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Local innovations to tackling covid-19 in Indonesia: how Depok City government managed the pandemic effectively?

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Abstract

This article examines how locally driven innovations contribute to the effectiveness of decentralization policies, focusing on the COVID-19 pandemic response by the Depok City Government in Indonesia. Using a qualitative case study approach, the research draws on in-depth interviews, field surveys with 932 residents, an online survey of 218 healthcare workers conducted between September 2020 and January 2021, and content analysis of mass and social media conducted in collaboration with citizen experts. The analysis highlights two key initiatives. The first is the COVID-19 Information Center for Depok City (Pusat Informasi COVID-19 Kota Depok), better known as the PICODEP application, which functions as a digital data platform that supports evidence-based policy-making. The second is the Kampung Siaga program, which facilitates community participation in monitoring and managing the local impacts of the pandemic. Despite fiscal and infrastructural constraints, these innovations strengthened Depok's capacity for timely and effective pandemic control. The study also reveals skepticism among some residents regarding official government assistance. However, it demonstrates that adaptive, collaborative, and inclusive strategies are vital for rebuilding trust and reinforcing local governance. Cross-sector collaboration, including partnerships with academic institutions, together with broad citizen engagement, proved critical for sustainable pandemic adaptation. The integration of technology, grassroots participation, and institutional support not only improved crisis management but also provided valuable lessons for strengthening decentralization frameworks in future emergencies. Ultimately, this article offers a comprehensive analytical perspective on designing adaptive local policies for public health resilience and disaster mitigation.

Keywords: *local Innovation, decentralization, Covid-19, pandemic*

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Introduction

Managing the Covid-19 pandemic posed a significant challenge for countries worldwide (Spinelli & Pellino, 2020), including Indonesia (van Empel et al., 2020). Nations undertook various measures, both independently and collaboratively, often through authoritative institutions such as health organizations and universities (WHO, 2020). These efforts aimed to reduce case numbers, mitigate socio-economic impacts (Das, 2022), and address the pandemic's indirect consequences (Chiesa et al., 2021). In Indonesia, the government faced a dilemma between prioritizing public health and maintaining economic stability. The lack of a clear health priority during the early stages of the pandemic led to suboptimal management (Roziqin et al., 2021),

particularly in Depok, West Java, the location of Indonesia's first confirmed Covid-19 case (Nugraha et al., 2020).

Strategies and priorities for pandemic management across countries demonstrate that there is no single, universal standard guaranteeing success. The LOWY Institute (2021) found that countries with the most effective responses employed a diverse range of strategies, including strict isolation protocols, leveraging science and technology to strengthen community collaboration, and enhancing public health education to facilitate understanding and compliance with preventive measures (Ayuningtyas et al., 2020). This diversity of approaches underscores that successful outcomes are highly contingent upon local context and the capacity to integrate multiple resources into health policy.

In Indonesia, policy responses have similarly varied widely among cities and regions. Decentralization, as introduced through Law No. 32 of 2004, grants local governments broad authority to design and implement policies suited to the specific needs, characteristics, and capacities of their jurisdictions (Seftyono, 2025). While such flexibility creates opportunities for innovation, it also presents considerable challenges, particularly regarding disparities in capacity (Sharma et al., 2021). Regions with limited human resources and health infrastructure face significant barriers in pandemic response, whereas those with greater capacity are able to implement innovative measures that yield more rapid and positive outcomes.

Nevertheless, decentralization presents its own challenges. Disparities in regional capacity constitute significant obstacles to pandemic management (Sharma et al., 2021). Areas with limited human resources and health infrastructure struggle to respond effectively, while regions with greater capacity can implement impactful innovations more rapidly. This dynamic demonstrates that regional autonomy does not automatically yield optimal performance without adequate institutional support.

Ineffective coordination between central and local governments also poses a major concern. Divergent interpretations and understandings of policy contribute to inconsistencies in field-level implementation (Pülzl & Treib, 2017). This highlights the necessity for transparent mechanisms of communication and coordination so that all stakeholders share a common perspective on policy goals and strategies (Lee & Li, 2021).

The Covid-19 pandemic further underscores the importance of a resilient and adaptive health system. Long-term investment in the health sector—including infrastructure upgrades, capacity-building for medical personnel, and the development of health technologies emerges as a key lesson from this experience (Haldane et al., 2021). Integrating frameworks between central and local governments is essential for future preparedness against health challenges.

In this regard, the article seeks to address a significant research gap. Existing studies, both international and national, on the pandemic in Indonesia have largely focused on central government measures or provincial-level initiatives. The role of municipal governments within decentralization frameworks, particularly those that combine digital innovation with community empowerment, has received much less attention. The case of Depok is especially noteworthy, as it demonstrates the simultaneous use of information technology strategies alongside community-driven programs.

This study's academic contribution lies in expanding understanding of the relationships among decentralization, governmental innovation, and health crisis management. Findings from Depok aim to offer new perspectives on how city

governments can integrate technological and social innovations to reinforce pandemic response capacity. Thus, this study not only documents best practices but also builds a theoretical argument for understanding and comparing local responses in other regions.

This research aims to examine the extent to which local capacity and innovation developed at the city level can enhance the effectiveness of decentralization-based policies during health crises. The analysis focuses on two main aspects: first, the policy strategies adopted by the Depok City Government in responding to the pandemic; and second, the extent to which the decentralization framework enables these innovations to function effectively, including the role of cross-sectoral collaboration.

Unlike many other regions that adhered strictly to central government directives (Morris, 2021), the City of Depok adopted a comprehensive, decentralization-based strategy. This approach allowed Depok to achieve Community Restrictions Level 1 status the highest level of pandemic control (Instruction of the Minister of Home Affairs No. 67/2021). Such policy-making demonstrated political courage in prioritizing public health, even when national priorities initially emphasized economic recovery (Setiati & Azwar, 2020).

The Depok City Government also successfully fostered robust institutional collaborations, including partnerships with academic bodies such as University of Indonesia (Safitry, 2020). These collaborations strengthened the scientific foundation of local policies and ensured the relevance of innovations to community needs. By integrating digital technology, inter-sectoral cooperation, and civic engagement, Depok has established a strong model for adaptive and sustainable municipal response.

This article's novelty lies in its unique integration of decentralization analysis with an empirical examination of both technology-enabled and community-driven innovations at the city level during a health crisis. Few studies have simultaneously explored how municipal governments utilize big data through applications such as the COVID-19 Information Center for Depok City *(Pusat Informasi COVID-19 Kota Depok)*, better known as *PICODEP*, while also mobilizing social capital through initiatives like *Kampung siaga*. This analytical framework provides fresh insights into the development of adaptive, collaborative, and sustainable local policies for pandemic management and future public health emergencies.

Research Method

This article examines the management of the Covid-19 pandemic, which was carried out differently at the local level compared to what was implemented by the central government. This work investigates how pandemic management was implemented at the regional level, where capacity did not always align with the targets set by the central government. Two major questions proposed are: 1) What did the Depok City government do to respond effectively to the pandemic? And 2) How did decentralization, which emphasizes regional autonomy for innovation, enable Depok City to have the capacity to respond optimally to the pandemic?

These two questions are discussed sequentially by highlighting innovation and decentralization as key analyses. To address them, the first step was collecting information regarding Covid-19 pandemic management and policy issues through a literature review. This approach aims to provide an initial overview of what has been studied by previous researchers while identifying new findings in this work.

This study employed a qualitative approach with a case study design (Yin, 2018) to examine science communication practices in the implementation of the Covid-19

policy. This methodology is appropriate for explaining complex and dynamic social phenomena characterized by uncertainty, particularly in the context of evidence-based public policy at the local level. The case study design enables in-depth exploration of policy dynamics in Depok City and facilitates the analysis of interactions among actors, technology, and community stakeholders.

The research structure follows a non-linear, cyclical pattern, adopting the logic of practice as described by Neuman (2014), allowing research stages to adapt to evolving field data. Flexibility is essential, given the need to adjust methods and data collection strategies in response to changing conditions and mobility restrictions during the pandemic.

The study focused on policy communication practices related to Covid-19 management in Depok City, with particular attention to actors engaged in the production, dissemination, and consumption of scientific knowledge in the public sphere. It integrates the analysis of municipal policy, the digital innovation *PICODEP*, and the community-based *Kampung Siaga Tangguh Jaya* program, which serve as vehicles for public communication and education.

Subjects include expert citizens and health educators (four health experts from various universities and research institutions and one representative from a professional medical association), healthcare workers (online surveyed through 218 professionals in diverse medical roles), and direct interviews with government officials (one representative from the Depok City Health Agency). The general public is also included as field survey respondents (932 participants) to enrich perspectives on policy communication effectiveness and local innovation. These surveys conducted between September 2020 to January 2021.

The interview informants were obtained using the snowball method, which was considered capable of representing various perspectives (Ritchie et al., 2013). Selecting informants with direct involvement or deep knowledge of Covid-19 policies in Depok City. Healthcare worker and public surveys employ a combination of purposive and snowball sampling, leveraging professional and local community networks. This approach facilitates access to relevant respondents amid mobility constraints imposed by Community Restrictions.

Surveys were conducted online via web-based platforms to minimize health risks and comply with social restrictions. The chosen method supports time and cost efficiency and achieves broader respondent coverage. However, this strategy acknowledges limitations, such as potential bias towards those with internet access and digital literacy, which may reduce the representation of more vulnerable, less digitally connected populations.

Data collection methods include in-depth interviews, semi-structured surveys, and content analysis of mass media and social media. Semi-structured interviews allow for narrative exploration from informants, while surveys provide quantitative data to complement qualitative findings. Secondary data, such as news articles, webinar recordings, and social media posts, are used for triangulation and verification.

Data processing is based on principles of reduction, abstraction, and transformation as recommended by Lobe et. al. (2020). Collected data are selected for relevance to research questions and analyzed contextually. Narrative construction is guided by two frameworks: policy communication and science communication, encompassing the roles of knowledge brokers, actor idea reinforcement, and public education.

Analysis connects empirical findings with theories of decentralization (Imperial, 2021), policy innovation (Torfing, 2019), and collaborative governance (Bryson et al., 2014). It also explicates healthcare workers' policy proposals accommodated by local government through concepts such as policy uptake and structural barriers in local bureaucracy (Deslatte et al., 2020). These constraints illustrate the challenges of inter-actor coordination and the potential for local political tensions within policy adoption processes.

Regarding *PICODEP*, effectiveness is influenced not only by technical factors but also by local political dynamics, such as legislative support and cross-departmental coordination. This aligns with Sørensen & Torfing (2011), who argue that public innovation requires political legitimacy and institutional support for sustained implementation.

Similarly, the success of *Kampung Siaga* is shaped by socio-political factors, including local leadership capacity, resident solidarity, and autonomous resource management. Digital literacy and informal leader support are critical variables that may strengthen or undermine program effectiveness. This interconnection demonstrates that community-based innovation must be viewed not only as best practice, but also as an outcome of local socio-political negotiation.

To ensure validity, this research employed source and method triangulation. Source triangulation involves verifying information from expert citizens, healthcare workers, officials, and residents. Method triangulation compares interview data, official documents, and social media content. Synchronization of findings is performed to accurately represent field realities and avoid replicating solely formal government narratives.

Result and Discussion

Depok City, Constraints and Successes in Responding to the Covid-19 Pandemic

Depok was one of the first regions in Indonesia to report COVID-19 cases. Despite limited resources, the city government responded promptly by issuing formal mayoral decrees and introducing PICODEP, a digital COVID-19 information hub. This platform facilitated real-time case monitoring based on residents' locations and identities, representing a significant breakthrough despite infrastructural and fiscal constraints.

Table 1. Perceptions on the Covid-19 Truth

Information Filtering Facility	Covid-19 as a Hoax	Mobility Restriction	Compliance with Health Protocols
81.1%	9.6%	37.2%	32.6%

Source: processed by authors

Referring to Table 1, not all residents of Depok have access to facilities that enable them to filter information. This has led to a relatively high number of residents who consider Covid-19 a hoax and do not comply with existing health protocols. For example, only 37.2% of respondents followed mobility restrictions, and just 32.6% adhered to health protocols. Therefore, the presence of reliable information systems and networks is highly urgent.

Rather than awaiting the development of a national platform, Depok independently initiated digital case reporting and contact tracing. Data from *PICODEP* not only facilitated contact tracing but also served as the basis for more precise policy-making (Mantalean & Patnistik, 2021). This approach was accompanied by full

transparency, including the rejection of data manipulation to maintain a "green zone" image. Such policies reflect the city's commitment to evidence-based pandemic management tailored to local context.

Fiscal constraints in early 2020, with emergency funding of approximately Rp20 billion, prompted the reallocation of resources from non-priority programs toward health and social protection. By 2021, allocations increased to Rp99 billion, indicating fiscal adaptation to the escalating pandemic. Another major challenge was the prevalence of hoaxes affecting community behavior. To address this, the city government established public communication channels through hotlines and multi-agency official platforms.

Table 2. Perceptions on Government Assistance

Received Business Incentives	Received Assistance from Central and Local Government	Assistance Considered Effective
60.6%	69.7%	36.9%

Source: processed by authors

Table 2 points out that approximately 69.7% of Depok residents reported receiving social assistance from the government. However, only one-third considered the assistance effective. This points to ongoing issues with the distribution and effectiveness of aid, particularly for informal sector workers directly impacted by activity restrictions.

Shortcomings in government assistance, as reflected in survey data, were mitigated through *Kampung Siaga*, a program that fosters community solidarity. Through this initiative, residents actively monitored virus transmission, distributed aid, and provided health protocol education. The program not only filled gaps in government services but also strengthened local social networks.

Table 3. Communication from Healthcare Workers to the Government

Suggestions via Professional Associations	Suggestions via Government Officials	Suggestions via Academic Forums	Suggestions Implemented by the Government
8.7%	13.3%	11.5%	12.4%

Source: processed by authors

The combination of *PICODEP*'s digital innovation and social mobilization through *Kampung Siaga* enhanced the city government's response capacity. Interactions between healthcare workers, communities, and government, while still limited, have emerged and influenced program implementation, which remains suboptimal (Table 3). These innovations improved tracing effectiveness, streamlined aid distribution, combated misinformation, and reinforced public trust. Depok demonstrates that integrating technology with citizen participation can produce adaptive, collaborative, and science-based local policy models, even in times of crisis and constraint.

Innovation and Decentralization Impact on Institutional Reinforcement

From Decentralization to Innovation and Institutional Reinforcement

Prior to decentralization reform, Indonesia's governance system was highly centralized. City and district-level policies primarily implemented central government decisions, leaving little room for local innovation. A significant shift occurred with the enactment of Law No. 23 of 2014, which granted broad authority to local governments to formulate their own policies, except in certain domains such as foreign affairs, defense, security, the judiciary, monetary and fiscal policy, and religion.

This reform enabled regions to creatively manage local potential, including in the health sector. During the Covid-19 pandemic—even though its management was normatively under central jurisdiction—many regional governments took innovative actions reflecting local needs and capacities (Imperial, 2021). This newfound autonomy produced varied strategies, ranging from strict containment policies to technology-based and community-driven approaches.

Table 4. Map of the Division of Work Domains between Central and Regional Governments Under Applicable Regulations in Indonesia

	Absolute Affairs (Central Government)	**Concurrent Affairs** (Central and Local Government)	**Government's General Affairs** (Coordination)
Division of Work Domains	**Foreign Policy:** Conducting diplomatic relations between countries. **Defense:** Managing armed forces and protecting national sovereignty. **Security:** Maintaining national security through institutions such as the National Police (Polri). **Justice (Law and Judiciary):** Administering the judiciary through the Supreme Court and other judicial institutions. **National Monetary and Fiscal Affairs:** Managing currency policy, Bank Indonesia, and central taxation. **Religion**: Regulating religious affairs, such as the hajj pilgrimage, religious guidance, and religious education**.** **Legal Basis:** Article 10 of Law No. 23 of 2014; Article 18 Paragraph (5) of the 1945 Constitution.	**Education:** **Center:** National education policy, curriculum, accreditation, and public universities. **Province:** Management of senior high schools and special education. **Regency/City:** Management of elementary schools, junior high schools, and non-formal education. **Legal basis:** Article 12 Paragraph (2) of Law No. 23 of 2014. **Health:** **Center:** National health policy, control of infectious diseases, and vaccination programs. **Province:** Provincial hospitals and coordination of health services across regencies/cities. **Regency/City:** Community health centers, basic health services, and nutrition management. **Legal Basis:** Article 12 Paragraph (2) of Law No. 23 of 2014, and Government Regulation No. 38 of 2007. **Transportation:** **Center:** Air transportation, seaports, inter-provincial railways, and international traffic. **Province:** Type B terminals and management of inter-regional transportation within the province. **Regency/City:** Type C terminals, urban transportation, and management of local roads. **Legal basis:** Article 12 Paragraph (2) of Law No. 23 of 2014.	Function of Cross-Sectoral and Intergovernmental Coordination Article 25 of Law No. 23 of 2014: Disaster Management

Source: processed by authors

Directly elected regional heads possess political legitimacy and bear considerable responsibility for resident welfare, motivating them to prioritize community needs above national agendas (Faguet, 2014). This fosters bottom-up policies tailored to local challenges, often differing from the uniform policies of central authorities that overlook socio-economic and infrastructural diversity among regions.

However, decentralization entails consequences. Disparities in regional capacity remain a prominent challenge. Areas with limited resources often struggle to implement effective policies, while those with greater capacity are able to rapidly adopt adaptive innovations (Sharma et al., 2021). This phenomenon aligns with the concept of the valley of death (Beard et al., 2009), wherein promising ideas may fail due to structural and financial constraints.

Tensions between central and regional governments intensified during the crisis. In the early stages of the pandemic, the central government prioritized economic recovery, whereas several local governments, including Depok, emphasized public health by implementing social restrictions, closing non-essential sectors, and limiting mobility (Wahyuni & Ambardi, 2020). These divergent priorities sparked friction between maintaining economic stability and controlling virus transmission.

This dilemma reflects differing time horizons: the central government seeks short-term economic stability, whereas local governments emphasize pandemic control to prevent long-term health and social burdens. International studies support local approaches that prioritize health; countries such as Australia (Higginson et al., 2020), China (Huang et al., 2023), and various European nations (Goniewicz et al., 2023) demonstrate that strict outbreak control facilitates faster economic recovery.

The foundational premise is that public health provides the basis for economic resilience (Nicola et al., 2020). Without adequate control, high infection and mortality rates create socio-economic instability and hinder recovery. Therefore, strict health policies, although initially restrictive for the economy, represent an investment in long-term sustainability.

Regulatory flexibility is critical in enabling local governments to take actions suited to their circumstances. Butenko and Larouche (2015) emphasize that legal frameworks supporting experimentation and adaptation are essential for responsive policy-making. The pandemic tests whether regulations provide room for regional initiative or constrain them with rigid procedures (Deslatte et al., 2020).

In addition to legal flexibility, policy innovation requires effective policy tools. Un et al. (2010) and Sørensen & Torfing (2011) highlight the significance of information systems and digital platforms in expediting decision-making and policy implementation. Examples such as digital health reporting applications and technology-based data centers strengthen government–citizen interaction, increase response speed, and enhance policy targeting.

Multi-stakeholder collaboration is also imperative. Local governments engaging communities, the private sector, and professional groups create policy synergy that is more adaptive and responsive (Ansell & Gash, 2007; Bryson et al., 2014; Kuenkel, 2024). Such collaboration bolsters response capacity, broadens policy legitimacy, and builds public trust as social capital for implementation (Vangen & Huxham, 2003; Kumagai & Ilorio, 2020).

Depok's case illustrates how active citizen and non-governmental actor involvement can compensate for formal capacity limitations. This approach is not only relevant for pandemic management but can be adapted for other crises requiring swift, context-sensitive responses. Success stems from a combination of innovation,

collaboration, and the willingness to diverge from central policy narratives. It also demonstrates that decentralization is more than administrative power-sharing; it is a political opportunity to develop policies anchored in local realities. Despite tensions with central priorities, locally driven policies have proven more effective for holistic crisis response. As noted by Daimer et al. (2012), local prioritization of public health can minimize the long-term consequences of epidemics, even at the expense of short-term economic growth (Aldrich & Meyer, 2015; Bailey et al., 2020).

Depok City and Covid-19 Pandemic Management: Innovation and Institutional Capacity

Referring to the success of the Depok City government in tackling the Covid-19 pandemic from a decentralization perspective, two types of innovations were identified. The first innovation is based on advancements in science and technology, where collaboration was conducted through scientific approaches with various competent parties, such as universities and government research institutions. The emergence of applications e.g. *PICODEP* stands out compared to the optimization of website-based information. The second innovation is based on a community approach. In this regard, *Kampung siaga* substantially strengthened the government's capacity to manage pandemic-affected residents.

Science and Technology for Innovation

PICODEP, derived from the "Covid-19 Information Center for Depok City", performed crucially in utilizing science and technology to address the pandemic in a decentralized manner. As part of the Jabodetabek metropolitan area, Depok underwent significant challenges in managing information and healthcare services, as well as mitigating pandemic impacts (Seftyono, 2023). *PICODEP* was established to integrate real-time data and technology in an effort to provide rapid and evidence-based responses to the health crisis, as shown in other regions (Sun et al., 2020; He et al., 2021).

The decentralized technology introduced through *PICODEP* significantly improved public access to health information. Residents could monitor pandemic conditions in their neighborhoods, access health protocol guidelines, and locate nearby medical facilities via the application and website. This system enhanced public health literacy while reducing hoaxes and misinformation—key factors in expanding the reach of public health efforts during the pandemic (Praptiningsih & Kurnia, 2020).

Collaboration with academic institutions, notably Universitas Indonesia, also strengthened the scientific foundations of *PICODEP*. Joint research on Covid-19 transmission patterns in Depok informed the development of evidence-based interventions (Seftyono, 2023). This partnership accelerated the formulation of more targeted, data-driven policies, demonstrating the value of science and technology in supporting local health governance (Torfing, 2019). For example, in critical moments such as during Large-Scale Social Restrictions and Community Restrictions, big data helped the government to track people's mobility, behavioural trends, and potential violations. therefore, the authority could take immediate responses (Guan et al., 2020; Keesara et al., 2020). *PICODEP* also addressed healthcare access limitations through telemedicine services. This kind of technology connected patients with medical professionals, enabling safe, efficient remote consultations—particularly critical in red zones under strict restrictions (Dorsey et al., 2020; Asadzadeh et al., 2020). It could even

gather the information related to vaccine supply and distribution (Rachmawati et al., 2021).

PICODEP adopted the digital Covid-19 case reporting system, in which residents could self-report symptoms or test results through a user-friendly interface, with health teams analyzing this data in real time. This approach streamlined health condition monitoring, accelerated policy responses, and facilitated early detection of new clusters (Interview Z, 11 April 2022). The app's infrastructure also enabled seamless data integration across government agencies and private sector partners. For example, hospital bed availability was transparently shared, facilitating efficient inter-agency coordination and optimal resource allocation during emergencies. To strengthen community engagement, PICODEP provided digital training on health applications and information systems. This initiative empowered residents to serve not only as recipients but also as active contributors in managing the pandemic, exemplifying a community-based model of decentralized innovation.

During the pandemic, *PICODEP* leveraged social media for public health campaigns. By analyzing online behavior, it tailored educational messages to community needs, expanding message reach and accuracy (Interview I1, May 26, 2022). Social media also served as a platform to verify and clarify information, reinforcing public health literacy (Interview I2, May 24, 2021).

In terms of policy evaluation, *PICODEP* adopted data-driven methods to assess the effectiveness of implemented measures. By tracking case reduction trends, the platform like *PICODEP* helped refine subsequent interventions, improving both policy effectiveness and institutional accountability (Sanderson, 2002; Matheus et al., 2020).

As an innovation hub, *PICODEP* exemplifies how decentralized governance, when supported by science, technology, and community collaboration, can effectively respond to complex public health crises. Its adaptive, locally grounded model offers a promising reference for managing future emergencies.

Building Up Community Networks

Kampung Siaga Tangguh Jaya or Resilient Alert Village in Depok City is an initiative that successfully strengthens community networks through a decentralized approach. This program was designed to empower communities at the neighborhood level to monitor and manage residents' health conditions during the pandemic. A community-based approach enables residents to be more active in managing their health crises. Such initiatives also enhance local capacity to participate in governing public issues (Fung, 2015).

Kampung Siaga empowered residents to address local needs independently during the pandemic. A notable example was the establishment of community-managed food barns, which secured essential supplies and fostered food resilience. This approach not only ensured material sufficiency but also strengthened social solidarity.

The program also played a pivotal role in public education. Neighborhood-level forums disseminated information on health protocols, vaccination, and preventive measures, thereby increasing health literacy and preparing the community for future health crises. While doing so, the community coordinated to track residents, particularly those returning from outside the city—facilitating early detection of potential Covid-19 cases. This data-driven approach supported timely interventions and complemented broader infection control strategies. The initiative's effectiveness was demonstrated in

several neighborhoods that achieved Covid-free status, illustrating the impact of community participation and collective action on local crisis management.

Local leadership was instrumental in sustaining the program. Sub-district and village heads closely monitored implementation, ensuring alignment with community goals. This collaboration between local government and residents reinforced public trust and enhanced program sustainability (Sullivan & Skelcher, 2017; Gilmore et al., 2020).

Beyond health interventions, *Kampung siaga* provided economic assistance to households affected by the pandemic. Community fundraising and targeted aid distribution supported vulnerable families, maintaining social stability and indirectly encouraging adherence to health measures.

Youth engagement further strengthened the program. Young people contributed to logistics and digital literacy education, expanding the initiative's reach and fostering civic responsibility. Their involvement underscored the vital role of youth in building community resilience (Driskell, 2017).

A clearly defined division of responsibilities among local governments, health volunteers, and residents was crucial to the program's success. Organizational clarity enhanced coordination, improved resource efficiency, and enabled prompt responses to emerging health threats. The social networks established through *Kampung siaga* produced lasting benefits. Participants gained health knowledge and developed collaborative capacity and trust-key elements for sustainable community governance.

Kampung siaga demonstrates how decentralization can be effectively operationalized at the grassroots level. By granting communities decision-making authority, the program ensured timely, locally relevant responses-proving more effective than top-down approaches in addressing immediate challenges. Ultimately, *Kampung siaga* underscores the importance of local innovation in addressing global crises. Its flexible, needs-based model offers a replicable framework for other cities aiming to enhance urban resilience. Community-driven innovation remains essential for sustainable and adaptive crisis management.

The Role of Innovation in Strengthening Government Capacity to Tackle Pandemic

Science and technology-based innovations implemented by the Depok City Government have generated a substantial domino effect. Initially, technical advancements enhanced local government capacity, which in turn improved program and policy implementation effectiveness, particularly in Covid-19 response. Within the framework of the Sustainable Development Goals (SDGs), these steps align with SDG 3 (good health and well-being) (Howden-Chapman et. al., 2017) and SDG 11 (resilient, inclusive, and sustainable cities) (Küfeoğlu, 2022). This approach ensures that pandemic responses not only address emergency needs but also reinforce the foundations of urban governance for the future.

Innovation for Strengthening Local Government Capacity

Innovation is critical to strengthening local government capacity, especially in meeting increasingly complex development and public service challenges. It enhances efficiency, transparency, and accountability, thereby improving the quality of public services (Elstub & Escobar, 2019). At the local level, innovation enables more targeted and rapid achievement of development goals, particularly in social and economic sectors (Malizia et al., 2021).

Strengthening government capacity through innovation begins with the adoption of information and communication technology (ICT) to streamline administration and management. Electronic government systems (e-government) enable efficient data management and support more accurate, responsive decision-making (Adamides & Karacapilidis, 2020). ICT implementation also fosters more transparent and efficient public services (Gil-Garcia et al., 2018), increasing government adaptability to rapid change.

The use of technology in public services not only improves efficiency but also encourages broader community participation. Mobile applications, online platforms, and social media provide residents with access to public information, opportunities for feedback, and participation in planning and development processes. Enhanced public engagement strengthens local democracy, granting residents greater influence on decisions affecting their lives (Nabatchi & Leighninger, 2015), and bolsters the legitimacy and transparency of local government.

Furthermore, data-driven policy innovation has become increasingly vital. The use of big data and analytics enables evidence-based policy formulation. By analyzing demographic, economic, and social data, local governments can develop policies that better match actual conditions. This is especially relevant under decentralization, where local governments possess authority to tailor policies to regional characteristics.

Innovation also contributes to local bureaucratic capacity building. Training and professional development using digital technologies and online platforms are increasingly important for enhancing administrative management (Janowski et al., 2018). ICT-based human resource management systems allow for objective performance evaluation and targeted training program design, supporting improved administrative and public service capacity.

Simultaneously, governance and transparency innovations are essential for building government capacity. Innovations based on public information disclosure—such as budget transparency portals—allow citizens to effectively monitor public fund usage, promoting accountability and increasing public trust in local government (Beshi & Kaur, 2020). Such transparency directly contributes to sustainable city development as underlined in SDG 11.

Optimal implementation of innovation depends on broad support. Collaboration between central and local government in policy formulation, funding, and capacity building is crucial (Rhodes, 2018). The central government can provide financial and policy support, while local governments ensure effective application. Such synergy enhances the local government's ability to implement innovation appropriately.

Successful innovation in strengthening local capacity is further shaped by partnerships with the private sector and civil society. Innovation originates not only from government but also from other sectors providing creative and practical solutions. Cross-sector collaboration builds an innovation ecosystem, strengthening local governance (Hodge & Greve, 2017).

However, government innovation faces several challenges, notably limited human resource readiness to adopt and utilize new technologies (Meiyanti et al., 2018). Enhancing technical and managerial capacities is therefore strategic. Ongoing human resource development is essential for effective innovation implementation.

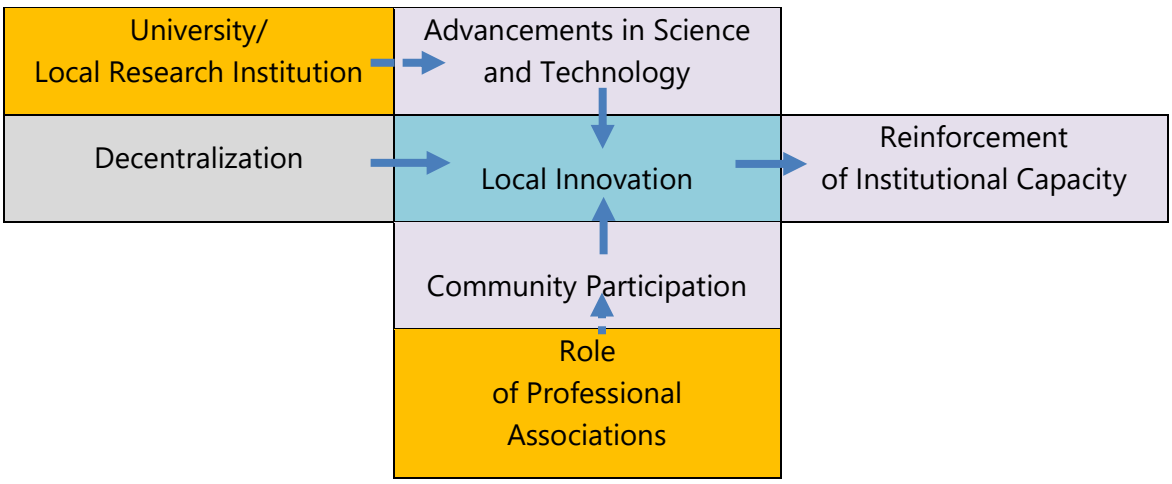
Human resource readiness and supportive policies are both essential for successful innovation implementation. Adaptive policies that encourage technology adoption and new approaches in public service accelerate transformation. Policies that promote local technology development and community-driven innovation further

reinforce government capacity in addressing social and development challenges. In the pandemic context, science- and technology-based innovation involving universities and communities has stimulated broader public participation (Figueiredo et al., 2016). Programs such as *PICODEP* in Depok have shown that collaboration among governments, universities, and communities can produce relevant, impactful digital solutions. This approach not only addresses pandemic-related challenges but also lays an adaptive governance foundation for future health crises, in line with SDG 3.

Overall, strengthening local government capacity through innovation is relevant not only for Covid-19 response, but also forms a key component of long-term strategies to build healthy, resilient, and sustainable cities. Integrating technological innovation, transparent governance, public participation, and cross-sector collaboration ensures greater readiness for future global challenges.

The Reinforcement of Local Government Capacity and Covid-19 Pandemic Management

Strengthening local government capacity is crucial in confronting the Covid-19 pandemic. As the primary interface with citizens, local governments play a strategic role in decision-making speed, information dissemination, and cross-sectoral coordination, all determined by the robustness of institutional capacity. Solid governance mechanisms enable rapid, accurate responses to evolving situations (Janssen & Van Der Voort, 2016). Effective local management can mitigate the impacts of crises and deliver targeted responses to the most affected populations.



Solid Line: Direct Influence | **Dashed Line**: Indirect Influence

Figure 2. The Influence of Decentralization on Innovation Leading to Institutional Capacity Reinforcement

Source: processed by authors

An essential aspect of strengthening local government capacity is integrated management of data and information. In health crises, data serve as a strategic asset for evidence-based decision-making. Local governments capable of efficiently consolidating health, social, and economic data into information systems are better positioned to design targeted policies. Technology-based monitoring systems, such as contact tracing apps and digital health information platforms, enable real-time tracking of pandemic developments (Andrejevic & Volcic, 2021), facilitating prompt action based on field conditions.

Decentralization policies give local governments the flexibility to innovate in response to specific regional needs. This adaptability supports the development of

science and technology-based programs tailored to the characteristics of each locality (Cai et al., 2020). Success depends on advanced technological understanding and effective management of local resources. Universities serve as strategic partners, offering research and technology development that governments can adopt to improve public service efficiency.

University involvement in science and technology innovation also encourages public participation (Figueiredo et al., 2016). Academic institutions can support governments and communities in crafting innovative solutions that empower local populations. The development of the *PICODEP* application in Depok illustrates close collaboration between local government, universities, and community organizations. Support from professional associations ensures innovation quality by applying professional standards and enhancing local workforce skills.

Cross-sector collaboration fosters an inclusive and sustainable innovation ecosystem. In local governance frameworks, successful adoption and implementation of technology rely heavily on the ability of governments to build synergy with academic and community partners (Homer et al., 2022). Effective knowledge transfer and robust community participation yield innovations that are locally relevant and directly improve well-being.

Inter-agency coordination is vital for reinforcing regional capacity, especially during a pandemic that involves sectors such as health, economics, social affairs, and education. Robust coordination mechanisms ensure that government policies operate synergistically. Technological innovation in coordination systems can expedite inter-agency communication, prevent policy overlap, and facilitate efficient resource allocation, notably in vaccine and social aid distribution.

Human resource management within local government also defines crisis response effectiveness. Officials engaged in pandemic management require appropriate skills and knowledge. Continuous training in technology, health protocols, and crisis management is critical for enabling swift and effective response. Innovative training approaches, such as online or app-based training, promote equitable human resource capacity building without geographic or time constraints (Berman et al., 2021).

In addition to internal capacity building, timely and accurate public information dissemination is imperative. Government-facilitated education and awareness campaigns via mass media or social media enhance public understanding and compliance with health protocols. Digital campaigns in various regions have communicated Covid-19 prevention, vaccine distribution, and social restriction policies (Meckelburg & Bal, 2021).

Technology-driven health service innovation accelerates pandemic response. Telemedicine enables remote medical consultations, reducing transmission risk in healthcare facilities. These systems help decrease hospital burdens, expand care access in remote areas, and ensure continuity of care for those in need (Sittig & Singh, 2015). Such technological solutions are pivotal for creating efficient, inclusive, and crisis-adaptive service systems. Depok demonstrates that integrating technology with citizen participation can produce adaptive, collaborative, and science-based local policy models, even in times of crisis and constraint.

Early detection and response capability are integral to effective crisis management. Data-driven early warning systems allow governments to act before situations deteriorate. Responsive, evidence-based crisis management reduces the pandemic's negative impact (Kavanagh & Singh, 2020) and strengthens public trust in local preparedness.

Resource limitations in human, financial, and technological capacities remain major challenges. Therefore, close collaboration among the central government, local governments, the private sector, and communities is strategically essential. The central government can provide policy direction and financial support, while local governments concentrate on effective field implementation.

Capacity strengthening also depends on strong political support. Policies granting flexibility in resource management and promoting innovation across sectors can accelerate pandemic response (Deslatte et al., 2020). Without adaptive policy frameworks, local governments' ability to respond to rapidly changing conditions is limited.

Community involvement is an essential pillar in strengthening local government capacity. Active citizen reporting, such as online submission of cases or health status, enables more accurate monitoring, while government–community collaboration accelerates pandemic control and reinforces social capital to confront future crises. Enhancing local government capacity through technological innovation, cross-sector coordination, human resource development, and multi-stakeholder collaboration is not only critical for effective pandemic management but also fundamental to building resilient, healthy, and sustainable cities. This holistic approach unites responsive public health strategies with a broader vision of adaptive and inclusive urban governance.

Conclusion

Depok City's experience demonstrates that limitations in local government capacity during health crises can be effectively addressed through a combination of technology-driven strategies and community empowerment. Where coordination with the central government is less than optimal, local innovation serves as a bridge to close gaps in responsiveness. PICODEP, through the use of big data, telemedicine, and digital reporting systems, provides concrete support for rapid and accurate decision-making while ensuring more efficient allocation of health resources. This technological approach is complemented by the Kampung Siaga program, which mobilizes social capital at the neighborhood level. Through mobility monitoring, aid distribution, and health protocol education, communities play a critical role in curbing virus transmission and maintaining socio-economic stability. The synergy between technological instruments and community capacity creates an adaptive crisis response model, with clearly defined roles for municipal government and residents. The novelty of these findings lies in the empirical evidence that decentralization enables cities to integrate cross-domain innovations in information technology and community participation within a unified policy framework. Instead of relying solely on central directives, city governments can design context-specific solutions, employ data-driven foundations for policy, and maximize citizen participation to expand the reach and effectiveness of interventions.

The implications of this model extend beyond pandemic response to broader health outcomes and sustainable urban management. More equitable access to health services, improved inter-agency coordination, and strengthened social resilience emerge as direct benefits of this strategy, while its long-term impact is the creation of urban environments better prepared for future shocks, ranging from disease outbreaks to other threats to public safety and sustainable development. Recommendations include strengthening regulatory frameworks to support replication of this model in other regions, enhancing staff capacity through digital training, and investing in

technological infrastructure for cross-sectoral data integration. Equally important, mechanisms for community empowerment should be sustained beyond periods of crisis, ensuring that social networks formed during emergencies can be reactivated when needed. By integrating technological innovation and community empowerment within a decentralization framework, city governments can build capacities that are not only reactive in times of crisis but also proactive in shaping resilient, inclusive, and sustainable urban ecosystems.

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References

Adamides, E., & Karacapilidis, N. (2020). Information technology for supporting the development and maintenance of open innovation capabilities. *Journal of Innovation & Knowledge*, *5*(1), 29-38. https://doi.org/10.1016/j.jik.2018.07.001

Aldrich, D. P., & Meyer, M. A. (2015). *Social capital and community resilience*. American Behavioral Scientist, 59(2), 254-269. https://doi.org/10.1177/0002764214550299

Andrejevic, M., & Volcic, Z. (2021). Pandemic lessons: total surveillance and the post-trust society. *The Political Economy of Communication*, *9*(1). https://www.polecom.org/index.php/polecom/article/view/134

Ansell, C., & Gash, A. (2007). *Collaborative governance in theory and practice*. Journal of Public Administration Research and Theory, 18(4), 543-571. https://doi.org/10.1093/jopart/mum032

Ayuningtyas, D., Misnaniarti, M., Parinduri, S. K., Susanti, F. A., Sutrisnawati, N. N. D., & Munawaroh, S. (2020). Local Initiatives in Preventing Coronavirus Based On Health Policy Perceptive. *Journal of Indonesian Health Policy and Administration*, *5*(2). https://doi.org/10.7454/ihpa.v5i2.4057

Bailey, D., Clark, J., Colombelli, A., Corradini, C., De Propris, L., Derudder, B., ... & Usai, S. (2020). Regions in a time of pandemic. *Regional Studies*, *54*(9), 1163-1174. https://doi.org/10.1080/00343404.2020.1798611

Beard, T. R., Ford, G. S., Koutsky, T. M., & Spiwak, L. J. (2009). A Valley of Death in the innovation sequence: an economic investigation. *Research Evaluation*, *18*(5), 343-356. https://doi.org/10.3152/095820209X481057

Berman, E. M., Bowman, J. S., West, J. P., & Van Wart, M. R. (2021). *Human resource management in public service: Paradoxes, processes, and problems*. Cq Press.

Beshi, T. D., & Kaur, R. (2020). Public trust in local government: Explaining the role of good governance practices. *Public Organization Review*, *20*(2), 337-350. https://doi.org/10.1007/s11115-019-00444-6

Bryson, J. M., Crosby, B. C., & Bloomberg, L. (2014). *Public value governance: Moving beyond traditional public administration and network governance*. Public Administration Review, 74(4), 445-456. https://doi.org/10.1111/puar.12238

Butenko, A., & Larouche, P. (2015). Regulation for innovativeness or regulation of innovation?. *Law, Innovation and Technology*, *7*(1), 52-82. https://doi.org/10.1080/17579961.2015.1052643

Cai, Y., Ma, J., & Chen, Q. (2020). Higher education in innovation ecosystems. *Sustainability*, *12*(11), 4376. https://doi.org/10.3390/su12114376

Chiesa, V., Antony, G., Wismar, M., & Rechel, B. (2021). COVID-19 pandemic: health impact of staying at home, social distancing and 'lockdown'measures—a systematic review of systematic reviews. *Journal of public health*, *43*(3). https://10.1093/pubmed/fdab102

Daimer, S., Hufnagl, M., & Warnke, P. (2012). Challenge-oriented policy-making and innovation systems theory. *Fraunhofer ISI (Hg.): Innovation system revisited. Experiences from 40 Years of Fraunhofer Isi Research*, *40*, 217-234.

Das, K., Behera, R. L., & Paital, B. (2022). Socio-economic impact of COVID-19. In *COVID-19 in the Environment* (pp. 153-190). Elsevier. https://doi.org/10.1016/B978-0-323-90272-4.00014-2

Deslatte, A., Hatch, M. E., & Stokan, E. (2020). How can local governments address pandemic inequities?. *Public Administration Review*, *80*(5), 827-831. https://doi.org/10.1111/puar.13257

Dorsey, E. R., Topol, E. J., & Gornick, M. (2020). Telemedicine 2020 and the next decade. *The Lancet, 26*(8), 537-543. https://doi.org/10.1016/S0140-6736(20)30424-4

Driskell, D. (2017). *Creating better cities with children and youth: A manual for participation*. Routledge. https://doi.org/10.4324/9781315071930

Elstub, S., & Escobar, O. (Eds.). (2019). *Handbook of democratic innovation and governance*. Edward Elgar Publishing.

Faguet, J. P. (2014). Decentralization and governance. *World Development*, *53*, 2-13. https://doi.org/10.1016/j.worlddev.2013.01.002

Figueiredo Nascimento, S., Cuccillato, E., Schade, S., & Guimarães Pereira, A. (2016). Citizen engagement in science and policy-making. *Luxembourg: Publications Office of the European Union*.

Fung, A. (2015). Putting the public back into governance: The challenge of public participation. *Public Administration Review*, 75(4), 513-522. https://doi.org/10.1111/puar.12361

Gash, A. (2022). Collaborative governance. In *Handbook on theories of governance* (pp. 497-509). Edward Elgar Publishing.

Gilmore, B., Ndejjo, R., Tchetchia, A., de Claro, V., Mago, E., Lopes, C., & Bhattacharyya, S. (2020). Community engagement for COVID-19 prevention and control: a rapid evidence synthesis. *BMJ global health*, *5*(10), https://doi.org/10.1136/bmjgh-2020-003188

Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: finding the crossroads. *Public Management Review*, *20*(5), 633-646. https://doi.org/10.1080/14719037.2017.1327181

Goniewicz, K., Khorram-Manesh, A., Burkle, F. M., Hertelendy, A. J., & Goniewicz, M. (2023). The European Union's post-pandemic strategies for public health, economic recovery, and social resilience. *Global Transitions*, *5*, 201-209. https://doi.org/10.1016/j.glt.2023.10.003

Guan, W., Ni, Z., & Hu, Y. (2020). Clinical characteristics of coronavirus disease 2019 in China. *New England Journal of Medicine, 382*(18), 1708-1720. https://doi.org/10.1056/NEJMoa2002032

Haldane, V., De Foo, C., Abdalla, S. M., Jung, A. S., Tan, M., Wu, S., ... & Legido-Quigley, H. (2021). Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries. *Nature medicine*, *27*(6), 964-980. https://doi.org/10.1038/s41591-021-01381-y

He, W., Zhang, Z. J., & Li, W. (2021). Information technology solutions, challenges, and suggestions for tackling the COVID-19 pandemic. *International journal of information management*, *57*, 102287. https://doi.org/10.1016/j.ijinfomgt.2020.102287

Higginson, S., Milovanovic, K., Gillespie, J., Matthews, A., Williams, C., Wall, L., ... & Paolucci, F. (2020). COVID-19: The need for an Australian economic pandemic response plan. *Health Policy and Technology*, *9*(4), 488-502. https://doi.org/10.1016/j.hlpt.2020.08.017

Hodge, G. A., & Greve, C. (2017). On public–private partnership performance: A contemporary review. *Public works management & policy*, *22*(1), 55-78. https://doi.org/10.1177/1087724X16657830

Homer, C., Woodall, J., Freeman, C., South, J., Cooke, J., Holliday, J., ... & Mullen, S. (2022). Changing the culture: a qualitative study exploring research capacity in local government. *BMC Public Health*, *22*(1), 1341. https://doi.org/10.1186/s12889-022-13758-w

Howden-Chapman, P., Siri, J., Chisholm, E., Chapman, R., Doll, C. N., & Capon, A. (2017). SDG 3: Ensure healthy lives and promote wellbeing for all at all ages. *A guide to SDG interactions: from science to implementation. Paris, France: International Council for Science*, 81-126. https://doi.org/10.24948/2017.01

Huang, B., Ye, L., & Wu, J. (2023). Pandemic control vs. economic recovery: understanding the dynamics of work and production resumption policy in local China. *Journal of Chinese Governance*, *8*(2), 283-301. https://doi.org/10.1080/23812346.2022.2131977

Imperial, M. T. (2021). Implementation structures: The use of top-down and bottom-up approaches to policy implementation. *Oxford research encyclopedia of politics*. https://doi.org/10.1093/acrefore/9780190228637.013.1750

Janowski, T., Estevez, E., & Baguma, R. (2018). Platform governance for sustainable development: Reshaping citizen-administration relationships in the digital age. *Government Information Quarterly*, *35*(4), S1-S16. https://doi.org/10.1016/j.giq.2018.09.002

Janssen, M., & Van Der Voort, H. (2016). Adaptive governance: Towards a stable, accountable and responsive government. *Government Information Quarterly*, *33*(1), 1-5. https://doi.org/10.1016/j.giq.2016.02.003

Kavanagh, M. M., & Singh, R. (2020). Democracy, capacity, and coercion in pandemic response: COVID-19 in comparative political perspective. *Journal of health politics, policy and law*, *45*(6), 997-1012. https://doi.org/10.1215/03616878-8641530

Keesara, S., Jonas, A., & Schulman, K. (2020). The role of digital health in the COVID-19 pandemic. *American Journal of Public Health, 110*(10), 1533-1535. DOI: https://doi.org/10.1056/NEJMp2005835

Küfeoğlu, S. (2022). SDG-11: Sustainable cities and communities. In *Emerging technologies: Value creation for sustainable development* (pp. 385-408). Cham: Springer International Publishing.

Kuenkel, P. (2024). Navigating change in complex multi-actor settings: A practice approach to better collaboration. In *Large Systems Change: An Emerging Field of*

Transformation and Transitions (pp. 119-136). Routledge. https://doi.org/10.4324/9781003579380-10

Kumagai, S., & Ilorio, F. (2020). *Building trust in government through citizen engagement*. World Bank.

Lobe, B., Morgan, D., & Hoffman, K. A. (2020). Qualitative data collection in an era of social distancing. *International Journal of Qualitative Methods*, *19*, 1609406920937875. https://doi.org/10.1177/1609406920937875

Lowy Institute (2021) Covid19 Performance. See: https://interactives.lowyinstitute.org/features/covid-performance/.

Malizia, E., Feser, E. J., Renski, H., & Drucker, J. (2021). *Understanding local economic development* (p. 312). Taylor & Francis. https://doi.org/10.4324/9780367815134

Mantalean, V., & Patnistik, E. (2021, January 7). *Data Covid-19 beda jauh dengan Kemenkes, Depok berpegang pada data real-time*. Kompas.com. https://megapolitan.kompas.com/read/2021/01/07/13115951/data-covid-19-beda-jauh-dengan-kemenkes-depok-berpegang-pada-data-real

Matheus, R., Janssen, M., & Maheshwari, D. (2020). Data science empowering the public: Data-driven dashboards for transparent and accountable decision-making in smart cities. *Government Information Quarterly*, *37*(3), 101284. https://doi.org/10.1016/j.giq.2018.01.006

Meckelburg, R., & Bal, C. S. (2021). Indonesia and Covid-19: Decentralization and social conflict. In *Covid-19 and governance* (pp. 74-87). Routledge. https://doi.org/10.4324/9781003154037-8

Meiyanti, R., Utomo, B., Sensuse, D. I., & Wahyuni, R. (2018, August). e-Government challenges in developing Countries: A literature review. In *2018 6th International Conference on Cyber and IT Service Management (CITSM)* (pp. 1-6). IEEE. https://doi.org/10.1109/CITSM.2018.8674245

Morris, C. (2021). A Centralized Pandemic Response in Decentralized Indonesia. *Contemporary Southeast Asia*, *43*(1), 38-44. https://doi.org/10.1355/cs43-1a

Nabatchi, T., & Leighninger, M. (2015). *Public participation for 21st century democracy*. John Wiley & Sons.

Neuman, W. L., (2014). *Social Research Methods: Qualitative and Quantitative Approaches*. Pearson Education Limited

Nicola, M., Alsafi, Z., Sohrabi, C., et al. (2020). *The socio-economic implications of the coronavirus pandemic (COVID-19): A review*. International Journal of Surgery, 78, 185-193. https://doi.org/10.1016/j.ijsu.2020.04.018

Nugraha, B., Wahyuni, L. K., Laswati, H., Kusumastuti, P., Tulaar, A. B., & Gutenbrunner, C. (2020). COVID-19 pandemic in Indonesia: Situation and challenges of rehabilitation medicine in Indonesia. *Acta Med Indones*, *52*(3), 299-305.

Praptiningsih, W., & Kurnia, N. (2020). Hoax and the crisis of health communication-public sphere. *Journal Communication Spectrum: Capturing New Perspectives in Communication*, *10*(1), 1-9. https://doi.org/10.36782/jcs.v10i1.2002

Pülzl, H., & Treib, O. (2017). Implementing public policy. In *Handbook of public policy analysis* (pp. 115-134). Routledge.

Rachmawati, R., Sari, A. D., Sukawan, H. A. R., Widhyastana, I. M. A., & Ghiffari, R. A. (2021). The use of ICT-based applications to support the implementation of smart cities during the COVID-19 pandemic in Indonesia. *Infrastructures*, *6*(9), 119. https://doi.org/10.3390/infrastructures6090119

Rhodes, R. A. W. (2018). *Control and power in central-local government relations*. Routledge. https://doi.org/10.4324/9780429463518

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (Eds.). (2013). *Qualitative research practice: A guide for social science students and researchers*. sage. https://www.torrossa.com/en/resources/an/5017584

Roziqin, A., Mas' udi, S. Y., & Sihidi, I. T. (2021). An analysis of Indonesian government policies against COVID-19. *Public Administration and Policy*, *24*(1), 92-107. https://doi.org/10.1108/PAP-08-2020-0039

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (Eds.). (2013). *Qualitative research practice: A guide for social science students and researchers*. sage.

Safitry, O. (2020). *Penanganan Covid-19: Pengalaman RSUI*. Universitas Indonesia Publishing.

Seftyono, C. (2023, June 10). Kelindan Noise dan Voice menjadi Choice: Komunikasi Sains dalam Implementasi Kebijakan Berbasis Bukti Penanganan Pandemi COVID-19 di Indonesia. https://doi.org/10.31235/osf.io/wm64a

Seftyono, C. (2025). *Politik dan inovasi kebijakan: Kelindan sains, teknologi, dan kemasyarakatan*. Pustaka Bestari.

Setiati, S., & Azwar, M. K. (2020). Dilemma of prioritising health and the economy during COVID-19 pandemic in Indonesia. *Acta Medica Indonesiana*, *52*(3), 196. https://www.actamedindones.org/index.php/ijim/article/view/1579

Sharma, A., Borah, S. B., & Moses, A. C. (2021). Responses to COVID-19: The role of governance, healthcare infrastructure, and learning from past pandemics. *Journal of business research*, *122*, 597-607. https://doi.org/10.1016/j.jbusres.2020.09.011

Sharma, M. (2021). *Theoretical foundations of health education and health promotion*. Jones & Bartlett Learning.

Sittig, D. F., & Singh, H. (2015). A new socio-technical model for studying health information technology in complex adaptive healthcare systems. *Cognitive Informatics for Biomedicine: Human Computer Interaction in Healthcare*, 59-80. https://doi.org/10.1201/b18371

Sørensen, E., & Torfing, J. (2011). Enhancing collaborative innovation in the public sector. *Administration & society*, *43*(8), 842-868. https://doi.org/10.1177/0095399711418768

Spinelli, A., & Pellino, G. (2020). COVID-19 pandemic: perspectives on an unfolding crisis. *Journal of British Surgery*, *107*(7), 785-787. https://doi.org/10.1002/bjs.11627

Sullivan, H., & Skelcher, C. (2017). *Working across boundaries: collaboration in public services*. Bloomsbury Publishing. https://doi.org/10.1007/978-1-4039-4010-0

Sun, W., Bocchini, P., & Davison, B. D. (2020). Applications of artificial intelligence for disaster management. *Natural Hazards*, *103*(3), 2631-2689. https://doi.org/10.1007/s11069-020-04124-3

Torfing, J. (2019). Collaborative innovation in the public sector: The argument. *Public management review*, *21*(1), 1-11. https://doi.org/10.1080/14719037.2018.1430248

Un, C. A., Cuervo-Cazurra, A., & Asakawa, K. (2010). R&D collaborations and product innovation. *Journal of Product Innovation Management*, *27*(5), 673-689. https://doi.org/10.1111/j.1540-5885.2010.00744.x

van Empel, G., Mulyanto, J., & Wiratama, B. S. (2020). Undertesting of COVID-19 in Indonesia: what has gone wrong?. *Journal of global health*, *10*(2). https://doi.org/10.7189/jogh.10.020306

Wahyuni, Hermin Indah and Kuskridho Ambardi (2020), Problem *Infodemic* dalam Merespon Pandemi COVID-19, Policy Broef FISIP UGM 3rd Edition.

Vangen, S., & Huxham, C. (2003). *Nurturing collaborative relations: Building trust in inter-organizational collaboration*. The Journal of Applied Behavioral Science, 39(1), 5-31. https://doi.org/10.1177/0021886303039001001

Yin, R. K. (2018). *Case study research and applications*. Sage. https://doi.org/10.4135/9781412957397