

Bureaucratic Barrier Mitigation Strategy in Smart City Implementation in Cimahi City

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The implementation of Smart City policies often faces non-technical obstacles in the form of structural rigidity and resistance from the government bureaucratic work culture. This study aims to identify clusters of bureaucratic obstacles in Smart City implementation in Cimahi City and formulate comprehensive mitigation strategies. Using qualitative research methods with a descriptive approach, data were collected through in-depth interviews with key informants from the Cimahi City Communication and Information Technology Office (Diskominfo) and the Regional Development Planning Agency (Bappeda), system observations, and documentation studies of supporting regulations. The results indicate that smart city implementation is hampered by six main factors: sectoral egos that trigger data silos, the clash between rigid structures and digital dynamics, apparatus resistance to change, limited human resource ICT competencies, a reductive mindset toward "ICT projects," and weak leadership commitment and budget sustainability. To address these issues, this study formulates four comprehensive mitigation strategies: (1) digital transformation through a Single Sign-On (SSO) system and SPBE-based data interconnection; (2) technical guidance on digital literacy and a shift in the mindset of civil servants (ASN) to a service-oriented one; (3) strengthening macro regulations in the RPJMD/RPJPD and developing digital standard operating procedures (SOPs) to reduce bureaucracy (debureaucratization); and (4) institutionalizing public participation spaces and the Pentahelix Collaboration involving local academics such as Jenderal Achmad Yani University. In conclusion, the success of Smart City in Cimahi City requires holistic bureaucratic reform to transform technology from a mere administrative formality into a fast, agile, and accountable public service engine.

Keywords: Smart City, Bureaucratic Barriers, Mitigation Strategy, Cimahi City, Bureaucratic Reform.

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1. Introduction

The Smart City concept has transformed from a mere hardware trend into a strategic policy instrument for reforming contemporary governance (Mursalim, 2017). At the global and national levels, this policy is designed to break down the rigidity of traditional bureaucratic models through the integration of transparent and accountable digital systems. The success of smart city governance adoption is no longer measured by the sophistication of purchased technology, but rather by the extent to which the policy transforms the work patterns of government officials in serving the public (Nurdiassa et al., 2021).

In Indonesia, this policy direction has a strong legal basis through Presidential Regulation Number 95 of 2018 concerning the Electronic-Based Government System (SPBE) and the Movement Towards 100 Smart Cities (Soetarto & Yuliastina, 2022). This macro policy requires every local government to develop an integrated Smart City planning document, or Masterplan. This national regulation is designed as a standard guideline for uniform implementation of standardization, data interoperability, and information security across all levels of government (Bahrudin & Wahyuningsih, 2023).

However, in its implementation at the regional level, Smart City policies often run into institutional conflicts due to weak harmonization of local regulations (Suhendra & Ginting, 2018). Regional legislative processes often lag behind the pace of technological innovation, resulting in legal vacuums or overlapping administrative regulations. This local regulatory uncertainty fuels doubts among field implementers, who demand flexible yet accountable legal certainty in executing digital work programs (Sari et al., 2020).

As an entity obligated to comply with national policy directives, the Cimahi City Government has formalized its smart city development blueprint through regional legal instruments. This policy sets targets for achieving six main pillars, from Smart Governance to Smart Economy (Rohayatin et al., 2023). Although this formal document has been ratified, its implementation effectiveness on the ground is still being tested by the readiness of local bureaucratic structures to translate policy articles into concrete actions (Shilvia & Bharata, 2022).

The main obstacle to implementing this policy stems from the bureaucratic institutional design, which still adopts a siloed (fragmented) model (Bilqis et al., 2025). Traditional rules for the division of main tasks and functions (tupoksi) between agencies often align with Smart City principles, which demand cross-sector collaboration. Consequently, policy instructions for integrating services are often hampered by rigid administrative authority boundaries within local government bureaucratic structures (Khaerah et al., 2025).

One crucial pillar of smart city policy is the regulation regarding interoperability or data sharing between Regional Work Units (SKPD) (Batuara et al., 2022). Normatively, the policy mandates a single integrated data center, but empirically, each agency tends to maintain its own subsystems and applications to assert its sectoral presence. This conflict of interest in data governance causes the digitalization policy to fail to achieve budget efficiency and instead lengthens the bureaucratic chain of data handling (Wulandari & Munawaroh, 2020).

The success of policy enforcement is also largely determined by the readiness of the human resources entrusted with its implementation. Digital transformation policies require specific expertise and technological literacy, which unfortunately are not evenly distributed among civil servants (Sarjito & Djati, 2025). The gap between the competency requirements outlined in Smart City planning documents and the actual expertise of civil servants on the ground creates a structural weakness that slows the rate of system adoption (Pratiwi et al., 2025).

If bureaucratic obstacles and inconsistent enforcement are left unchecked, Smart City policies will lose their substance and become merely administrative commodities. Therefore, a strategic study is needed to formulate mitigation measures for bureaucratic obstacles, focusing on policy restructuring and improving governance. This mitigation strategy is crucial for bridging the gap between the ideals of regulations on paper and the reality of their execution by the regional bureaucracy.

Against this background, the study, "Strategies for Mitigating Bureaucratic Obstacles in Smart City Implementation in Cimahi City," focuses its analysis on evaluating and improving policy and institutional aspects. This research aims to unravel regulatory bottlenecks, map bureaucratic dysfunction, and formulate applicable mitigation strategies for decision-makers. The final results are expected to provide theoretical and practical contributions to accelerating digital governance policy reform in the regions.

2. Method

This study uses a qualitative approach with a descriptive design to in-depth explore the phenomenon of bureaucratic barriers in Smart City policies. The research focuses on analyzing institutional aspects, regulations, data governance, and inter-agency interactions in the implementation of the Electronic-Based

Government System (ESBS). Through this descriptive-qualitative approach, researchers can unravel the complexity of bureaucratic structures, identify non-technical root causes, and formulate contextual and applicable mitigation strategies for policymakers. Data sources in this study consist of primary and secondary data (Fiantika et al., 2022). Primary data were obtained directly through in-depth interviews with key informants (purposive sampling), such as officials from the Communication and Information Agency (Diskominfo), representatives from the Regional Development Planning Agency (Bappeda), and digital service implementing officials. Meanwhile, secondary data were collected through a documentary study of national regulations, Smart City Masterplan documents, local ESBS index achievement reports, and other supporting data governance policy archives. The data analysis technique adopted an interactive model that encompasses three main stages: data reduction, data display, and conclusion drawing or verification. All collected data was sorted and categorized based on clusters of policy and institutional barriers to then draw conclusions about mitigation strategies. To ensure the validity of the research results, researchers applied data triangulation techniques, specifically source triangulation and method triangulation, to ensure that all information presented was objective, valid, and scientifically accountable.

3. Result And Discussion

Bureaucratic Barriers to Smart City Policy in Cimahi

a. Sectoral Egos and Data Silos

Sectoral egos within the Cimahi City Government are the root cause of the failure of Smart City policy integration. Each Regional Apparatus Organization (OPD) tends to prioritize its own agency's work targets without regard for macro-system alignment. This traditional bureaucratic work culture triggers a phenomenon where each OPD feels more prestigious if it successfully launches a new, independent digital application or service. As a result, regional budget allocations are consumed by duplicative and partial technology projects, rather than being used to build an efficient, shared data infrastructure.

A direct impact of this dominant sectoral ego is the formation of data silos, a condition where databases between agencies are isolated and lack interoperability (data sharing). Because electronic systems are designed separately without standardized, uniform technological architecture, data communication between OPDs is paralyzed. Important information that should flow automatically from one agency to another ultimately has to be processed manually repeatedly, thus eliminating the essence of efficiency, accountability, and speed promised by the concept of digital governance (e-Government).

This structural blockage ultimately creates a heavy burden and a poor user experience for the citizens of Cimahi City as users of public services. Citizens are forced to download, register, and navigate dozens of different, confusing applications simply to handle various administrative needs. This impracticality not only reduces citizen participation in the success of the smart city program but also creates the perception that bureaucratic digitization actually adds complexity rather than streamlining public services.

b. Rigid Structure vs. Digital Dynamics

The characteristics of conventional bureaucracy in government environments inherently adopt the Weberian model, which is hierarchical, formal, and oriented towards adherence to strict administrative procedures. This rigid structure is designed to create stability and minimize risk in governance, where every policy must pass through a long, multi-layered chain of command before it can be executed. However, when this static institutional model is confronted with the Smart City agenda, a massive paradigm shift occurs because local government bureaucracies are not designed to move at the speed of the digital technology industry.

On the other hand, the Smart City ecosystem demands opposing work dynamics: operational flexibility, rapid innovation, and the ability to respond to real-time data. The success of a smart city depends heavily on the agility of officials in capturing fluctuations in public data—such as traffic congestion, complaints about damaged infrastructure, and surges in demand for healthcare services—and then taking immediate action. Slow and convoluted bureaucratic decision chains automatically disable this real-time function, so that expensive and accurate digital data often becomes outdated and loses its urgency before it can be acted upon.

c. Resistance to Change

Resistance to change from policymakers and civil servants is one of the biggest cultural barriers to Smart City transformation. This reluctance to migrate from conventional, paper-based work methods to digital systems is rooted in psychological comfort with decades-old work patterns. For some officials, especially senior officials, new technology is perceived as a threat that reduces their authority, increases their workload, and exposes their technical incompetence to the public. Consequently, instead of embracing innovation as a tool for efficiency, passive resistance emerges, manifesting in the form of delayed system adoption, ignoring established digital platforms, and even a tendency to repeatedly duplicate digital documents into printed form.

Furthermore, this resistance is exacerbated by the absence of clear incentives and a weak system of binding rewards and punishments for officials reluctant to change. When top leadership lacks consistent political pressure or commitment to mandate the use of digital systems, employees tend to revert to their comfort zones of manual methods. This cultural barrier creates an anomaly where expensive technology investments ultimately become mere operational window dressing, as the bureaucratic machinery within remains driven by an outdated mentality that stutters to respond to the demands of transparency and speed in the digital era.

d. Limited Human Resources (HR)

The limited quality and quantity of human resources (HR) in the Information and Communication Technology (ICT) sector is the weakest link in the sustainability of the Smart City ecosystem. Most civil servants (ASN) placed in strategic positions managing digital systems lack the educational background or expertise certification relevant to the needs of modern technology. As a result, the operation of crucial infrastructure—such as server management, cybersecurity, big data analysis, and system integration—is often hampered by internal technical inability to independently maintain and develop their own systems.

The impact of this scarcity of technical expertise forces local governments to rely heavily on third parties or private vendors to build and maintain Smart City systems. This dependency creates new problems when cooperation contracts expire, where internal apparatus experience operational gaps in managing the systems left behind due to the lack of effective knowledge transfer. The lack of certified and tiered technical training programs from relevant agencies means that bureaucratic human resource capacity consistently lags behind the flow of technological innovation, resulting in expensive smart city platforms often stalling or failing to function optimally.

e. Focusing Solely on "ICT Projects"

The reduction of Smart City to merely "ICT projects" reflects the bureaucracy's shallow understanding of the nature of digital transformation. Many government agencies are trapped in a contractual mindset, where smart city success is measured quantitatively by the number of computers procured, CCTV cameras installed, or new applications launched at the end of the fiscal year. This project-based approach tends to

be partial and focused solely on budget absorption, without considering sustainability plans, system integration, or the real impact on the efficiency of public services.

In fact, the essence of Smart City implementation is not hardware modernization, but rather a comprehensive bureaucratic reform movement that demands a change in the work culture (culture set) and mindset of the apparatus. Technology should be positioned as an enabler to create transparent governance, cut through bureaucratic red tape, and accelerate decision-making. Without restructuring government business processes and adapting to an agile work culture, the adoption of technology, no matter how sophisticated, will only transfer the complexity of conventional bureaucracy into a digital system without producing substantive change.

f. Weak Commitment and Budget

Weak commitment from regional leaders is a key determining factor. Slowing the acceleration of the Smart City ecosystem, given that Indonesia's bureaucracy relies heavily on a top-down chain of command. When regional heads or high-ranking agency officials fail to prioritize digital transformation, the smart city vision will remain in planning documents without strong enforcement. The lack of firmness from top leadership in mandating cross-sectoral program compliance blunts coordination between regional government agencies (OPDs), resulting in unclear direction and potential failure due to resistance within the bureaucracy itself.

The direct impact of this weak political commitment is reflected in the fragility of financial support through Regional Budget (APBD) allocations. Many regions allocate Smart City funds in a fluctuating and short-term manner, limited to initial installation costs without guaranteeing the availability of funds for operational, maintenance, and system upgrades in subsequent years. This reliance on minimal and unsustainable budgets quickly causes expensively built digital infrastructure to deteriorate, become obsolete, or even become abandoned due to the lack of adequate funding for regular technology updates and cybersecurity system strengthening.

Strategies to Mitigate Bureaucratic Barriers to Smart City Policies in Cimahi

a. Digital Transformation and System Integration (Smart Governance)

The initial and most crucial step in breaking down bureaucratic silos in Cimahi City is to radically transform its digital architecture through the implementation of a Single Sign-On (SSO) system. Through this strategy, the Cimahi City Government can unify hundreds of previously scattered and fragmented public service applications into a single, integrated service portal. For the public, this innovation reduces administrative complexity, as residents only need to create one account and undergo a single identity verification process to access all types of smart city ecosystem services, from population administration and business licensing to public complaint channels.

From an internal government perspective, the implementation of this SSO-based integrated application automatically forces database consolidation at the upstream level. The existence of a single integrated portal eliminates the space for each Regional Apparatus Organization (OPD) to operate independently and develop self-serving, standalone applications. This strategy positions technology no longer as a commodity for display within agencies, but rather as an efficient shared infrastructure (shared services), thus significantly saving regional budgets by reducing costs for procurement and maintenance of duplicative software.

To permanently mitigate the silo system phenomenon, this integration must be secured through strict data exchange standardization, referring to the Electronic-Based Government System (SPBE) architecture. The Cimahi City Government needs to develop clear local regulations regarding Regional Data Governance that

align with the One Data Indonesia principle. This standardization establishes uniform data formats, data dictionaries, and communication networks, so that all electronic systems owned by different agencies can communicate with each other and share data (interoperability) automatically without technical or sectoral barriers.

b. Improving Human Resource Capacity of Civil Servants

The provision of sophisticated technological infrastructure will not have a substantive impact without the readiness of the apparatus operating it. Therefore, the Cimahi City Government must initiate a massive, structured, and sustainable technical guidance and digital literacy training program for all levels of the State Civil Apparatus (ASN). This training should not be ceremonial, but rather based on clear information and communication technology (ICT) competency standards, ranging from basic skills in operating digital service systems, basic cybersecurity governance, to public service data analysis skills for tactical decision-makers.

More than simply transferring technical expertise (hard skills), accelerating Smart City requires profound cultural reform through a repositioning of the mindset of all elements of the bureaucracy. Conventional work cultures characterized by rigidity, procedural formality, and slowness must be radically deconstructed. Civil servants in Cimahi City need to internalize the values of a digital work culture that prioritizes agility, transparency, and cross-sector collaboration. This shift in mindset positions technology not as an additional administrative workload, but as a primary instrument to facilitate the implementation of each apparatus' daily tasks.

This paradigm shift ultimately aims to shape the character of an intelligent bureaucracy that is fully oriented towards public service (service-oriented). Through an adaptive mindset, civil servants are expected to no longer passively await lengthy hierarchical instructions, but rather to be more proactive in utilizing digital platforms to respond instantly to citizen needs and complaints. This responsive and public-satisfaction-oriented attitude is a crucial foundation for ensuring that the smart city governance system maintains its human spirit and truly provides tangible solutions to various urban problems on the ground.

To ensure this commitment to increasing human resource capacity is effective and permanent, the Cimahi City Government needs to integrate digital competency indicators into the individual performance assessment system and civil servant career management. Incentives, rewards, and promotions must be directly linked to the contributions and abilities of civil servants in driving digital innovation within their respective agencies. Conversely, firm administrative sanctions (punishment) need to be applied to civil servants who consistently demonstrate passive resistance to the adoption of new systems. In this way, the bureaucratic ecosystem in Cimahi City will be naturally stimulated to continue developing into a modern, competent bureaucratic machine ready to oversee the sustainability of the future of a Smart City.

c. Strengthening Regulations and Policies

The key pillar for ensuring the sustainability of the Smart City ecosystem from the risk of changes in regional political leadership is through strengthening legal aspects. The Cimahi City Government must firmly anchor this digital transformation policy direction in legally binding regional planning documents, namely the Regional Medium-Term Development Plan (RPJMD) and the Regional Long-Term Development Plan (RPJPD). By integrating the Smart City blueprint into these macro-planning documents, digitalization programs are no longer viewed as optional projects solely owned by the Communication and Informatics Agency, but rather become a constitutional mandate that must be implemented and funded by all sectors of the local government on an annual basis.

The development of this strong legal framework will automatically guarantee budget certainty in the Cimahi City Regional Budget (APBD). When smart city programs have a clear legal basis within the RPJMD, funding allocations for infrastructure maintenance, cybersecurity strengthening, and system development will not be easily cut or diverted for short-term interests. This legal certainty also provides a sense of security for heads of regional government agencies (OPD) and field officials to innovate and execute digital budgets, as all tactical steps they take are legally sound and protected from the risk of administrative findings.

However, the existence of macro regulations on paper must be balanced with a complete overhaul at the operational level through the development of new digital Standard Operating Procedures (SOPs). Conventional SOPs, which are bureaucratic, linear, and require extensive physical verification, must be eliminated and replaced with electronic procedures that prioritize speed. The development of these digital SOPs focuses on the spirit of debureaucratization, where unnecessary, duplicative, or merely formal manual signature steps are drastically reduced using automated system validation.

Through the synergy between strong macro regulations and agile operational SOPs, government business processes in Cimahi City will transform to become significantly more efficient. These new digital SOPs will force officials to work beyond traditional bureaucratic boundaries, as document and data flows now move transparently and measurably within an electronic tracking system. The final result is the creation of certainty of time and transparency of service costs for the public, which also proves that strengthening regulations is able to change the face of the Cimahi City bureaucracy into a fast, accurate and accountable public service machine.

d. Public Participation and Collaboration (Smart Society & Smart Branding)

The ultimate strategy for breaking down bureaucratic rigidity in Smart City implementation is to position the public not merely as objects of services but as active partners in development. The Cimahi City Government must expand and optimize digital-based participatory spaces by providing an integrated channel for public complaints and aspirations. This platform should not simply function as a passive digital suggestion box but should be designed as a transparent, two-way monitoring system, where citizens can track the progress of their permit processing in real time or report infrastructure issues in the field with the guarantee of a measurable response from relevant officials.

The presence of this transparent participatory space indirectly serves as an effective instrument of social control to break down bureaucratic slowness. When every citizen complaint and the speed of the OPD's response are clearly displayed on a public dashboard, civil servants are forced to step out of their comfort zones and work more agilely. This transparency of information reduces the potential for illegal levies and deliberate delays in services, while simultaneously rebuilding public trust in the credibility of Cimahi City's governance.

However, public engagement should not stop at complaints but must be elevated to the co-creation stage through the implementation of the Pentahelix Collaboration model. The Cimahi City Government needs to build a solid partnership bridge involving five main pillars: government, academia, the private sector, the creative community, and the mass media. In the academic sector, the Cimahi City Government can collaborate with local higher education institutions, such as Jenderal Achmad Yani University (Unjani), to provide scientific studies, technological research, and expert assistance to validate the effectiveness of digital innovations before they are launched to the public.

Through this dynamic Pentahelix synergy, budget constraints and the scarcity of technical human resources within the bureaucracy can be creatively addressed. The private sector can contribute through Corporate

Social Responsibility (CSR) programs to fund smart infrastructure, while the creative community and the mass media play a crucial role in socializing programs and shaping the city's innovative image (Smart Branding). This inclusive collaboration ensures that the Smart City ecosystem in Cimahi City no longer runs slowly under the sole control of a rigid bureaucratic machine, but instead grows into a dynamic, adaptive social movement owned by all levels of society.

4. Conclusion

The acceleration of smart cities in Cimahi City is still hampered by six intertwined clusters of bureaucratic obstacles: strong sectoral egos that trigger the phenomenon of data silos; the clash between rigid government organizational structures and digital dynamics that demand agility; and cultural resistance among civil servants to changes in conventional work systems. These conditions are exacerbated by the limited quantity and quality of human resources (HR) in the technical field; the tendency of policymakers to reduce Smart City to merely a hardware procurement project (ICT project); and the weak consistency of leadership commitment that impacts the uncertainty of long-term regional budget allocations. To unravel these structural and cultural blockages, the execution of a comprehensive, integrative, and sustainable mitigation strategy is required. First, the Cimahi City Government must transform data governance through the implementation of a Single Sign-On (SSO) system and strengthening data interoperability that adheres to the Electronic-Based Government System (SPBE) architecture. Second, capacity constraints and HR resistance need to be intervened through massive digital literacy technical guidance and the reconstruction of the apparatus' mindset to be more service-oriented. Third, ensuring the sustainability of the program must be secured through strengthening macro regulations by incorporating the Smart City blueprint into the RPJMD/RPJPD documents, accompanied by a digital operational SOP overhaul to cut inefficient bureaucratic channels (debureaucratization). Finally, this reform must be supported by expanding transparent public participation and institutionalizing the Pentahelix Collaboration model with the private sector and local academics such as Jenderal Achmad Yani University. Through the integration of all these mitigation strategies, bureaucratic obstacles can be gradually eliminated, enabling Smart City in Cimahi City to migrate from mere administrative formalities to driving fast, accurate, transparent, and accountable public services.

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