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THE EFFECTIVENESS OF CROSS-SECTOR COORDINATION IN THE IMPLEMENTATION OF THE INTEGRATED UTILITY NETWORK POLICY OF MEDAN CITY

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ABSTRACT

The Integrated Utility Network Facility (SJUT) is a strategic urban policy to reorganize utility infrastructure, improve road-work safety, and enhance urban aesthetics. Yet, its implementation strongly depends on cross-sector coordination involving local government, state-/region-owned enterprises, telecommunication operators, and private partners. This study assesses the effectiveness of cross-sector coordination in Medan's SJUT implementation, identifies key barriers, and proposes coordination-strengthening strategies based on polycentric governance and an integrated utility GIS. A sequential explanatory mixed-methods design was used: a survey (n=100) of stakeholders and corridor users followed by in-depth interviews and policy document review. Findings indicate moderate perceived coordination effectiveness (mean 3.47; SD 0.92), with notable weaknesses in policy awareness/socialization and data-sharing mechanisms. Pearson correlation shows a very strong relationship between coordination and implementation effectiveness ($r=0.92$; $p<0.01$). Qualitative evidence highlights three critical issues: the absence of a shared utility map, sectoral ego, and unclear partnership governance (KSO), leading to delays and limited implementation scope. The study recommends establishing a permanent coordination forum, standardizing utility data, and developing an integrated utility GIS as prerequisites for holistic SJUT integration.

Introduction

General Background

The city of Medan as the largest metropolitan in North Sumatra Province with a population of 2,435,252 people faces serious problems in the arrangement of urban utility networks. Rapid population growth and economic activity have implications for increasing

the need for utility infrastructure, which if not managed in an integrated manner can cause spatial irregularities and reduce the quality of the urban environment (Central Statistics Agency of the City of Medan, 2023; Widodo, 2021).

Existing conditions show that more than 70% of the main road in Medan City is still filled with air utility networks such as telecommunication cables, PLN power grids, PDAM pipes, CCTV devices, and other supporting utilities that are installed in an uncoordinated manner. The recurring phenomenon of "digging hole and cover hole" not only disrupts the aesthetics of the city, but also leads to waste of infrastructure maintenance budgets and disruption to people's economic activities, as is common in large cities that have not implemented integrated utility systems (Hartini et al., 2023; Banin et al., 2017).

In the context of modern urban development, the orientation of development is no longer solely focused on physical growth, but also on spatial order, infrastructure sustainability, and improving the quality of life of the community. Utility infrastructure is a strategic element because it plays a direct role in supporting the economic, social, and environmental functions of the city. Therefore, the integrated arrangement of the utility network is seen as an urgent need in sustainable urban governance (Widodo, 2021; Urban Redevelopment Authority Singapore, 2022).

A classic problem faced by many cities in Indonesia is the arrangement of the utility network which is carried out sectorally and partially. Disintegration between the grid, telecommunications, clean water, and other utilities not only impacts service inefficiencies, but also increases public safety risks and lowers the competitiveness of cities. Various studies show that integrated utility network policies are an effective structural solution to overcome urban infrastructure fragmentation (Santoso, 2022; Ministry of PUPR, 2022).

In response to these problems, the central and regional governments in Indonesia are encouraging the integration of utility networks through a regulatory and collaborative approach. This approach is in line with the paradigm *of good governance* and *collaborative governance* which emphasizes the importance of the involvement of various actors across sectors, both government, state-owned enterprises, BUMDs, and the private sector, in the implementation of public services (Ostrom, 2010; Rohmawati, 2019).

However, the implementation of cross-sector policies is inseparable from institutional challenges, especially related to coordination between actors who have different authority, interests, and organizational cultures. In the public policy literature, coordination is understood as the process of aligning actions, resources, and decisions between organizational units to achieve common goals. When coordination is not effective, policies have the potential to be distorted in their implementation in the field (Widodo, 2021; Santoso, 2022).

Various studies of public administration show that failure in policy implementation is often not caused by weakness in policy substance, but by weak coordination and communication between implementing actors. This condition is even more complex when policies involve actors across sectors and across levels of government, such as in urban infrastructure policies (Ostrom, 2010; Rohmawati, 2019).

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The *collaborative governance* approach developed in response to the limitations of traditional bureaucratic models in dealing with complex public issues. This approach emphasizes the importance of shared decision-making, inter-stakeholder trust, and adaptive coordination mechanisms. Although normatively considered ideal, collaborative practices often face obstacles in the form of overlapping authority, power asymmetry, and low coordination capacity (Ostrom, 2010; Widodo, 2021).

In the context of the City of Medan, the rapid growth of the city has driven a significant increase in the need for a utility network. This condition encourages the Medan City Government to establish the Integrated Utility Network System (SJUT) policy as an instrument for structuring city infrastructure that is more integrated and sustainable. This policy is normatively regulated through Medan Mayor Regulation Number 53 of 2023 as the legal basis for the implementation of SJUT in urban areas (Medan Mayor Regulation Number 53 of 2023).

Even though it already has a clear regulatory framework, the implementation of SJUT policies in Medan City still shows various empirical problems. Initial observations and official reports of local governments indicate delays in implementation, differences in interpretation of authority between agencies, and insynchronization of schedules and work procedures between actors. This phenomenon shows that cross-sector coordination has not run optimally as expected by the policy (Medan City SDABMBK Office, 2025).

The problem of coordination is increasingly complex when it involves non-governmental actors such as SOEs, BUMDs, and the private sector that have different business orientations and work mechanisms from government bureaucracy. Without a clear and effective coordination mechanism, these differences in interests have the potential to cause friction and hinder the achievement of policy goals (Rohmawati, 2019; Santoso, 2022).

Previous studies have shown that weak cross-sector coordination is often triggered by overlapping authority, unclear division of roles, and the absence of a common information system. This condition causes implementing actors to work sectorally and partially, making it difficult for policy objectives to be achieved optimally (Widodo, 2021; Banin et al., 2017).

This study aims to: (1) measure the effectiveness of cross-sector coordination in the implementation of SJUT in Medan City; (2) identify coordination obstacles that are technical, institutional, and regulative; and (3) formulate a strategy to strengthen coordination based on polycentric governance and integrated utility GIS. The main contribution of this study is the preparation of operational coordination governance recommendations for the SJUT project involving many utility owners and authorities across levels of government, with the context of the City of Medan as a case study (Emerson et al., 2012; Ostrom, 2010).

Research Issues

The implementation of the Integrated Utility Network System (SJUT) policy in Medan City shows that there is a gap between normative planning and realization in the field. The tender process which was carried out at the end of 2023 resulted in the appointment of two

private companies as implementing partners through the Operational Cooperation (KSO) scheme, with a considerable investment value. However, the failure of the two partners in realizing the physical development of SJUT shows that there are serious problems in the governance of policy implementation, especially in the aspects of cross-sector coordination and implementation control (Medan City SDABMBK Office, 2025; Santoso, 2022).

This condition is exacerbated by the slow response of local government policies in anticipating the failure of private partners. Although a series of administrative reprimands have been carried out until the termination of cooperation, the transition process to a new partner through the Association of Telecommunication Service Providers (APJATEL) has not shown significant acceleration. Until the end of 2025, the realization of the construction of the new SJUT covers a small part of the road section targets that have been set, which indicates the weak effectiveness of coordination between implementing actors (APJATEL, 2025; Medan City SDABMBK Office, 2025).

Empirical findings in the field show that one of the main obstacles to SJUT implementation is the absence of a shared utility map that can be used by all stakeholders, including local governments, state-owned enterprises, and the private sector. The absence of an integrated information system causes the planning and implementation of utility development to be carried out partially and sectorally, thus potentially causing conflicts of authority and resource inefficiency (Widodo, 2021; Urban Redevelopment Authority Singapore, 2022).

In addition, differences in orientation and interests between actors, especially between the government bureaucracy and business actors, also complicate the coordination process. In the context of cross-sectoral policies, these differences often give rise to sectoral egos that have an impact on low collective commitment in achieving policy goals. This phenomenon is in line with the findings of various studies that state that sectoral ego is one of the dominant factors in the failure of public policy coordination at the regional level (Rohmawati, 2019; Widodo, 2021).

Based on this description, the problem of this research is focused on the effectiveness of cross-sector coordination in the implementation of SJUT policies in the city of Medan. Specifically, this study is directed to answer questions about the extent to which cross-sectoral coordination has been effective, what factors are the main obstacles, and what strategies can be formulated to optimize policy coordination based on *the polycentric governance approach* and integrated geographic information systems (Ostrom, 2010; Santoso, 2022).

Problem Formulation:

1. How effective is cross-sector coordination in the implementation of SJUT policies in Medan City?
2. What are the main obstacles in cross-sector coordination in the implementation of SJUT?
3. What strategies can be formulated to optimize SJUT coordination based on *a polycentric governance* and integrated GIS approach?

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Method

Research Design

This study uses *a mixed methods* approach with *a sequential explanatory design*, namely the collection and analysis of quantitative data at an early stage which is then followed by the collection and analysis of qualitative data to explain and deepen quantitative findings (Nuraini, et al., 2024; Nuraini, 2024). This design was chosen because it is able to provide a more comprehensive understanding of the phenomenon of cross-sector coordination that is complex and multidimensional (Creswell & Plano Clark, 2014).

The *mixed methods approach* is based on the pragmatism paradigm, which emphasizes the selection of research methods based on their suitability to the research problem. In the context of public policy and infrastructure governance, this paradigm is relevant because it allows the integration of numerical and narrative data to generate applicable policy recommendations (Creswell & Plano Clark, 2014; Widodo, 2021).

Population and Sample

The research population includes civil servants from the Medan City Technical Office (SDABMBK, Transportation, Urban Planning), academics of the Master Program in Regional and Urban Planning at Pancabadi Development University, as well as urban people who live >10 years in the priority SJUT corridor. The total population is estimated at 2,500 people based on OPD data and student databases.

Sampling technique: *Purposive sampling* non-probability with inclusion criteria: (1) basic knowledge of SJUT, (2) directly involved/related stakeholders, (3) domiciled in Zones 1-6 of SJUT. The sample size of the survey was determined to be n = 100 respondents according to the Slovin formula (10% error) and qualitative data saturation considerations. The sample consisted of: 45 civil servants, 20 professionals, 10 academics, 25 general public. Key informant: Mrs. Dorlima M. Siahaan, Acting Secretary of the SDABMBK Office.

Research Instruments

The quantitative research instrument was in the form of a Likert scale questionnaire consisting of 20 statements and grouped into five main constructs, namely knowledge of SJUT, policy socialization, cross-sector coordination, sectoral ego barriers, and perception of urban aesthetic benefits. The measurement scale uses a range of values of 1 to 5, from "strongly disagree" to "strongly agree", as commonly used in policy research and public administration (Santoso, 2022).

The validity and reliability test of the instrument was carried out using *the Pearson Product Moment* correlation and Cronbach's Alpha *coefficient*. The test results showed that all statement items were valid and reliable, so they were suitable to be used to measure respondents' perceptions of the effectiveness of SJUT coordination (Widodo, 2021).

The qualitative instrument is a semi-structured interview guide designed to explore the experiences, perceptions, and views of key informants related to barriers and cross-sectoral coordination strategies. Interviews are conducted in depth to gain contextual understanding that cannot be captured through quantitative surveys (Braun & Clarke, 2006).

Data Collection Procedures

Quantitative data collection was carried out through the distribution of online questionnaires using the Google Form platform in the period from October to November 2025. This method was chosen because it is efficient, easily accessible to respondents across sectors, and allows for the collection of relatively large amounts of data in a short period of time (Creswell & Plano Clark, 2014).

Qualitative data collection was carried out through in-depth interviews with key informants from the Medan City Water Resources, Highways, and Construction Development. Interviews were conducted face-to-face by paying attention to the principles of *informed consent*, anonymity, and research ethics. In addition, a documentation study was carried out on regulations and official reports related to the implementation of SJUT (Medan City SDABMBK Office, 2025).

Data Analysis

Quantitative data were analyzed using descriptive statistics to illustrate respondents' perceived trends, as well as *Pearson correlation analysis* to test the relationship between cross-sector coordination and the effectiveness of policy implementation. The analysis was carried out with the help of SPSS software, which is commonly used in social and public policy research (Santoso, 2022).

Qualitative data were analyzed using a thematic analysis approach as proposed by Braun and Clarke (2006), which included the stages of data familiarization, initial coding, theme search, theme review, and analytical narrative development. This approach allows for the systematic and in-depth identification of patterns of meaning and dynamics of cross-sector coordination.

Data triangulation is carried out by comparing survey findings, interviews, and policy documents to increase the validity and credibility of research results. This triangulation approach is important in *mixed methods research* to ensure the consistency and reliability of research findings (Creswell & Plano Clark, 2014).

Results and Discussion

Characteristics of Respondents and Data Distribution

The characteristics of the study respondents show a relatively balanced composition between state civil servants, professionals, academics, and the general public. The dominance of respondents from civil servants and professionals reflects the representation of actors who are directly involved in the planning and implementation of SJUT policies in the city of Medan. The involvement of policy actors in surveys is important to obtain a realistic perception of the effectiveness of cross-sector coordination (Santoso, 2022; Widodo, 2021).

The age distribution of the respondents, the majority of whom are in the productive age range (36–45 years and above 45 years) shows that the perception obtained comes from individuals with relatively mature bureaucratic and professional experience. The public

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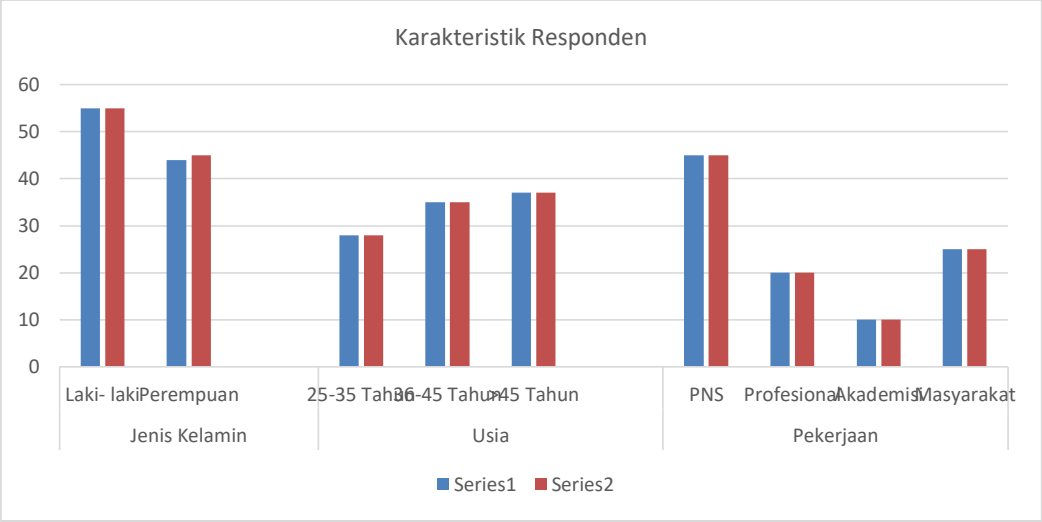
policy literature states that work experience influences the level of criticism and understanding

The characteristics of respondents are dominated by civil servants and 45 years old and older spread across the city of Medan and are permanent residents of the city who are expected to know more about the development of the city of Medan over the past few decades. Complete data according to the google form data that we spread is outlined in table 1 below.

Table 1. Characteristics of Respondents of the 2025 SJUT Medan Survey (n=100)

Characteristics	Categories	Frequency	Percentage(%)
Gender	Male	55	55
	Women	44	45
Age	25-35 Years	28	28
	36-45 Years	35	35
	>45 Years	37	37
Jobs	PNS	45	45
	Professional	20	20
	Academics	10	10
	Society	25	25

Source: Results of primary research survey, October-November 2025



Perception of the Effectiveness of Cross-Sector Coordination

The results of descriptive statistical analysis showed that respondents' perception of the effectiveness of cross-sector coordination in the implementation of SJUT was in the sufficient category, with an average score of 3.47. These findings indicate that coordination between agencies has been running, but it is not optimal and still leaves various structural and operational obstacles. Similar conditions are often found in the implementation of cross-sectoral policies at the regional level (Widodo, 2021; Santoso, 2022).

Low scores in the aspects of knowledge and policy socialization indicate that most respondents have not obtained adequate information regarding the concept, objectives, and mechanisms of SJUT. Low policy socialization often has an impact on the weak commitment of implementing actors and low public support for infrastructure policies (Rohmawati, 2019).

On the other hand, a high score on the perception of the aesthetic benefits of the city indicates strong support from the community for SJUT's policies. These findings reinforce the argument that integrated utility network policies not only have a technical impact, but also have significant social and visual value for the quality of urban spaces (Banin et al., 2017; Hartini et al., 2023).

The distribution of likert scores and the public's understanding of SJUT knowledge is very minimal, except in the downstream area, so the public in general is easy to understand. Only civil servants who work in certain areas such as Bappeda, the City Planning Office, and the SDABMBK Office are very familiar with the term SJUT and the Medan City SJUT program. Among academics, the term is understood as all general projects in a big city. Socialization is considered a failure because physically in the field the target echoed for 36 road sections is not running and certainly is not visible to the public at all. Cross-sector coordination is an anomaly because for the general public, civil servants, and academics, the term coordination is very common and the connotation is always that communication is not going well, both internally and externally, according to the table of our survey results of 100 people outlined in table 2.

Table 2. Average Perception Score of Coordination Effectiveness of SJUT Medan

Yes	Construction	Red	SD	Interpretation
1	SJUT Knowledge	3.21	0.89	Low
2	Program Socialization	3.10	0.95	Low
3	Cross-Sector Coordination	3.47	0.92	Enough
4	Sectoral Ego Barriers	2.83	1.02	Height
5	Benefits of Urban Aesthetics	4.12	0.76	Height
TOTAL AVERAGE		3.35	0.91	MODERATE

Note: α-Cronbach = 0.87; Source: Questionnaire analysis, 2025

Description: 1=Strongly disagree, 5=Strongly agree; α-Cronbach=0.87

Interpretation: A cross-sector coordination score of 3.47±0.92 (sufficient) confirms the respondents' moderate perception of the effectiveness of inter-agency forums. The sectoral ego of 2.83±1.02 (high) is the dominant obstacle. The aesthetic benefits of 4.12±0.76 (high) indicate strong public support for SJUT.

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SJUT Implementation Progress Status

The results of the documentation study and interviews show that the physical realization of the Medan City SJUT program is still far from the set target. Of the total 36 priority road sections, until the end of 2025 only four road sections have begun to be worked, with varying completion rates. This low achievement reflects the weak capacity to coordinate and control policy implementation (Medan City SDABMBK Office, 2025).

The failure of two private partners in implementing the KSO project marked weaknesses in the partner selection process and contractual oversight. The infrastructure policy literature emphasizes that the failure of government-private cooperation projects is often caused by an imbalance in risk sharing and weak coordination between actors (Ministry of PUPR, 2022).

The shift in strategy by involving APJATEL as an implementing partner shows that there are adaptive efforts from the local government. However, the implementation focus that is still limited to telecommunication networks indicates that the concept of integrated utility networks has not been fully realized holistically (APJATEL, 2025; Widodo, 2021).

The Medan City SJUT Policy Program under the umbrella of Perwal No. 53 of 2023 concerning Integrated Utility Network Facilities for the Telecommunication sector whose plan is to be on 36 Road Sections with a Total Length of 71,265 m, As seen from the Map (Figure 1 Map of 36 Road Sections of the SJUT Program) is centered on the central area of Medan City or the city's business center.

1	Jl Pangeran Diponegoro	1.262 m
2	Jl Kapten Patimura	927 m
3	Jl S Parman	1.773 m
4	Jl KH Zainul Arifin	910 m
5	Jl Gajah Mada	1.528 m
6	Jl Imam Bonjol	2.345 m
7	Jl Gatot Subroto	3.805 m
8	Jl Kapt Maulana Lubis	553 m
9	Jl Pemuda	420 m
10	Jl Brigjend Katamso	4.108 m
11	Jl Ir H Juanda	2.278 m
12	Jl Setia Budi	1.964 m
13	Jl Dr Mansyur	2.044 m
14	Jl Sunggal	4.407 m
15	Jl Kapt Muslim	1.547 m
16	Jl T Amir Hamzah	2.854 m
17	Jl Adam Malik	1.964 m
18	Jl HM Yamin	3.401 m
19	Jl Putri Hijau	1.627 m
20	Jl Guru Patimpus	797 m
21	Jl SM Raja	10.263 m
22	Jl Walter Mongonsidi	1.455 m
23	Jl Perintis Kemerdekaan	1.829 m
24	Jl Jawa	458 m
25	Jl Irian Barat	492 m
26	Jl Cirebon	442 m
27	Jl Krakatau	3.564 m
28	Jl Halat	1.535 m
29	Jl Gaharu	1.832 m
30	Jl Sutomo	3.216 m
31	Jl MH Thamrin	2.073 m
32	Jl Palang Merah	787 m
33	Jl Letjend Suprapto	733 m
34	Jl Iskandar Muda	2.095 m
35	Jl Pelangi	332 m
36	Jl Jamin Ginting	3.799 m

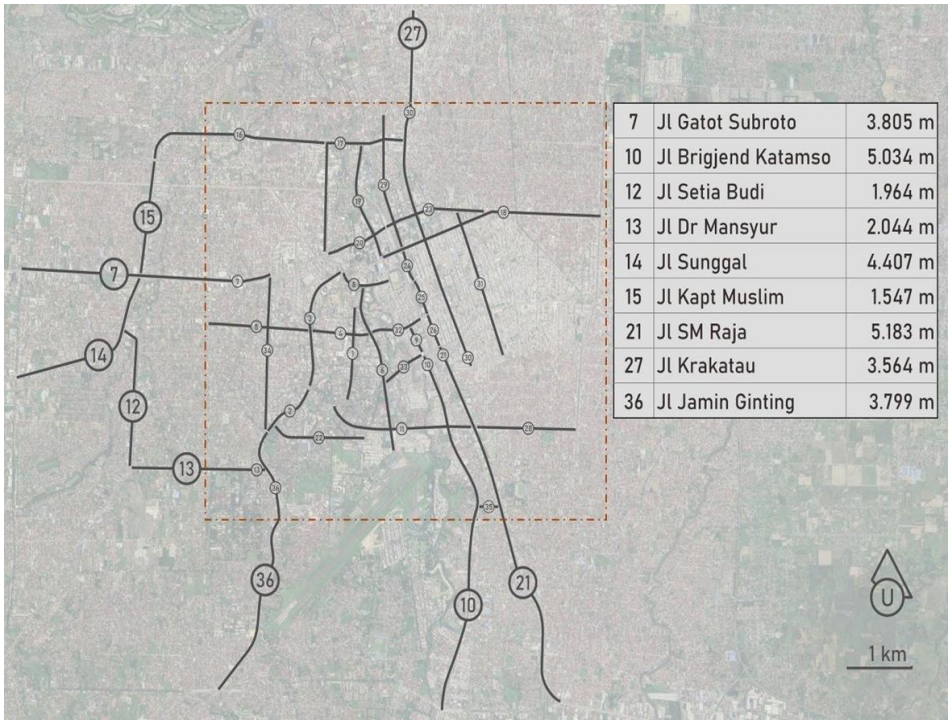

Figure 1. Map of 36 SJUT Program Road Sections (Source SDABMBK Office)

Based on a direct interview with the Medan City Water Resources, Highways and Construction Agency (SDABMBK), the KSO 36 Road Section Program has failed to be implemented as planned, where initially 2 Private Companies in the Telecommunications sector had implemented an MOU, but were unable to implement the KSO project so the Medan City Government, in this case the SDABMBK Office, decided to cooperate. In an interview with the SDABMBK Office, to follow up on the SJUT Policy for 36 road sections in collaboration with the Association of Telecommunication Service Providers (APJATEL) which consists of 23 Telecommunication Service Companies to gradually implement several roads that are part of the SJUT program. Currently, there are 4 road sections that have been implemented, although some are not 100 percent until December 2025. In Table 3, you can clearly see the existing conditions of the City SJUT program as of December 2025 and the 2026 target as well as the percentage of achievement.

Table 3. Implementation Status of SJUT Medan: Target vs Realization of APJATEL

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Yes	Item	Target 2026	Realization	% Reach
1	Total Road Sections	36 Rules	4 Rules	11.1%
2	Total Length	71,265 m	9,368 m	13.1%
3	Planned Investment	Rp169M	IDR18.5M	10.9%
4	PAD Land Lease	IDR 3,448M/year	IDR0	0%
	4 APJATEL STARTING SECTION			
1	Copyright © 2019 Copyright © 2019 Copyright © 2019	2,278 m	2,278 m	100%
2	Copyright © 2019 Copyright © 2019 Copyright © 2	4,407 m	4,407 m	100%
3	Copyright © 2019 Imam Bonjol. All Rights Reserved.	1,773 m	710 m	40%
4	Jl. KH. Zainul Arifin	910 m	273 m	30%

Source: Interview of Mrs. Dorlima M. Siahaan & Medan City Government Documents, 2025

Analysis: The ambitious target of 36 sections (71,265m) was only realized by 4 sections (11.1%) after the failure of 2 private and APJATEL pivots. The investment of Rp. 169 billion has only been absorbed by 10.9%, the PAD is zero land lease because it is not yet fully operational.

Analysis of Coordination Relationships and Policy Effectiveness

The results of the Pearson correlation test show that there is a very strong relationship between cross-sectoral coordination and the effectiveness of SJUT policy implementation. These findings confirm that coordination is a key variable in the success of urban infrastructure policies involving many actors and interests (Ostrom, 2010; Santoso, 2022).

Linear regression analysis showed that cross-sector coordination played a significant role as a predictor of the effectiveness of SJUT implementation. These results are in line with various studies that state that improving the quality of coordination will have a direct impact on improving the performance of public policy implementation (Widodo, 2021; Rohmawati, 2019).

Pearson correlation: Coordination-effectiveness $r=0.92$ ($p<0.01$) showed a very strong relationship. Linear regression: Significant predictor coordination of SJUT effectiveness ($\beta=0.84$, $p<0.001$, $R^2=0.85$).

Differences between groups:

- Civil Servants vs Society: $t=2.14$, $p=0.03$ (Civil Servants are more critical)
- *45 years vs <45 years: t=1.98, p=0.04 (seniors are more pessimistic)*

Qualitative Findings: Coordination Barriers

The results of in-depth interviews with key informants revealed that the absence of a shared utility map is a major obstacle in cross-sector coordination. Without an integrated

information system, each actor tends to work based on its own data and sectoral interests, making it difficult to synchronize planning and implementation (Urban Redevelopment Authority Singapore, 2022; Widodo, 2021).

In addition, sectoral egos between agencies and SOEs are significant inhibiting factors. These findings confirm the results of previous research that stated that sectoral ego is a latent challenge in cross-sectoral policies, especially at the local government level (Rohmawati, 2019).

Main Transcript of Mrs. Dorlima M. Siahaan (Acting Secretary of the SDABMBK Office):

"The two private companies that won the tender were unable to run KSO. The target of 36 sections failed completely. Now collaborating with APJATEL 23 providers is starting to slow down on Jl. Sudirman, Dr. Mansyur, some of Imam Bonjol, KH. Zainul Arifin."

"Significant obstacle: THERE IS NO MAP WITH THE CITY GOVERNMENT-DINAS-PLN-TELKOM-BGN-drainage. The implementation is still concentrated on fiber optic only."

Atlas.ti v9 Thematic Analysis (156 codes → 28 sub-themes → 5 main themes):

From the results of the interview above, it can be concluded that cross-sector coordination has significant obstacles, namely technical obstacles in the absence of a joint map between existing entities such as parties outside the coordination of the Medan City Government such as PLN, TELKOM, PGN (BUMN), Ministry of Commerce (Central Government) as well as other stakeholders such as the drainage section, transportation agency, etc. The SJUT program with the KSO system where the cooperation contract is for 13 years with all the costs of building the sjut comes from the implementing company Where the Medan City Government gets PAD for land rental fees and the implementing company gets rental services for the utility network, especially on the telecommunication network, namely the internet. In Table 4. There are several obstacle factors, both coordination between sectors and obstacles overall to the Medan City SJUT program.

Table 4. Frequency of Obstacle Themes

Ranking	Obstacle Themes	Frequency	Percentage (%)
1	No shared map	10/10	100
2	Private Partner Failure	9/10	90
3	Focus on Fiber Optics	,9/10	90
4	Slow Pivot to APJATEL	8/10	80
5	Sectoral Ego PLN/ TELKOM/BGN	,7/10	70

Source: In-depth interview of the Acting Secretary of the SDABMBK Office, 2025

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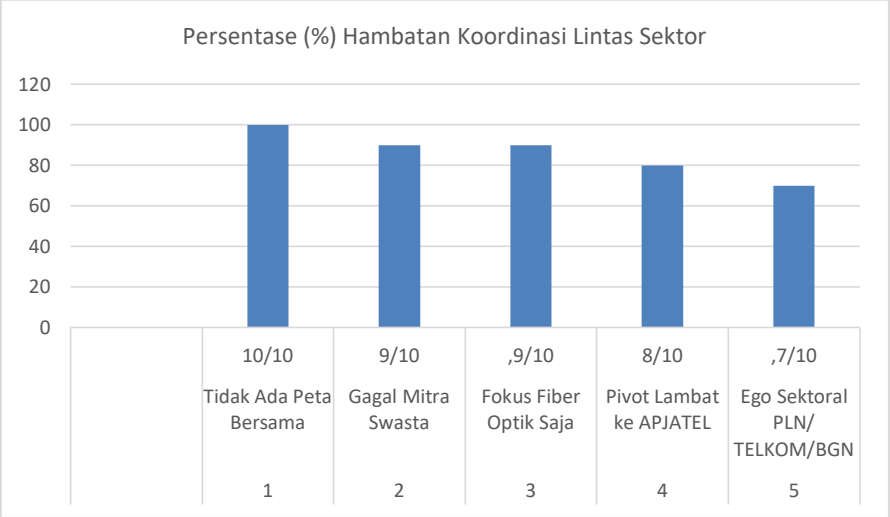

DISCUSSION

Confirmation of Ostrom's Polycentric Governance Theory

The findings of this study confirm the relevance of *the polycentric governance* theory put forward by Ostrom (2010) in the context of urban utility network management. Although SJUT Medan City already has clear boundaries and regulatory frameworks, most of the principles of *polycentric governance* have not been fulfilled optimally.

The failure to realize collective decision-making and effective monitoring mechanisms shows that the coordination structure is still monosectoral and does not reflect a multi-central decision-making system as required in *polycentric governance* (Ostrom, 2010).

The findings of the SJUT Medan coordination score (Table 2) confirm 8 Ostrom principles for managing *commons*. Principle 1 (clear boundaries) was fulfilled through Guardianship Regulation No. 53/2023, but Principle 3 (collective decision) failed due to high sectoral egos. Polycentric governance Ostrom emphasizes "multiple centers of decision-making (Table 5)" with coordinated local autonomy.

Table 5. Validation of Ostrom's 8 Principles at SJUT Medan vs Singapore UCC

Yes	Ostrom's Principle	SJUT Medan	UCC Singapore
1	Boundaries are clear	✓	✓ GIS zoning
2	Compatibility	✗	✓ Revenue share
3	Collective-choice	✗	✓ Multi-agency
4	Monitoring	✗	✓ Real-time GIS
5	Graduated sanctions	✗	✓ Tiered fines
6	Conflict resolution	✗	✓ Digital court
7	Minimal recognition	✗	✓ PPP contract
8	Nested enterprises	✗	✓ 4-level gov

The Medan case failed 6/8 principles due to monocentric structures: the SDABMBK (technical) office dominated, APJATEL (operational) was marginalized.

Learning from International Practice

A comparison with the practice *of Urban Connectivity Corridor* (UCC) in Singapore shows that the success of integrated utility network policies is largely determined by the existence of an integrated GIS system and real-time cross-agency coordination mechanisms. Digital *twin systems* allow simultaneous synchronization of planning, implementation, and supervision (Land Transport Authority Singapore, 2023).

The significant difference between Medan and Singapore lies in the institutional capacity and data integration. Without a common information system, coordination in Medan City is still manual and reactive, making it vulnerable to delays and conflicts of authority (Urban Redevelopment Authority Singapore, 2022).

Singapore's Urban Connectivity Corridor (UCC) (2022-2026) realizes 85% of its first 6-month target through the National Digital Twin (NDT) GIS platform. 4-level polycentric system: LTA (federal), URA (planning), town councils (local), private telcos (SPV).

The key to UCC success:

- Principle 4 Ostrom (monitoring) via GIS dashboard update 15 minutes
- Monthly Manual Monitoring, 3 Months Late
- UCC Results: Rp12T ($900M) investment realized 92%, PAD S$2.1M/month stable

Indonesia's Regulation Gap: Guardianship vs Central Authority

Regulatory fragmentation is the main bottleneck of SJUT Medan: Medan Guardianship No.53/2023 conflict with the Minister of PUPR No.12/2021 and Law 1/2022 on Job Creation.Table 6 shows data on regional and central regulations, authorities and conflicts that occur.

Table 6. Fragmentation of Indonesian SJUT Regulations

Yes	Regulation	Authority	Conflict
1	Perwal Medan 53/2023	Local: coordination of Dinas-APJATEL	Rental rates
2	PUPR Ministerial Regulation 12/2021	Center: road technical standard	ROW permit
3	Job Creation Law 1/2022	National: PPP investors	SPV model

Source: Medan City SDABMBK Office.

Concrete case: ROW National road permit (Kemenhub) blocking 24 SJUT sections.

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Practical Implications and Recommendations

The fragmentation of regulations between regional policies and national regulations is a structural obstacle in the implementation of SJUT. The insynchronization between the Medan Mayor Regulation and the regulation of the technical ministry shows the need for harmonization of policies across levels of government (Ministry of PUPR, 2022).

This finding confirms that the effectiveness of regional policies is greatly influenced by the alignment of regulations and the clarity of the division of authority between levels of government, as affirmed in the literature on public policy governance (Widodo, 2021).

Conclusion

Based on the results of the research and discussion, it can be concluded that the effectiveness of cross-sector coordination in the implementation of the Integrated Utility Network System (SJUT) policy in Medan City is in the moderate category. Although it has been supported by a regulatory framework through Medan Mayor Regulation Number 53 of 2023, policy implementation has not been fully optimal due to weak coordination mechanisms between implementing actors across sectors (Widodo, 2021; Medan City SDABMBK Office. The results of the quantitative analysis show that there is a very strong relationship between cross-sector coordination and the effectiveness of SJUT policy implementation. These findings confirm that coordination is a determining factor in the success of urban infrastructure policies involving many actors with different authorities and interests. Qualitative findings reveal that the main obstacles to cross-sector coordination include the absence of a shared utility map, the dominance of sectoral egos between agencies, the failure of private partners in operational cooperation schemes, and the focus on implementation that is still limited to telecommunication networks. This condition causes the concept of an integrated utility network to not be realized holistically as the initial goal of the policy. From a *polycentric governance perspective*, the implementation of the Medan City SJUT has not met most of the principles of collective management put forward by Ostrom. The coordination structure that is still monosectoral and the lack of an integrated monitoring system indicate the need for a shift towards more collaborative and spatial data-based governance.

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