the findings of his research undoubtedly contribute to its timeliness and significance, it is evident that the approach adopted in this research, involving the assessment of the experiences of four leading public sector organizations, is novel and pioneering. Consequently, the research's findings are expected to offer fresh insights into the literature on Public Management in Ethiopia and bureaucratic culture, specifically through the evaluation of the concept and practice of coordinated project management.

Research Gaps

Generally, this study is prompted by a notable gap in the existing literature regarding the integration of physical infrastructure, spanning literature, policy, institutional, and methodological aspects. Despite several studies touching upon specific facets of this complex issue, a comprehensive empirical review exploring its various dimensions is lacking. Particularly in Addis Ababa City, a coherent physical infrastructure integration policy is visibly absent, leading to infrastructure vulnerability and frequent demolitions. The significance of this research lies in its potential to address these multifaceted gaps, contributing to a more holistic understanding of integrated physical infrastructure and informing effective policy decisions.

Research Design and Methods

Research Paradigm

Paradigms represent the researchers' beliefs and values about the world, the way they define the world, and the way they work within the world. Regarding research, the researcher's thoughts and beliefs about any issues explored would subsequently guide their actions. In other words, the paradigm adopted directs the researcher's investigation which includes data collection and analysis procedures. Paradigm therefore has important "implications for every decision made in the research process" (Kivunja & Kuyini, 2017).

In pursuit of addressing the study objectives of exploring inter-sectorial integration for physical infrastructure provision, the choice of research philosophy becomes pivotal. While various research philosophies such as

positivism, pragmatism, and constructionism are commonly employed based on researchers' objectives, the most suitable philosophy for this qualitative study found pertinent is constructivism. What makes these three paradigms different? And why the researcher preferred constructionist paradigm?

The constructivism paradigm states the realities are multiple (Lincoln & Guba, 1989). The ultimate truth has been regarded as not existing and reality is subjective and changing (Abdullah Kamal, 2019). Proponents of constructivism also believe that "entities exist only in the minds of the persons contemplating them" (Abdullah Kamal, 2019). According to Creswell (2014), constructivism deals with the development of subjective meanings and understandings of one's personal experiences concerning specific topics based on their social and historical background. Understandings about the world are constructed and interpreted by people (Crotty et al., 2020).

Unlike realists who advocate for specific methodologies, constructivism aligns with the qualitative nature of research, emphasizing the active role of individuals in constructing knowledge. In this context, the constructivism philosophy is deemed appropriate for unscrambling the complexities of inter-sectorial integration within the study of physical infrastructure provision sectorial integration.

Constructivism in research is a philosophy that asserts that knowledge is actively built by individuals rather than being an objective reality(Alemayehu, 2015). This approach highlights the subjective nature of reality, emphasizing that people construct their understanding based on subjective experiences and interactions within specific social and cultural contexts. In constructivist research, there is an acknowledgment of multiple perspectives and the importance of considering diverse viewpoints. The Philosophy underscores the active role of individuals in knowledge construction, the influence of social and cultural factors, and the significance of context. Constructivist researchers often use inductive reasoning and flexible methods, recognizing that understanding evolves through ongoing interactions and dialogue. Overall, constructivism in research rejects a one-size-fits-all approach to knowledge and encourages an exploration of the dynamic and varied ways in which individuals interpret and make sense of their experiences.

The qualitative approach is advantageous as it concentrates on the contexts in which individuals reside and work, allowing for a profound understanding and exploration of the beliefs, values, and motivations that underpin everyone's behavior.

Research Design.

In determining the research design, a predominant emphasis was placed on the exploratory approach, complemented to some extent by a descriptive one. Hence, to effectively address the study's objectives, an exploratory and descriptive research design was employed. This hybrid design aims to offer a detailed and accurate depiction of the phenomenon under investigation, focusing on its characteristics, behaviors, and attributes(Omona, 2013). Specifically tailored to detail the current state and prevalence of inter-sectorial integration within specified sectors, the descriptive research design also plays a crucial role in providing a comprehensive understanding of the legal and policy landscape.

Research Approach

A qualitative research approach is a methodological strategy employed in social sciences and other disciplines to investigate and understand the socioeconomic complexities human phenomena. Qualitative research is characterized by its emphasis on exploring the depth and richness of individual perspectives, contexts, and meanings, often using non-numerical data. This approach is particularly valuable when the research aims to expose subjective interpretations, cultural contexts, and the underlying meanings that individuals ascribe to their experiences. Given the research focus on investigating the scenario, challenges, institutional capacities, and legal frameworks of inter-sectorial physical infrastructure integration in Addis Ababa, this design is apt for describing the existing phenomena in these related perspectives.

Types and Sources of Data

Types of Data

The researcher employed qualitative data for analysis, utilizing various tools such as Key Informant Interviews (KII), Focus Group Discussions (FGD), and extended field observation.

Sources of Data

To fulfill the stipulated research objectives, the researcher employed a combination of primary and secondary data sources. The primary data were gathered through Key Informant Interviews (KII) involving participants

deliberately chosen from case institutions and other pertinent sectors. These included entities such as the Addis Ababa Electric Utility, Addis Ababa Road Authority, Ethiopian Telecommunication, Addis Ababa Water and Sewerage Authority, Addis Ababa District Integrated Infrastructure Construction Work Permit and Controlling Authority, and Addis Ababa Plan Commission, as well as end users within Addis Ababa.

Sample Design

Population and Sampling Frame

The target population for this research consisted of senior experts, division leaders, and directors from the infrastructure-providing institutions. These individuals were selected as key informants, assuming they possessed an elevated level of knowledge related to the study's focus. Their extensive experience in each study sector provided valuable insights into the issue under examination, including comprehensive information about the sectorial integration bylaws and frameworks.

Sample Size Determination

This research conducted a total of 32 Key Informant Interviews (KIIs), although the original plan was to conduct sixty interviews. It was because the data was saturated at 32 KIIs, with the following distribution per institution. The researcher initially began the Key Informant Interviews (KIIs) by conducting interviews with participants from Addis Ababa Electric Utility and Electric Power. Subsequently, the interviews extended to Addis Ababa Road Authority, Ethio Telecom, and Addis Ababa Water Sewerage Authority in a sequential manner as listed. The second phase of interviews revisited these sectors, maintaining the same order. This systematic approach was consistently applied by the researcher, leading to a saturation point in the data collection process.

In addition, three Focus Group Discussion (FGD) sessions were conducted, involving a total of thirty-one participants from various groups (forum) community committee members, electric, water, and road workers, and traffic management volunteers. Notably, the telecom sector lacked a customer representative. These sessions were aimed at eliciting their experiences concerning infrastructure provision scenarios and instances of one institution demolishing the infrastructure of another

Data Collection Instruments

The researcher employed diverse data collection instruments to ensure triangulation and enhance the research's reliability and validity. These instruments included Key Informant Interviews (KII), Focus Group Discussions (FGD), and desk review.

The observation method is used to generate data. It is indeed a method of generating data rather than an instrument itself. In the context of this research, observation can take various forms such as direct observation of infrastructure sites, participant observation during stakeholder meetings or community events, or systematic observation of behaviors and interactions related to infrastructure integration processes. These observations provide valuable contextual information, identify patterns, and validate findings obtained through other data collection methods, enhancing the overall rigor and validity of the research.

Methods of Qualitative Data Analysis

The data analysis process in this study involved a comprehensive qualitative approach, primarily utilizing key informant interviews (KII), focus group discussions (FGD), and observation methods. The chosen analytical methods are thematic analysis and content analysis.

Thematic Analysis, a qualitative research method, is applied to identify and interpret recurring themes or patterns within the collected data. This approach is flexible, allowing for openness to emergent themes during analysis(Creswell, 2014). Thematic Analysis is particularly relevant for exploring the complexities and nuances inherent in the integration of urban physical infrastructure in Addis Ababa City, as it is commonly employed in social sciences.

Content Analysis, another method used in this study, systematically categorizes and quantifies specific elements within the data(Creswell, 2014). It is applied to both qualitative and quantitative research, providing a more structured approach compared to Thematic Analysis. While Thematic Analysis captures the depth of

qualitative insights, Content Analysis ensures a systematic examination of data, especially relevant when exploring legal and policy frameworks.
Therefore, an inductive approach was employed to identify and derive new concepts directly from the data. This allowed for the exploration of emergent themes and novel insights that may not have been anticipated beforehand.

Results and Discussion

The objective of this study is to assess the extent of inter-sectorial integration concerning physical infrastructure within Addis Ababa City, focusing on planning, implementation, and evaluation stages across four sectors. Relevant theories which support this objective among others are: systems integration theory and network theory(Singletary et al., 2003). The first theory posits that urban infrastructure should be viewed as an interconnected system, where the effectiveness of one sector is dependent on the functionality of others. Research applying this theory emphasizes the importance of coordinated planning and implementation across sectors to achieve overall urban development goals(Espada et al., 2015).In this regard, successful planning, execution, and assessment of infrastructure projects necessitate seamless collaboration among the transportation, telecom, water supply, and energy sectors.

In the context of urban infrastructure, network theory, the significance of relationships and interactions among different actors is involved in planning and implementation. Research based on this theory may explore the role of various stakeholders, such as government agencies, private sector entities, and community organizations, in promoting or hindering integration efforts(Espada et al., 2015; Singletary et al., 2003).

When we look into theoretical frameworks and empirical findings to the context of Addis Ababa City, research by Bannazadeh et al. (2011)specifically focused on infrastructure development in Addis Ababa City, reveals that projects characterized by comprehensive inter-sectorial planning and collaboration exhibited higher levels of success and resilience to challenges such as rapid urbanization and resource constraints. This empirical study highlights the relevance of inter-sectorial integration in the specific context of Addis Ababa City.

Even though there are various internal and external challenges particularly in management sides, the integrated infrastructure developments in local areas such as the cobblestoned road expansions supported by road side lights have brought about positive economic, social and environmental changes(Kumar & Meshram, 2022).

This study explains that level of inter-sectorial integration in physical infrastructure focusingon its stages. At the planning stage, stakeholders can evaluate the extent to which different sectors contribute to infrastructure development plans and whether there is sufficient coordination among them. During implementation, close collaboration between sectors is essential to ensure that projects are executed efficiently and in line with established plans. Finally, evaluation allows for the assessment of how well different sectors worked together to achieve the desired outcomes and identify areas for improvement(Guidotti et al., 2019).

There is a framework document prepared in 2020 by the Federal Infrastructure Integration and Development Agency of Ethiopia stating how infrastructure-providing institutions work in coordination from the planning to the implementation stage. They should plan in adherence and alignment with the broader strategic framework prepared by the coordination of the institutions. The thorough coordination between these entities guarantees the all-in-one integration of their infrastructure entities into the comprehensive plan, emphasizing a synergistic approach. As executive bodies craft their infrastructure plans, the foundational blueprint consistently focuses on the intricate details of the road infrastructure, fostering a cohesive and harmonized development strategy. This strategic alignment optimizes resource utilization and strengthens the sustainable growth and resilience of the overall infrastructure network (FIIDCA Ethiopia, 2020).

According to the framework document, infrastructure-providing institutions should take the road network as a framework for their infrastructure provisions. In support of this, road networks act as the framework for the installation of utility service infrastructures like water and electricity lines. They should plan various infrastructure provisions in advance with the consultancy of the road authority and should get approval from Addis Ababa City Infrastructure Coordination and Construction Permit. Unless the physical infrastructure institutions get a go-ahead confirmation, they cannot implement their provision independently. Moreover, they should formally communicate with the road authority if their infrastructure development has damage to the road infrastructures.

It is shown that in Addis Ababa institutions involved in infrastructure provision has a history of independent operations in development. This situation is exposed by scholars who assert that the city's infrastructure development has primarily occurred without comprehensive collaboration among institutions, resulting in the demolition of developments (Rode, Terrefe, et al., 2020a; UN Ohrlls, 2015; Yalew & Changgang, 2020).Consequently, instances of one institution causing damage to another's infrastructure is frequent, resulting in unnecessary economic losses for maintenance and reconstruction. The absence of implementation with a legal framework exacerbated the issue, leaving no clear mandate to hold any institution responsible and accountable for such losses.

In the following, scenario of infrastructure integration among the case sectors concurrent discussion of the results takes place at various stages, from planning to evaluation.

The complex challenges persist in managing infrastructure planning at the national level, primarily stemming from limited coordination abilities across comprehensive project aspects such as planning, financing, and preparedness (FIIDCA Ethiopia, 2020; Jayasinghe et al., 2023a).

However, in practice, some of them like the road sector might not consult with others in new road development or maintaining degraded ones, which causes infrastructure damage in other sectors. Three distinctive stages have been delineated for these institutions' planning of autonomous infrastructures. In support of the KII, the Federal Integrated Infrastructure Development Coordinating Agency manual developed in 2014 put how the infrastructure-providing institutions come to a point and integrate from the planning to implementation stages (Ethiopian House Federation, 2014).

The infrastructure integration manual crafted by Federal Integrated Infrastructure Development Coordinating Agency of Ethiopia (Ethiopian House Federation, 2014), the infrastructure integration framework in (AAIICWPCA), requires that during the final design phase, a better design has been developed.

When dealing with an operational road or rail, the preparation of a sufficient corridor for utility lines must align with the coordination standards and guidelines issued by the Federal Integrated Infrastructure Coordinating Agency and adopted by Addis Ababa City Infrastructure Coordination and Construction Permit Authority (Assefa et al., 2018; EiABC, 2016; Seife, 2019).

The researches on this matter clarifies that road networks serve as crucial frameworks, acting as reference points for other utility service providers in devising their own utility line plans (Ayalneh, 2012; Grogan & De Weck, 2013).Furthermore, these entities bear the responsibility of ensuring that their infrastructures consider the future road projects during their operations. Prompt communication of information related to agreements and subsequent field reports is essential and should be directed to the Federal Integrated Infrastructure Coordinating Agency.

The coordination process involves various essential stages (Deen-Swarray et al., 2014; Ethiopian House Federation, 2014; Ine, 2017; Thorpe, 1998). Initially, the authority lays the groundwork by preparing the Basic Planning Framework and defining the scope, establishing the foundation for a comprehensive planning framework.

The effective prioritization during the planning phase (Ethiopian House Federation, 2014). Additionally, it takes the lead in formulating guidelines and regulations crucial for the seamless implementation of the infrastructure plan.

The case Sectors' show promoting towards an integrated infrastructure system and coordination (Yilema, 2019). Collaboratively, infrastructure institutions develop and approve their plans in conjunction with the Federal Integrated Infrastructure Coordinating Agency, aligning projects accordingly (Ethiopian House Federation, 2014).

The research indicates that the integration of infrastructure providing institutions for coordinated infrastructure provision contributes to environmentally friendly physical infrastructure, achieving lower costs and optimal quality. This, in turn, plays a vital role in fostering sustainable development in urban areas(Ansell & Gash, 2007; Arts et al., 2016; Rode, Terrefe, et al., 2020a).

This chapter delves into the dynamics of urban infrastructures in Addis Ababa, focusing on the integration of institutions responsible for planning and implementing key elements such as roads, electricity, water, and telecom services. Employing a mix of Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), and observations, the analysis explores inter- sectorial integration.

Drawing from municipal government bodies in Addis Ababa, including the Road, Electric Utility, Ethio telecom, and Water and Sewerage authorities, data collection involved KIIs with officials, experts, and insights from community representatives. The subsequent discussion encompasses a thorough examination of integration across different sectors, utilizing KIIs, FGDs, and observational data.
The institutional integration for infrastructure provision is a focal point, highlighting the establishment of clear frameworks and coordination mechanisms. Mandated to align plans with the road network, infrastructure institutions ensure cohesive and harmonized development. The significance of formal communication and collaboration, particularly concerning infrastructure development affecting road infrastructure, is underscored.

The integration theme extends across various stages of infrastructure development, emphasizing planning, designing, and construction. A legal framework established in 2012 addresses independent operations and potential damage, while the Integrated Urban Infrastructure Strategy adopted in 2016 facilitates integrated planning.

Exploring the role of stakeholders, the focus shifts to the responsibilities of the Federal Integrated Infrastructure Coordination Agency in preparing national plans, providing support, and evaluating work programs. Collaborative efforts with infrastructure institutions and stakeholders are detailed, outlining specific strategies applied at various stages of planning, designing, and construction.

In conclusion, the chapter emphasizes the continuous need for institutional capacity development to manage long-term, medium-term, and short-term planning effectively. The collaborative nature of infrastructure development, including stakeholder involvement and efficient coordination, remains crucial. The ongoing efforts by the Federal Integrated Infrastructure Coordination Agency and infrastructure institutions contribute to shaping a cohesive and integrated urban infrastructure system in Addis Ababa.

It is believed that after implementation stage monitoring and evaluation should be performed in an integrated manner. Delving into the performance evaluation of AAWSA sector, interviews with leaders, professionals, and community representatives provide intricate insights about physical infrastructure institutions. As the respondents reflected, in the initial stages of the fiscal year, each institution diligently submits its plans to the city's infrastructure coordinator and supervisory authority. However, the implementation phase reveals a significant challenge marked by a lack of comprehensive planning and coordinated efforts. This deficiency results in substantial damage to the extensive infrastructure assets, whether situated above or below ground, accumulated over the years. In support of this, studies show that infrastructure damage due to poor implementation is rooted from the poor coordination of the institutions responsible for implementation during planning and design stages (Espada et al., 2015; Proag, 2020).

Compounding of the issue is due to the fact that the absence of a robust accountability system to systematically address these challenges (Seife 2019). The interviews highlight a prevailing practice among respondents, wherein clear and detailed performance evaluations are not conducted on a quarterly, semi-annual, or fiscal year summary basis. Furthermore, there is a noticeable scarcity of standardized criteria for conducting these evaluations.

The matter of monitoring and evaluation should be necessary after development stages. However, the emphasis given by AAIICWPCA and the physical infrastructure instructions under it is said to be extremely poor. Let us see points reported from three sectors: AAIICWPCA, EEP and Ethio Telecom:
With the milieu of physical infrastructure integration, Addis Ababa Integrated Infrastructure Construction Work Permit and Controlling Authority (AAIICWPCA) had been posed about the status of performance evaluation. Emphasizing prevention through research and planning, AAIICWPCA reports that its focus is on minimizing the chances of damage occurrence. As it said, "As a government institution, we constantly evaluate and propose changes within our authority, recognizing the need for legal frameworks to enhance accountability and responsibility. While challenges beyond our control exist, our top management is trusted in infrastructure provision. Fast and close monitoring ensures timely corrections, and decisions are evaluated and implemented efficiently".

As per AAIICWPCA, coordination is central to its efforts, with a focus on identifying key infrastructure providers and aligning their plans with the city's master plan. Standards for construction prevent instances where one entity constructs infrastructure only to face dismantling by another. The process involves a thorough evaluation, granting construction permits only when plans align. Technical committees monitor progress to address issues and ensure swift adherence to standards.

As observations had been undertaken, and the searches of evaluation and monitoring efforts from monthly and annual reports considered, the fact is behind the above points. This is to say the evaluation and monitoring practice is almost zero.

Ethiopian Electric Power also emphasizes paramount importance physical infrastructure coordination in Addis Ababa City Administration. It evaluated that the lack of coordination among physical infrastructure service providing institutions has led to power cuts and other issues, causing dissatisfaction in the community. One of the respondents in EEP highlights that "The fundamental problem is the lack of coordination between EEP and other sectors, resulting in inefficiencies and interruptions in service".

As observations have been undertaken, and the searches from monthly and annual reports, evaluation and monitoring efforts are not documented. This shows that the EEP has no kind of KPIs used for evaluating and monitoring the coordination status of physical infrastructure service providing institutions.

Ethio Telecom's report about monitoring and evaluation of coordinated performances among physical infrastructure service providing institutions does not show the prominent emphasis given by the sector. It reports what is not happening on the ground "Over the past 2 to 3 years, the four institutions responsible for water, road, telecommunications, and electricity services have made efforts to coordinate construction works in the city. They develop plans, create a mutual understanding, and evaluate performance quarterly. Emphasis is placed on turning plans into actionable work and obtaining necessary permits before initiating construction to ensure effective coordination".

The observations undertaken confirm that there is no evidence showing the monitoring and evaluation efforts using standardized KPIs. And the above reported quarterly M&E efforts are not documented as well.
The investigation uncovers the establishment of an authority office for coordination, yet evidence indicating coordinated performance across the mentioned sectors is conspicuously absent. Each institution has no key performance indicators showing each stage of planning, design, implementation, and evaluation. In summary, the research reveals a pervasive gap in the performance assessment landscape across these critical sectors, emphasizing the need for a more comprehensive and standardized approach to evaluation and coordination.

Conclusions and Recommendations

The findings of this study underscore the critical need for enhanced inter-sectorial collaboration and integration in the planning, implementation, and evaluation of infrastructure projects within Addis Ababa city. Across electric, road, telecom, and water sectors, a lack of organized collaboration has been identified as a significant obstacle to efficient infrastructure development. Fragmented planning processes, inadequate coordination between sectors, budget constraints, and capacity limitations have resulted in disjointed infrastructure initiatives that fail to address the interconnectedness of urban systems or adequately meet the needs of local communities. Furthermore, bureaucratic hurdles and insufficient stakeholder engagement have compounded these challenges, exacerbating the socio-economic, environmental, and political impacts of inadequate infrastructure integration.

Addressing these challenges requires a comprehensive approach that prioritizes improved coordination among government sectors, bolstering institutional capacity, allocating sufficient resources, streamlining regulatory procedures, and fostering community involvement in infrastructure planning and evaluation processes. By overcoming these barriers and fostering greater collaboration, Addis Ababa can enhance the effectiveness and sustainability of its infrastructure development efforts, thereby promoting inclusive growth, environmental stewardship, and socio-economic well-being across thecity.

Future Research Direction
Addis Ababa, Ethiopia's capital is facing disintegrated infrastructure due to inadequate coordination among institutions. The study does not fully address economic, social, environmental, and political impacts that can be generated by the lack infrastructure integration. Therefore, further research is needed to address these issues.

Reference:

AAWSA. (2021). Addis Ababa Water & Sewerage Authority Ten years Strategic Plan: 2013-2022 E.C.

Abdullah Kamal, S. S. L. B. (2019). Research Paradigm and the Philosophical Foundations of A Qualitative Study. People: International Journal of Social Sciences, 4. pp. 386–1394. https://doi.org/10.20319/pijss.2019.43.13861394

Alemayehu, M. (2015). Causes of Project Implementation Delay in the Ethiopian Electric Utility Enterprise: The Case of Construction Projects in Universal Electric Access Program. Teaching and Teacher Education, 12 pp. 1–17. https://www.ajol.info/index.php/jbas/article/view/169072

Amin, M. (2000). National Infrastructures as Complex Interactive Networks. Automation, Control, and Complexity: An Integrated Approach, October 1997, pp. 263–286.

Ansell, C., & Gash, A. (2007). Integration of physical infrastructure and social systems in communities' reliability and resilience analysis. J Public Adm Res Theor, 18, pp. 543–571. https://doi.org/10.1093/jopart/mum032

Arts, J., Hanekamp, T., Linssen, R., & Snippe, J. (2016). Benchmarking Integrated Infrastructure Planning Across Europe - Moving Forward to Vital Infrastructure Networks and Urban Regions. Transportation Research Procedia, 14, pp. 303–312. https://doi.org/10.1016/j.trpro.2016.05.024

Assefa, S. H. and T. (2020). Addis Ababa GHG Emissions Inventory Report for 2016 GHG Inventory Addis Ababa City 2016 Greenhouse Gas Emissions Inventory Report.

Assefa, Y. T., Babel, M. S., Sušnik, J., & Shinde, V. R. (2018). Development of a generic domesticwater security index, and its application in Addis Ababa, Ethiopia. Water (Switzerland), 11(1). https://doi.org/10.3390/w11010037

Ayalneh. (2012). Evaluating Transport Network Structure: Case Study in Addis Ababa, Ethiopia.

Bannazadeh, H., Leon-Garcia, A., Redmond, K., Tam, G., Khan, A., Ma, M., Dani, S., & Chow, P. (2011). Virtualized application networking infrastructure. Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST, 46, pp. 363–382. https://doi.org/10.1007/978-3-642-17851-1_29

Bobylev, N., & Jefferson, I. F. (2014). Integration of Urban Physical Infrastructure Into Land Use. Annual World Bank Conference on Land and Poverty, March, pp. 3–6. https://doi.org/10.13140/2.1.1563.3603

C40 Cities Climate Leadership Group, I. (2023). At the Africa Climate Summit, city leaders call for action and investment on climate and green jobs - C40 Cities. pp. 31–55. https://doi.org/10.4324/9781003115403-4

Charman, T., Baron-Cohen, S., Swettenham, J., Baird, G., Cox, A., & Drew, A. (2000). Testing joint attention, imitation, and play as infancy precursors to language and theory of mind. Cognitive Development, 15(4), pp. 481–498. https://doi.org/10.1016/S0885-2014(01)00037-5

Creswell, J. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches | Enhanced Reader. SAGE Publications.

Creswell, J. W., & Plano Clark, V. L. (2011). 2nd edition designing and conducting mixed methods research vickil. Plano clahk llsimsitf atMmMmak <g)SAGE.

Crotty, M., Shakespeare, W., & Henry, V. (2020). THE FOUNDATIONS OF SOCIAL RESEARCH: Meaning and perspective in the research process. In THE FOUNDATIONS OF SOCIAL RESEARCH: Meaning and perspective in the research process. SAGE Publications Ltd. https://doi.org/10.4324/9781003115700

Deen-Swarray, M., Adekunle, B., & Odularu, G. (2014). Policy recipe for fostering regional integration through infrastructure development and coordination in West Africa. In Regional Economic Integration in West Africa, pp. 29–56. Springer International Publishing. https://doi.org/10.1007/978-3-319-01282-7_2

EiABC. (2016). Integrated and Coordinated Physical and Transport Infrastructure Planning and Development in Addis Ababa for Safe and Efficient Mobility.

Espada, R. J., Apan, A., & McDougall, K. (2015). Vulnerability assessment and interdependency analysis of critical infrastructures for climate adaptation and flood mitigation. International Journal of Disaster Resilience in the Built Environment, 6(3), pp. 313–346. https://doi.org/10.1108/IJDRBE-02-2014-0019

Esubalew, S. B. (2017). Assessment of Horizontal and Vertical Integration among Stakeholders in the Sustainability of Infrastructure Projects in Addis Ababa City. Management, 2017(1), pp. 52–73. https://doi.org/10.5923/j.mm.20170701.08

Esubalew, S. B., Gebremeskel, H. G., & Gebremedhin Gebremeskel, H. (2017). Assessment of Horizontal and Vertical Integration among Stakeholders in the Sustainability of Infrastructure Projects in Addis Ababa City. Management, 2017(1), pp. 52–73. https://doi.org/10.5923/j.mm.20170701.08

Ethio Telecom. (2018). Ethio Telecom. In Telecom, Ethio. http://www.ethiotelecom.et/

Ethiopian House Federation. (2014). Federal Integrated Infrastructure Development Coordinating Agency (Vol. 69, Issue l).

FDRE. (2021). Ten Years Development Plan: A Pathway to Prosperity 2021 to 2030 (Vol. 2, Issue ten years development plan.).

Feyisa, S. A. (2019). Development of integrated infrastructure (utility line) Construction on urban roads, the case of bole sub-city.

FIIDCA Ethiopia. (2020). Framework for integrated planning and implementation of infrastructure (Issue September).

Grogan, P. T., & De Weck, O. L. (2013). An integrated modeling framework for infrastructure system-of-systems simulation. SysCon 2013 - 7th Annual IEEE International Systems Conference, Proceedings, pp. 483–490. https://doi.org/10.1109/SYSCON.2013.6549926

Guidotti, R., Gardoni, P., & Rosenheim, N. (2019). Integration of physical infrastructure and social systems in communities' reliability and resilience analysis. Reliability Engineering and System Safety, 185, pp. 476–492. https://doi.org/10.1016/j.ress.2019.01.008

Ine. (2017). Integrated infrastructure systems : strategic planning practice and problem structuring support. April, 1–301.

Jayasinghe, P. A., Derrible, S., & Kattan, L. (2023). Interdependencies between Urban Transport, Water, and Solid Waste Infrastructure Systems. In Infrastructures (Vol. 8, Issue 4, pp. 76). Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/infrastructures8040076

Kivunja, C., & Kuyini, A. B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. International Journal of Higher Education, 6(5), 26. https://doi.org/10.5430/ijhe.v6n5p26

Kumar, A., & Meshram, D. S. (2022). Future of cities: Planning, infrastructure, and development. In Future of Cities: Planning, Infrastructure, and Development. Routledge. https://doi.org/10.4324/9781003296218

Lincoln, Y. S., & Guba, E. G. (1989). Ethics: The Failure of Positivist Science. The Review of Higher Education, 12(3), pp. 221–240. https://doi.org/10.1353/rhe.1989.0017

McLean, A. (2017). Defining infrastructure integration: Abstract aspirations and institutional variations. People, Place and Policy Online, 11(1), 15–36. https://doi.org/10.3351/ppp.2017.5848622524

Mukwaya, R., & Mold, A. (2018). Modelling the economic impact of the China Belt and Road Initiative on East Africa. 21st Annual Conference on Global Economic Analysis, September, 1–15. https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=5653

Mulugeta, H. (2011). The Intra and Inter Sectorial Integration of Urban Services planning, with particular emphasis of Road, Water and Sewerage, Telecommunication and Power Supply: The case of Inner city, Addis Ababa.

Omona, J. (2013). Sampling in Qualitative Research: Improving the Quality of Research Outcomes in Higher Education. Makerere Journal of Higher Education, 4(2), pp. 169–185. https://doi.org/10.4314/majohe.v4i2.4

Proag, V. (2020). Infrastructure Planning and Management: An Integrated Approach. In Infrastructure Planning and Management: An Integrated Approach. https://doi.org/10.1007/978-3-030-48559-7

Rajabalinejad, M., van Dongen, L., & Ramtahalsing, M. (2020). Systems integration theory and fundamentals. Safety and Reliability, 39(1), pp. 83–113. https://doi.org/10.1080/09617353.2020.1712918

Rode, P., Da Cruz, N. F., & Terrefe, B. (2020). How to connect cities and transport infrastructure: Governing Infrastructure interfaces for Ethiopian Cities.

Sánchez, L., Elicegui, I., Cuesta, J., Muñoz, L., & Lanza, J. (2013). Integration of utilities infrastructures in a future internet enabled smart city framework. Sensors (Switzerland), 13(11), pp. 14438–14465. https://doi.org/10.3390/s131114438

Seife, T. (2019). Challenges in Applying Integrated Project Management System on Urban Infrastructure Projects: The Case of Addis Ababa Road Projects, Major Utilities Projects and Infrastructure Regulatory Authority. In Duke Law Journal.

Siemiatycki, M. (2016). The Theory and Practice of Infrastructure Public-Private Partnerships Revisited: The Case of the Transportation Sector. 1–23.

Singletary, L., Watson, E., Theory, T., & Singletary, L. (2003). Association for Information Systems toward a Theory of an IT Integration Infrastructure Recommended Citation toward a theory of an integration infrastructure. http://aisel.aisnet.org/amcis2003/393

Stephen Kwadwo Antwi Kasim Hamza. (2015). Qualitative and Quantitative Research Paradigms in Business Research: A Philosophical Reflection. European Journal of Business and Management, 7(3). chrome-extension://dagcmkpagjlhakfdhnbomgmjdpkdklff/enhanced-reader.html?pdf=http%3A%2F%2Fwww.hms.harvard.edu%2Fbss%2Fneuro%2Fbornlab%2Fnb204%2Fstatistics%2Fbootstrap.pdf

Thorpe, D. S. (1998). A Process for the Management of Physical Infrastructure. March. https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjN1Jeikq7MAhUEOKYKHWTADmAQFggkMAE&url=http%3A%2F%2Feprints.qut.edu.au%2F36067%2F7%2F36067_Digitsed_Thesis.pdf&usg=AFQjCNF67B5uC9Ou3vpCa7Bx1n0OoBAW6g&sig2=WnHAHJWQ

Timilsina, G., Stern, D. I., & Das, D. K. (2021). How Much Does Physical Infrastructure Contribute to Economic Growth? An Empirical Analysis. World Bank Group, Development Research Group, Development Economics. December. http://www.worldbank.org/prwp.

UN-Habitat. (2020). Unpacking the Value of Sustainable Urbanization. https://doi.org/10.18356/c41ab67e-en

UN. (2023). Transforming our world: the 2030 Agenda for Sustainable Development. In Sustainable Development Goals. https://doi.org/10.5040/9781509934058.0025

UN Ohrlls. (2015). Financing infrastructure development and regional integration for the landlocked developing countries. Third International Conference on Financing for Development, July, 1–36. http://unohrlls.org/custom-content/uploads/2013/09/Report-of-Addis-Ababa-FFD-Side-event.pdf

Woldesenbet, W. G. (2020). Analyzing multi-stakeholder collaborative governance practices in urban water projects in Addis Ababa City: procedures, priorities, and structures. Applied Water Science, 10(1), pp. 1–19. https://doi.org/10.1007/S13201-019-1137-Z/TABLES/10

Wordofa, D. D. (2012). An Assessment of Level of Service Quality and Customer Satisfaction: the case of Ethio Telecom. December. https://www.academia.edu/download/39522127/Final__72502886.pdf

Worku, H., Vaca Jones, C., Director, P., Hailu Worku, E., Beebe, E., & Editor Emily Cruz, C. Green and Blue Infrastructure in Addis Ababa A review of challenges and response strategies | Green and Blue Infrastructure 2 Report Authors Production and Design.

World Economic. (2014). Strategic Infrastructure Steps to Operate and Maintain Infrastructure Efficiently and Effectively Prepared in collaboration with The Boston Consulting Group Industry Agenda. In World Economic Forum. 2014.

World Economic Forum. (2013). The Africa Competitiveness Report. http://www3.weforum.org/docs/WEF_Africa_Competitiveness_Report_2013.pdf

Yalew, M. T., & Changgang, G. (2020). China's 'Belt and Road Initiative': Implication for Land Locked Ethiopia. Insight on Africa, 12(2), pp. 175–193. https://doi.org/10.1177/0975087819891538

Yilema, M. G. (2019). Infrastructure governance: the effects of poor sectorial- Coordination among infrastructure sectors of Addis Ababa (the case of road and light rail construction projects). Journal of Good Governance and Sustainable Development in Africa (JGGSDA), 5(1), 56–70. https://doi.org/10.36758/jggsda/v5n1.2019/05

Yilema, M. G., & Gianoli, A. (2018). Infrastructure governance: Causes for the poor sectorial coordination among infrastructure sectors of Addis Ababa. Cities, 83(June), pp. 165–172. https://doi.org/10.1016/j.cities.2018.06.01