

# Leveraging virtual organizations for e-government effectiveness: A case study of Indonesia's SP4N-LAPOR! program

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*Abstract: Virtual organizations are crucial in improving e-government effectiveness by streamlining processes, enhancing coordination, and promoting transparency. This study explores how virtual organizations can be optimized within SP4N-LAPOR!, Indonesia's public service complaint management system. Using a qualitative approach and secondary data analysis, it identifies key challenges, including coordination inefficiencies, technological gaps, resistance to change, and cybersecurity risks. Key findings show that SP4N-LAPOR! has significantly improved interagency collaboration, accelerated complaint resolution, and increased transparency in public service delivery. The study emphasizes the importance of strengthening ICT infrastructure, improving system interoperability, equipping employees with digital skills, and implementing robust cybersecurity measures. It also highlights that adopting technologies such as AI and blockchain can enhance scalability and accountability. The practical implications include the need for adaptive governance frameworks, targeted capacity-building initiatives, and inclusive citizen engagement strategies to sustain digital transformation. Overall, the study provides actionable insights for policymakers seeking to improve e-government systems through virtual organizational models.*

*Keywords: Digital governance, E-government, Public service innovation, SP4N-LAPOR!, Virtual organizations*

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## 1. Introduction

E-government has become a foundational pillar of modern governance, fundamentally reshaping how public administration operates through the strategic use of information and communication technology (ICT). By prioritizing transparency, efficiency, and accessibility, e-government empowers governments to respond more effectively to the evolving needs of their citizens (Zou et al., 2023). This transformation encompasses a wide array of digital tools and platforms designed not only to streamline internal government operations but also to foster meaningful citizen engagement (World Bank, 2020). Among these innovations, virtual organizations stand out as a groundbreaking development, offering distributed digital frameworks that enhance collaboration and flexibility, freeing organizations from the constraints of physical locations (Omol, 2024).

The Diffusion of Innovation (DOI) theory provides a valuable lens to understand how digital platforms like SP4N-LAPOR! are adopted within complex public sector environments. DOI is particularly suitable for analyzing e-recruitment in the public sector because it captures the interplay between institutional culture, technological readiness, and individual perceptions – factors that are often more complex in bureaucratic environments compared to the private sector. Given the hierarchical structures, formal procedures, and risk-averse nature of public institutions, understanding how innovations like e-recruitment are communicated, perceived, and eventually adopted aligns well with DOI's conceptual focus on adoption patterns within structured systems.

Virtual organizations are changing how governments work by using digital tools to break down geographical barriers and make collaboration easier (Sarjito, 2023). This is especially helpful in large, diverse countries where people in remote areas often struggle to access government offices. By allowing different agencies to work together more smoothly, virtual organizations help reduce delays and ensure that public services can respond more quickly to citizens' needs (Ray-Bennett & Morgner, 2020; Syarien & Samarah, 2023).

People today expect government services to be fast, transparent, and easy to access. Virtual organizations help meet these expectations by improving communication between the government and citizens, while also making services more efficient. They support digital transformation by helping governments create fairer, more inclusive systems that can better manage resources and respond quickly when issues arise (Wouters et al., 2023; C. Yang et al., 2024).

In Indonesia, the SP4N-LAPOR! platform showcases how virtual organizations can transform public services by uniting government agencies on a single platform to manage citizen complaints. Its ability to integrate workflows, enable real-time updates, and promote transparency across over 600 government institutions has made it a cornerstone of Indonesia's e-government landscape. It streamlines workflows, improves communication, and enables faster responses, strengthening public trust (KemenPAN-RB, 2020). Using digital tools, the platform fosters real-time collaboration across ministries and local governments, breaking down bureaucratic barriers while keeping costs low and scaling to meet rising service demands (Ertz & Boily, 2019; Premaiswari et al., 2024).

Virtual organizations play a critical role in enhancing the effectiveness of e-government platforms. By overcoming geographic constraints and enabling seamless resource utilization, they provide solutions to the challenges of traditional governance systems. Through real-time communication and integrated workflows, virtual organizations create a more cohesive and responsive public administration (Lipnack & Stamps, 2000).

In the case of SP4N-LAPOR!, the use of virtual structures has proven to be a game changer. The platform integrates workflows across diverse administrative units, enhancing the speed and accuracy of complaint resolutions while fostering transparency and accountability (Premaiswari et al., 2024). These innovations have enabled SP4N-LAPOR! to adapt to the growing complexity and scale of public service demands, demonstrating the transformative potential of virtual organizations in governance.

Despite these advancements, a critical gap remains in understanding how virtual organizations can be systematically optimized to address persistent coordination barriers, digital inequalities, and institutional resistance within Indonesia's e-government ecosystem.

Current literature often highlights the benefits of digital platforms in general but lacks in-depth analysis of how virtual organizational structures operate in real-world public service applications, particularly in decentralized administrative systems like Indonesia.

This study is necessary to bridge that gap by examining not only the operational impact of virtual organizations in SP4N-LAPOR! but also the barriers that hinder their effectiveness and the strategies needed for their optimization.

This research aims to provide a comprehensive assessment of how virtual organizations enhance the effectiveness of e-government platforms through the case of SP4N-LAPOR!, with particular focus on operational outcomes, implementation challenges, and actionable optimization strategies for policy and practice.

While SP4N-LAPOR! has improved public service delivery, it also reveals challenges like poor internet access in rural areas and limited digital skills among government staff, which can hinder its effectiveness (Kawabata & Camargo, 2023; Wagola et al., 2023). Overcoming these issues requires better ICT infrastructure, staff training, and public outreach. Looking ahead, technologies like AI and blockchain offer ways to boost efficiency, security, and transparency, while user-friendly platforms and clear feedback systems can further strengthen public trust and participation (Shamsan Saleh, 2024).

The integration of virtual organizations into e-government systems marks a pivotal shift in modern governance. Platforms like SP4N-LAPOR! demonstrate how digital frameworks can improve public service delivery, strengthen citizen-government relationships, and build trust in public institutions. While challenges such as connectivity gaps and resistance to change persist, the strategic use of advanced technologies and targeted interventions can unlock the full potential of virtual organizations. As Indonesia continues its digital transformation journey, SP4N-LAPOR! serves as an inspiring model for leveraging virtual organizations to create more effective, inclusive, and citizen-centered governance.

## 1.1 Research problem

Implementing virtual organizations within e-government platforms like SP4N-LAPOR! offers benefits but also presents challenges, particularly in coordinating various government agencies with different priorities and processes. Misalignment often leads to delays and inefficiencies, while gaps in digital infrastructure and ICT skills further limit the platform's effectiveness (Wagola et al., 2023; Wildhani et al., 2023).

Service integration is another hurdle, as outdated systems, organizational silos, and resistance to change complicate efforts to unify complaint management across government levels (Premaiswari et al., 2024). Public trust can also suffer due to slow complaint resolution and cybersecurity risks, making it crucial to address these issues to fully realize the platform's potential (Kawabata & Caramago, 2023; Lipnack & Stamps, 2000).

## 1.2 Research objectives

This study aims to understand how virtual organizations contribute to enhancing the operational effectiveness of SP4N-LAPOR! by improving its efficiency, responsiveness, and capacity to manage public complaints. It focuses on uncovering how streamlined workflows, better inter-agency collaboration, and the use of digital tools can strengthen the relationship between citizens and the government, ultimately promoting transparency, accountability, and trust in public services. At the same time, the research examines the key challenges in integrating virtual organizations into SP4N-LAPOR!, such as difficulties in coordinating across government agencies, resistance to adopting new technologies, and complications in service integration. These issues can limit the platform's performance and negatively affect user experience. By identifying these barriers, the study aims to offer practical strategies for optimizing virtual organizations, improving operational efficiency, and maximizing their potential to support Indonesia's e-government initiatives and digital transformation.

## 1.3 Research questions

This study seeks to explore how virtual organizations enhance the operational effectiveness of SP4N-LAPOR! and contribute to better public service delivery. The first question focuses on understanding how these organizations improve efficiency, responsiveness, and the platform's ability to handle public complaints effectively. By examining the role of digital tools, decentralized operations, and inter-agency collaboration, the research aims to uncover how virtual organizations strengthen the relationship between citizens and the government. This inquiry is essential to understanding SP4N-LAPOR!'s impact on fostering transparency, trust, and accountability in public services.

The second and third questions address the challenges and opportunities for optimizing virtual organizations within SP4N-LAPOR!. They aim to identify key obstacles, such as coordination issues, difficulties in adopting technology, and challenges in service integration, that hinder the platform's performance and user experience. Building on this understanding, the study seeks to propose practical strategies to overcome these barriers and enhance operational efficiency. By focusing on solutions that maximize the potential of virtual organizations, the research aims to support Indonesia's

e-government initiatives, paving the way for more effective, inclusive, and citizen-centered public service delivery.

## 2. Literature review

### 2.1. Virtual organizations

Virtual organizations rely on digital tools and distributed work systems to enable teams to collaborate without needing a central office. They are valued for their flexibility, allowing quick adaptation to change, while their decentralized structure encourages autonomy and innovation (Lipnack & Stamps, 2000; Y. Yang et al., 2022). These qualities make virtual organizations particularly effective in fast-paced and complex environments.

In the public sector, virtual organizations are helping governments improve service delivery and streamline operations. By leveraging digital technologies, they enhance coordination between agencies, reduce delays, and expand services to remote communities (Latupeirissa et al., 2024). Platforms like SP4N-LAPOR! illustrate how virtual organizations can unify complaint systems across government levels, fostering transparency and public trust (Ombudsman of the Republic of Indonesia, 2021).

### 2.2. E-government effectiveness

Evaluating e-government systems involves assessing key aspects like accessibility, efficiency, responsiveness, and transparency. Accessibility ensures citizens, including those in remote areas, can easily access services through user-friendly platforms like SP4N-LAPOR! (Umbach & Tkalec, 2022). Efficiency focuses on streamlining processes and reducing costs by automating workflows, enabling faster service delivery and better resource use (iBridge, 2024).

Responsiveness measures how quickly agencies address citizen concerns, with platforms like SP4N-LAPOR! improving public trust by providing real-time updates on complaints (Islami et al., 2024). Transparency fosters accountability by allowing citizens to track government actions, as SP4N-LAPOR! ensures clear complaint-handling processes, strengthening citizen-government relationships (Audit Board of the Republic of Indonesia, 2024).

### 2.3. SP4N-LAPOR!

SP4N-LAPOR! is Indonesia's national public service complaint platform, created to connect citizens with the government and improve service quality. It allows people to submit complaints, provide feedback, and track how their concerns are addressed, all through a single, accessible system. The platform's main goal is to build trust by promoting government responsiveness, transparency, and accountability (KemenPAN-RB, 2020; Yahya & Setiyono, 2022).

While existing literature highlights the benefits of digital governance and general improvements through e-government systems, few studies have examined the specific role of virtual organizations in coordinating multi-agency complaint management platforms like SP4N-LAPOR! in Indonesia's decentralized governance structure.

There remains a critical gap in understanding how virtual organizational frameworks are operationalized in real-time public service delivery, especially in overcoming interoperability, digital literacy, and coordination challenges. This study seeks to fill that gap by analyzing the practical integration, challenges, and optimization strategies of virtual organizations in the SP4N-LAPOR! platform.

The platform was introduced gradually, starting with pilot programs in key ministries before expanding to regional governments and nationwide use. This step-by-step rollout ensured that government agencies could integrate the system smoothly and train staff to manage complaints effectively. Over time, SP4N-LAPOR! has not only made it easier for citizens to report issues but also improved how quickly and transparently the government resolves them, fostering greater public confidence in e-government services (Aptika, 2021).

## 2.4. Challenges in virtual organizations

Integrating virtual organizations into public administration often faces resistance from government employees who may be wary of disrupting familiar routines, taking on additional workloads, or fearing their roles could become obsolete. This hesitation is frequently rooted in a lack of understanding about how digital systems can simplify processes and improve efficiency (Gräfe et al., 2024). Technological gaps further complicate the transition, especially in regions with poor internet access and outdated equipment, as seen in parts of Indonesia, where such limitations have slowed the adoption of e-government services (Faggian et al., 2024).

Outdated systems and rigid administrative structures also create challenges. Many government platforms struggle to integrate with modern digital tools, leading to data silos and delays in service delivery (Wilson & Mergel, 2022). Additionally, hierarchical work cultures can clash with the flexible, collaborative nature of virtual organizations, limiting their potential to improve transparency and efficiency (Morrison-Smith & Ruiz, 2020). Cybersecurity concerns add another layer of complexity, as weak protections can expose sensitive data and undermine public trust (Srinivas et al., 2019a). Overcoming these barriers requires both technological upgrades and a cultural shift toward digital innovation.

## 3. Methods

This study adopts a qualitative case study approach, focusing on SP4N-LAPOR! as a single case to gain an in-depth understanding of how virtual organizations contribute to enhancing e-government effectiveness in Indonesia. A case study is particularly well-suited for investigating complex real-world systems within their unique contexts, allowing researchers to thoroughly analyze processes, challenges, and outcomes (Yin, 2018). By examining SP4N-LAPOR! as a pilot program, this research generates insights that can serve as a valuable reference for other e-government platforms across the country (Stake, 1995). The study primarily draws from secondary data sources, chosen for their relevance to SP4N-LAPOR!'s operations and its integration within Indonesia's e-government ecosystem. These sources include government reports, peer-reviewed journal articles, and publications from authoritative institutions such as the Ministry of Administrative and Bureaucratic

Reform (KemenPAN-RB, 2020) and the World Bank (World Bank, 2020), which offer detailed accounts of the platform's development, objectives, phased implementation, and broader role in strengthening digital governance. The data selection process was guided by established document analysis principles, ensuring that the information met the criteria of credibility, recency, and direct relevance to virtual organizations and public service systems (Bowen, 2009). This rigorous approach ensures that the study provides a comprehensive and accurate assessment of SP4N-LAPOR!'s role in advancing e-government effectiveness in Indonesia.

This study relies primarily on secondary data, including government reports, SP4N-LAPOR! platform data, and relevant literature. While direct interviews with SP4N-LAPOR! operators and government officials were not conducted, the analysis is informed by official reports, public statements, and media coverage to reflect the operational realities as accurately as possible.

This study did not involve primary data collection through interviews; therefore, no participants were sampled or interviewed. However, if future research includes fieldwork, a purposive sampling strategy would be appropriate to select key informants from central and local government agencies actively involved in SP4N-LAPOR!'s implementation. In such cases, typical interview durations would range from 30 to 60 minutes, focusing on operational experiences, perceived barriers, and optimization strategies.

To ensure a systematic and rigorous data collection process, the literature search method incorporated searching academic databases, conducting relevant keyword searches, and gathering information from governmental policy reports related to e-government. This approach clarifies the literature search process and ensures the inclusion of diverse and authoritative sources.

A thematic analysis approach was applied to identify recurring patterns and insights within the collected data (Braun & Clarke, 2006). This involved multiple readings of documents to code and categorize information across three core themes:

- Operational benefits of virtual organizations,
- Challenges in integrating virtual structures into public service delivery, and
- Optimization strategies for enhancing virtual organization effectiveness.

The research used an inductive coding approach, where initial themes were drawn from the data and refined through ongoing review, offering a clear structure to analyze the role of virtual organizations, integration challenges, and SP4N-LAPOR!'s performance. While the study relied solely on secondary data – allowing for a detailed review of records – it lacked real-time input from stakeholders. However, this method provided valuable insights into the platform's development and its impact on Indonesia's e-government progress (Tasci et al., 2020).

## 4. Results and discussion

The success of SP4N-LAPOR! reflects key principles from e-government models like Zou et al. (2023), which emphasizes the importance of ICT infrastructure, streamlined processes, and citizen engagement. The platform also aligns with Lipnack & Stamps (2000) virtual organization model by

using technology to support decentralized decision-making and real-time coordination across government levels. However, common challenges in developing countries—such as gaps in technological capacity and difficulties in coordinating across institutions—still hinder the platform’s full potential.

Lessons from global platforms like South Korea’s e-People and the UK’s FixMyStreet show that strong digital infrastructure and reliable citizen feedback loops are crucial to successful complaint-handling systems. Unlike SP4N-LAPOR!, these platforms benefit from more advanced interoperability between agencies and higher digital literacy among the public, enabling smoother operations and faster response times. These comparisons highlight the need for Indonesia to strengthen both its technical systems and human resources to fully unlock SP4N-LAPOR!’s capabilities.

Empirical studies reinforce both the platform’s achievements and its limitations. Research by UNDP Indonesia (2023) and (Premaiswari et al., 2024) shows that SP4N-LAPOR! has improved citizen participation and complaint resolution efficiency, though delays and inconsistent follow-ups persist. Aditya et al. (2023) found that digital literacy gaps and limited human resources affected the platform’s performance in Tangerang, while Fathni et al. (2023) emphasized that trust and accessibility were key to success in Probolinggo. One report noted, “Citizens still face challenges when accessing the platform due to limited internet skills, especially among older populations” (Aditya et al., 2023). Such quotes underscore the importance of digital inclusion, which might be lost in paraphrasing alone. Solutions like standardized workflows, better ICT in rural areas Duan-Porter et al. (2022), and targeted training for government staff (East Ventures, 2023) have helped address some issues, showing that combining system improvements with citizen-focused design can enhance SP4N-LAPOR!’s long-term effectiveness.

#### 4.1. Result

Virtual organizations have significantly enhanced the operational effectiveness of SP4N-LAPOR!, improving public service delivery and fostering transparency. By streamlining processes, enabling interagency collaboration, and optimizing resources, SP4N-LAPOR! has become a vital tool for addressing citizen complaints efficiently. However, the integration of virtual organizations has also presented challenges, including coordination issues, technological gaps, resistance to change, and cybersecurity concerns. The following table summarizes the key findings, highlighting the strengths, challenges, and optimization strategies for virtual organizations in SP4N-LAPOR!.

Table 1. Research Results Table

Aspect	Key Findings
<b>Strengths</b>	- Streamlined complaint management through a unified system across agencies (Wildhani et al., 2023).
	- Improved accessibility for citizens, especially in remote areas, using decentralized frameworks (Lipnack & Stamps, 2000).
	- Reduced administrative costs and reliance on physical infrastructure (Zou et al., 2023).
	- Enhanced transparency with real-time updates and accountability mechanisms (Rohayati & Abdillah, 2024).
	- Strengthened collaboration across government entities for resolving complex complaints (Khan & Tariq Majeed, 2019).
<b>Challenges</b>	- Coordination inefficiencies due to a lack of standardized procedures (Wildhani et al., 2023).
	- Technological limitations, particularly in rural areas, are affecting adoption and functionality (Rohayati & Abdillah, 2024).
	- Resistance to change among public employees due to inadequate training and fear of disruption (Fernandez & Rainey, 2017).
	- Interoperability challenges stemming from legacy systems (Kawabata & Camargo, 2023).
	- Cybersecurity vulnerabilities risk data breaches and public trust (Srinivas et al., 2019b).
	- Insufficient skilled personnel to manage and optimize virtual systems (Glyptis, Christofi, Vrontis, Giudice, et al., 2020).
	- Weak change management strategies leading to inefficiencies during digital transformation (Elsan Mansaray, 2019).
<b>Optimization Strategies</b>	- Invest in robust ICT infrastructure, particularly in underserved regions (Wagola et al., 2023; Zou et al., 2023).
	- Enhance interoperability through middleware solutions and standardized protocols (Kawabata & Camargo, 2023; Khan & Tariq Majeed, 2019).
	- Build digital literacy through targeted training programs and leadership development (Glyptis, Christofi, Vrontis, Del Giudice, et al., 2020; Srinivas et al., 2019b).
	- Implement strong cybersecurity frameworks, including encryption and regular audits (Glyptis, Christofi, Vrontis, Giudice, et al., 2020; Srinivas et al., 2019b).

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- Leverage AI and blockchain technologies for efficiency and transparency (Ertz & Boily, 2019).

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- Design citizen-friendly platforms and conduct awareness campaigns to boost participation (Liao et al., 2020; Rohayati & Abdillah, 2024).

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- Align e-government policies with national development strategies for long-term sustainability (Wagola et al., 2023).

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Source: Compiled by the author based on Wildhani et al. (2023) and others.

The findings emphasize both the significant achievements and the persistent challenges of integrating virtual organizations within SP4N-LAPOR!. While the platform has successfully improved complaint resolution, transparency, and collaboration, several barriers must be addressed to unlock its full potential. Key strategies, such as strengthening ICT infrastructure, fostering interoperability, and ensuring robust cybersecurity, can help overcome these challenges.

Moreover, empowering government employees with digital skills and engaging citizens through user-friendly platforms are critical steps toward building an inclusive and effective e-government system. By implementing these optimization strategies, SP4N-LAPOR! can further strengthen its role as a transformative tool for public service delivery, fostering trust and accountability between citizens and the government. These insights provide a roadmap for policymakers to drive meaningful improvements in digital governance across Indonesia.

These findings, which echo the platform's core features introduced earlier, demonstrate SP4N-LAPOR!'s operational strengths in complaint resolution and responsiveness.

## 4.2. Discussion

Comparative experiences from platforms like South Korea's e-People and the UK's FixMyStreet highlight the importance of robust digital infrastructure and citizen feedback loops in complaint-handling systems. Unlike SP4N-LAPOR!, these platforms benefit from more advanced interoperability frameworks and digital literacy.

### 4.2.1. How virtual organizations support the operational effectiveness of SP4N-LAPOR!

Virtual organizations play a critical role in improving the operational effectiveness of SP4N-LAPOR! by fostering collaboration, streamlining processes, and enhancing public service delivery. By leveraging digital tools and decentralized structures, SP4N-LAPOR! has transformed how government agencies manage citizen complaints, making the process more responsive and efficient (KemenPAN-RB, 2020). The flexibility of virtual organizations allows SP4N-LAPOR! to bridge geographical gaps, ensuring that government services are accessible across regions (Lipnack & Stamps, 2000).

One of the platform's key strengths lies in its ability to streamline complaint management. By integrating workflows across multiple agencies into a unified system, SP4N-LAPOR! reduces delays

and ensures timely resolutions. Government officials can access complaints and provide feedback through an interconnected network, improving operational efficiency (Wildhani et al., 2023). Additionally, SP4N-LAPOR!'s decentralized nature empowers local governments to handle complaints directly, decreasing reliance on central authorities and enhancing responsiveness (Premaiswari et al., 2024).

The platform also excels in resource optimization, as virtual organizations minimize the need for physical infrastructure and reduce administrative costs. By replacing in-person meetings and paper-based systems with digital communication tools, SP4N-LAPOR! achieves cost efficiency while maintaining scalability to accommodate increasing user demands (Zou et al., 2023). This scalability ensures the system can handle a growing number of complaints without sacrificing quality.

Transparency and accountability are further enhanced through SP4N-LAPOR!'s virtual organization model. The platform provides real-time updates on complaint statuses, allowing citizens to track their submissions and fostering trust in government processes. By publishing data on complaint resolution rates and performance metrics, SP4N-LAPOR! holds agencies accountable and encourages transparency (Liao et al., 2020; Rohayati & Abdillah, 2024). This open approach strengthens citizen-government relationships and promotes a culture of transparency.

As described earlier, SP4N-LAPOR! enhances transparency and public engagement through real-time complaint tracking and interagency coordination. It allows citizens to monitor the status of their complaints in real-time through a digital interface, reducing the uncertainty often associated with government processes. This system offers visibility into each stage of complaint resolution, fostering public trust and ensuring that government actions are traceable (Premaiswari et al., 2024). Furthermore, the publication of statistical data on complaint handling performance encourages government agencies to maintain high standards of service delivery, promoting a culture of openness (Febriani et al., 2024).

Collaboration across government entities is another major benefit enabled by virtual organizations. SP4N-LAPOR! integrates various departments under one system, ensuring that complex complaints requiring multi-agency coordination are resolved efficiently. This interagency cooperation, supported by robust digital frameworks, would be difficult to achieve without the virtual organization structure (Kawabata & Camargo, 2023; Khan & Tariq Majeed, 2019).

SP4N-LAPOR! illustrates promising innovation in Indonesia's e-government landscape, particularly in integrating multilevel complaint systems, as noted by KemenPAN-RB (2020). The platform integrates complaint management across ministries, local governments, and public service providers through a unified digital system. This interconnection eliminates redundant processes and ensures that complaints are directed to the appropriate authority swiftly (Wildhani et al., 2023). The platform also utilizes cloud computing and mobile-friendly applications to extend its reach, enabling citizens from remote areas to submit complaints seamlessly. Efforts are ongoing to explore the adoption of artificial intelligence (AI) and big data analytics to enhance service responsiveness and predict recurring issues (Ertz & Boily, 2019).

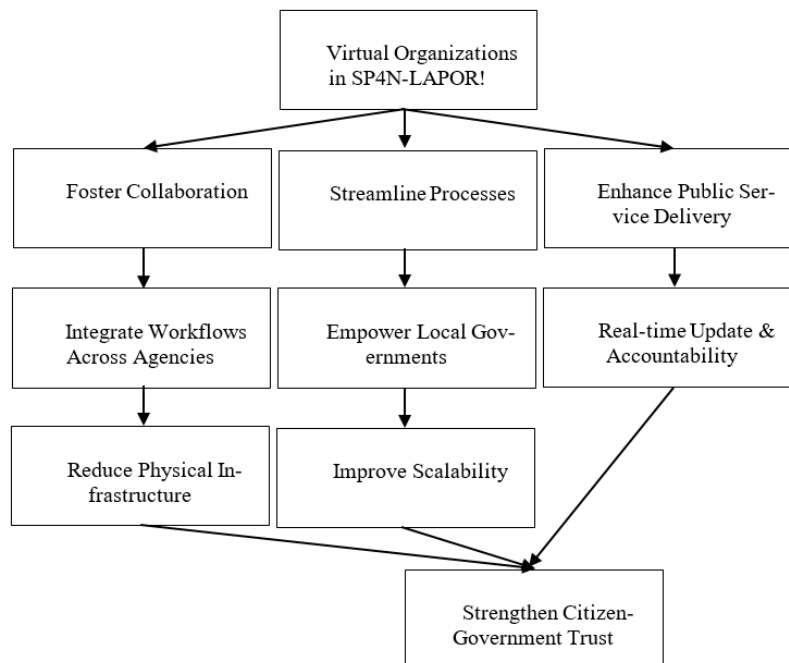
However, the effectiveness of virtual organizations in SP4N-LAPOR! relies on a strong ICT infrastructure, skilled personnel, and effective change management strategies. Ensuring these elements are in place is essential for the platform to function smoothly and adapt to evolving demands (Srinivas et al., 2019b). SP4N-LAPOR! demonstrates the transformative potential of virtual organizations in e-government, showcasing how digital innovation can enhance public service delivery and build stronger trust between governments and citizens.

SP4N-LAPOR! has led to concrete improvements in public services by holding government agencies accountable. A 2023 field report from UNDP Indonesia cited that “residents of Probolinggo saw road repairs within two weeks of logging complaints, building trust in the system.” Such examples reflect how citizen-reported issues can result in timely institutional responses. Empirical evidence suggests that local governments in Indonesia, such as in Probolinggo and Tangerang, have enhanced their responsiveness and transparency due to the platform (Aditya et al., 2023; Fathni et al., 2023). However, some studies indicate that response times remain inconsistent across regions, with certain complaints receiving delayed attention due to bureaucratic fragmentation and resource limitations (Premaiswari et al., 2024).

Virtual organizations have revolutionized SP4N-LAPOR! by improving its operational effectiveness through collaboration, streamlined processes, and enhanced public service delivery. These digital frameworks enable seamless coordination among government agencies, ensuring faster complaint resolutions and greater transparency. By bridging geographical barriers and optimizing resources, SP4N-LAPOR! makes public services accessible and reliable, even in remote areas of Indonesia. The following flowchart illustrates how virtual organizations contribute to these improvements and the resulting outcomes in governance and public trust.

Figure 1. How virtual organizations enhance the operational effectiveness of SP4N-LAPOR!

This flowchart visually represents the integration of virtual organizations in SP4N-LAPOR!, showing how digital frameworks enhance operational efficiency, real-time updates, and citizen trust.



Source: Compiled by the author based on Wildhani et al. (2023), Lipnack & Stamps (2000), Zou et al. (2023), and other referenced sources (2025).

The flowchart highlights the interconnected elements that make SP4N-LAPOR! a success. Through collaboration, decentralized operations, and resource optimization, the platform addresses citizen complaints efficiently while promoting transparency and accountability. These outcomes not only improve service quality but also strengthen public trust in government systems. However, sustaining this success requires ongoing investment in ICT infrastructure, advanced digital tools, and training for government personnel. SP4N-LAPOR! exemplifies how virtual organizations can transform public service delivery, making it a model for other e-government initiatives in Indonesia and beyond.

#### 4.2.2. Key challenges in the integration of virtual organizations within SP4N-LAPOR!

The integration of virtual organizations into SP4N-LAPOR! has introduced several challenges that affect its operational effectiveness. These challenges include coordination issues, technological limitations, resistance to change, interoperability problems, cybersecurity risks, lack of skilled personnel, and insufficient change management strategies.

**Coordination Challenges:** One of the major obstacles in integrating virtual organizations is the difficulty in coordinating multiple government agencies, each with unique processes and priorities. Without standardized procedures and communication protocols, interagency collaboration often faces delays and inefficiencies, impacting the resolution of citizen complaints (Wildhani et al., 2023).

Complex cases requiring input from multiple departments further highlight the need for a unified coordination framework (Zou et al., 2023).

**Technological Limitations:** Inconsistent digital infrastructure remains a significant challenge, particularly in Indonesia's rural areas. Limited internet access, outdated hardware, and inadequate IT infrastructure hinder the seamless functioning of SP4N-LAPOR!. Many local government units lack the necessary resources to fully utilize the platform's features, resulting in uneven adoption and inefficiencies (Rohayati & Abdillah, 2024). Additionally, legacy systems often conflict with modern digital tools, creating technical incompatibilities (Khan & Tariq Majeed, 2019).

**Resistance to Change:** Resistance from public sector employees is another critical challenge. Many staff members accustomed to traditional workflows view digital transformation as a threat to job security or an increased workload. This reluctance is often fueled by limited awareness of the benefits of virtual organizations and insufficient training in using new technologies (Fernandez & Rainey, 2017). Overcoming this resistance requires targeted efforts to build understanding and provide necessary support (Islam et al., 2021).

**Interoperability Issues:** SP4N-LAPOR! relies on integrating systems from various agencies, but technical barriers often arise due to the incompatibility of software and data formats. These interoperability issues create fragmented workflows, reducing the platform's efficiency and effectiveness (Kawabata & Camargo, 2023). Establishing common standards and ensuring seamless data sharing between systems are critical to resolving this challenge (Wagola et al., 2023).

**Cybersecurity Risks:** As SP4N-LAPOR! processes sensitive citizen data, it is particularly vulnerable to cybersecurity threats such as hacking, data breaches, and malware attacks. Many local agencies lack the expertise and resources to implement robust security measures, increasing the risk of unauthorized access and misuse of information. These vulnerabilities not only jeopardize the system's reliability but also undermine public trust (Srinivas et al., 2019b).

**Lack of Skilled Personnel:** The shortage of skilled IT personnel is another barrier to the effective integration of virtual organizations. Many government agencies lack trained professionals who can manage technical challenges, optimize the platform's performance, and support users. Without capacity-building initiatives, this skills gap continues to hinder the smooth operation of SP4N-LAPOR! (Glyptis, Christofi, Vrontis, Giudice, et al., 2020).

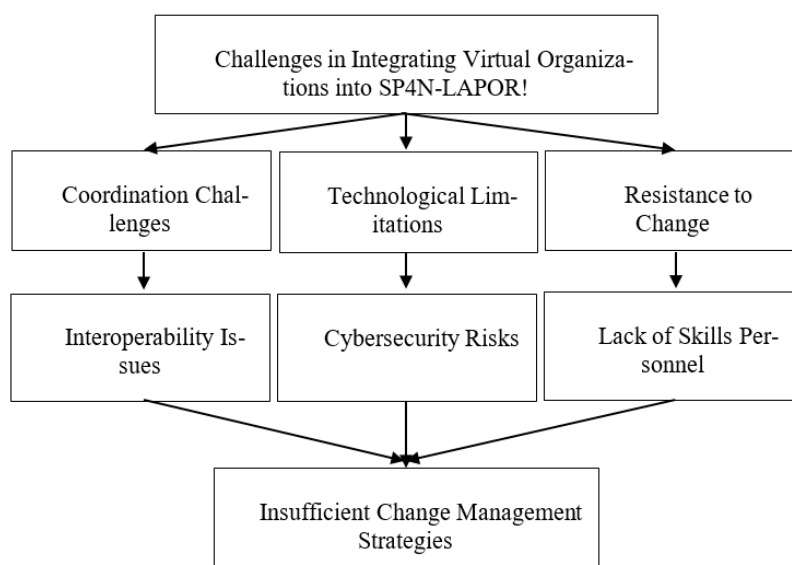
**Insufficient Change Management Strategies:** Integrating virtual organizations requires structured change management to guide the transition from traditional workflows to digital systems. Some studies report that change management in SP4N-LAPOR! remains uneven across institutions, with limited guidance or structured support frameworks available in certain regions (Fernandez & Rainey, 2017; Islam et al., 2021). Without leadership support, clear communication, and stakeholder engagement, the transition often leads to confusion and inefficiency (Elsan Mansaray, 2019).

Addressing these challenges requires a combination of robust infrastructure development, training programs for government staff, standardized protocols for interoperability, and comprehensive change management strategies. These efforts can help SP4N-LAPOR! overcome existing barriers and maximize the benefits of virtual organizations in improving public service delivery.

Integrating virtual organizations into SP4N-LAPOR! has been transformative but not without its challenges. Key obstacles include coordination difficulties, technological limitations, resistance to change, interoperability issues, cybersecurity risks, a shortage of skilled personnel, and inadequate change management strategies. These challenges affect the platform's ability to operate seamlessly and deliver its full potential. Addressing them is essential to ensure SP4N-LAPOR! remains an effective tool for public service delivery. The flowchart below illustrates these interconnected challenges and their impacts on the platform's operational effectiveness.

Figure 2. Key challenges in the integration of virtual organizations within SP4N-LAPOR!

This figure outlines the primary challenges faced during SP4N-LAPOR!'s implementation, including coordination gaps, technological limitations, and resistance to change, illustrating their interconnected impacts.



Source: Compiled by the author based on Wildhani et al. (2023), Zou et al. (2023), Fernandez & Rainey (2017), Khan & Tariq Majeed (2019), and other referenced sources (2025).

The flowchart highlights the critical challenges affecting SP4N-LAPOR!'s integration of virtual organizations. Coordination inefficiencies delay processes, while technological limitations and interoperability issues hinder smooth operations. Resistance to change and a lack of skilled personnel further complicate the transition to a digital framework. These implementation barriers suggest that more coherent policy alignment and stronger institutional coordination are required to ensure successful integration, as highlighted by Glyptis et al. (2020) and Elsan Mansaray (2019).

Overcoming these barriers requires a comprehensive approach, including investing in ICT infrastructure, enhancing interoperability, offering targeted training, and strengthening cybersecurity measures. With these strategies in place, SP4N-LAPOR! can continue to evolve as a reliable, transparent, and effective public service platform, bridging the gap between citizens and government while ensuring efficient complaint resolution.

### **4.2.3. Adaptive governance in e-government implementation: Why it matters**

Platforms like SP4N-LAPOR! are not built to stand still. They are living systems, constantly shaped by new technologies, evolving public demands, and internal government dynamics. What works today might not work tomorrow, and that's okay, as long as the system can adapt.

This is where adaptive governance becomes critical. It's not just about launching a platform and keeping it running – it's about staying flexible and responsive to change, especially in a system like SP4N-LAPOR! that connects multiple ministries, local governments, and public service providers.

#### **4.2.3.1. Why flexibility matters in SP4N-LAPOR!**

Think about it – SP4N-LAPOR! serves citizens across Indonesia, reaching from the bustling streets of Jakarta to remote islands like Mentawai. It handles diverse issues, from potholes to healthcare complaints, all while navigating Indonesia's multilayered bureaucracy, which links ministries, regional offices, and village-level authorities into a complex network (Wildhani et al., 2023). In such a system, a single rigid rule can disrupt the entire chain. Imagine a new regulation suddenly altering the way social assistance complaints are processed, confusing both citizens and officials. Or what if people, accustomed to real-time updates from e-commerce platforms, begin demanding the same responsiveness from public services (OECD, 2019)? Worse, consider a district government in Papua, where unstable internet repeatedly stalls complaint submissions (Rohayati & Abdillah, 2024). A rigid system would struggle – or even break – under such pressures. An adaptive system, however, would adjust, finding ways to accommodate legal changes, shifting expectations, and uneven digital infrastructure, ultimately building resilience (Meijer, 2016).

#### **4.2.3.2. What is adaptive governance?**

Adaptive governance is about building a government that can bend without breaking – a system that learns and grows alongside the needs of its people. It's the kind of governance where ministries, regional offices, and local authorities don't work in silos but move as one, shifting their roles as challenges arise (Choi & Chandler, 2015). It's a mindset that values experimentation over perfection – testing solutions, learning from mistakes, and refining approaches rather than clinging to rigid procedures (Zucaro & Agostinho, 2025). Most importantly, it puts citizens at the heart of progress. Platforms like SP4N-LAPOR! shouldn't just collect complaints to patch potholes – they should treat citizen feedback as a compass, guiding the government toward better services and smarter systems.

#### 4.2.3.3. Why adaptive governance is crucial for SP4N-LAPOR!

SP4N-LAPOR! connects over 600 government institutions across Indonesia, creating a bridge between ministries, regional offices, and local authorities (KemenPAN-RB, 2020). But coordination can't be rigid – when tackling issues like public health or disaster relief, gaps between agencies could leave citizens without help. At the same time, citizen expectations are shifting. People are used to real-time updates and seamless services from private apps, and they expect the same from the government. Embracing technologies like AI to sort complaints faster or chatbots to handle common issues can help meet this demand (Meijer & Thaens, 2021). Yet, what works in a big city like Surabaya might not work in East Kalimantan's rural areas. Adaptive governance gives local governments the freedom to customize their approach to fit their realities, while staying connected to the national SP4N-LAPOR! system.

#### 4.2.3.4. Examples of adaptive practices for SP4N-LAPOR!

In some districts, SP4N-LAPOR! has evolved beyond the standard platform – local officials noticed that residents found WhatsApp easier to use, so they adopted it as a companion channel to ensure people could still voice their concerns (Wildhani et al., 2023). In remote areas where internet access is unreliable, governments didn't let connectivity gaps silence citizens; instead, they allowed complaints to be filed in person, with staff later uploading the reports manually. During the COVID-19 pandemic, SP4N-LAPOR! proved just how adaptable digital platforms can be. It swiftly adjusted to handle service disruptions, becoming a vital tool for crisis response (KemenPAN-RB, 2020). These adjustments show that when government platforms stay flexible and grounded in local realities, they become not just systems, but lifelines.

#### 4.2.3.5. Looking ahead: Building adaptive capacity

To ensure SP4N-LAPOR! continues to grow and serve citizens effectively, the government must see it as more than just a fixed system; it should be a platform that evolves alongside the needs of the people. Institutionalizing a "Review and Improve" cycle can help achieve this, with regular evaluations driven by citizen feedback and emerging technological trends. Treating these reviews as a standard practice, rather than a one-off exercise, would ensure the platform keeps up with the fast-changing demands of public service.

At the same time, empowering local governments is key. Each region has unique needs – what works in urban Java may not fit remote islands like Maluku. Local governments should have the freedom to customize features like language options or offline complaint methods to suit their communities. But flexibility requires capable people. Public officials need more than technical training – they need to be equipped to think adaptively, identifying gaps and suggesting improvements as they arise. When the system, local leaders, and citizens grow together, SP4N-LAPOR! can truly become a platform that works for all Indonesians.

#### 4.2.4. Digital inclusion and the digital divide: Why it matters

In Indonesia – a country with over 17,000 islands and diverse socio-economic conditions – the digital divide remains a pressing challenge. While urban areas, especially big cities like Jakarta and

Surabaya, enjoy relatively stable internet access and digital literacy, rural and remote communities often struggle with poor connectivity, limited access to devices, and low digital skills (East Ventures, 2023). This gap poses a serious question when we talk about digital governance platforms like SP4N-LAPOR!: Is this system truly reaching everyone, or only the digitally privileged?

#### **4.2.4.1. Access beyond the cities: Who is being left out?**

SP4N-LAPOR! has been widely recognized for enhancing public service accountability and responsiveness in Indonesia (UNDP Indonesia, 2024). However, its success is closely tied to citizens' ability to access and effectively use the platform—a privilege not shared equally across the population. In remote areas such as the villages of Papua or the scattered islands of Maluku, mobile networks remain unstable, and broadband internet is often non-existent (BPS, n.d.). This digital gap is further exacerbated for elderly citizens and individuals with lower education levels, who may own smartphones but frequently lack the digital literacy and confidence to navigate platforms like SP4N-LAPOR! (Soepriyanti et al., 2022). Additionally, low-income families often prioritize spending on basic needs like food, leaving mobile data packages – and thus the ability to submit complaints – beyond their financial reach (World Bank, 2021).

As a result, the very groups most in need of public service improvements—those facing inadequate infrastructure, limited healthcare access, or unresponsive local officials—risk having their voices go unheard. Research shows that marginalized communities often struggle to leverage digital platforms designed to empower them, further entrenching existing inequalities (Gillwald et al., 2018). Without addressing these barriers to digital access, the promise of participatory governance through platforms like SP4N-LAPOR! may remain out of reach for Indonesia's most vulnerable populations, perpetuating their exclusion from critical public services (UNESCAP, 2019).

#### **4.2.4.2. Digital inclusion: More than just internet access**

Bridging the digital divide is not only about expanding internet coverage to Indonesia's remote areas but also about empowering people with the skills and confidence to use digital tools effectively. Research highlights that access alone is insufficient; without digital literacy, individuals remain excluded from platforms like SP4N-LAPOR! (Zou et al., 2023). True digital inclusion means ensuring that all citizens—regardless of income, education, or location—can engage with these systems to demand better public services (World Bank, 2021). This requires a comprehensive approach: improving connectivity by extending mobile and broadband networks to rural and outer islands (BPS, n.d.); simplifying platforms like SP4N-LAPOR! through offline-friendly features, such as SMS reporting or hotlines, to serve those without internet access (UNESCAP, 2019); and fostering digital confidence through workshops and literacy programs led by local governments and community leaders, equipping citizens to navigate these systems independently (Soepriyanti et al., 2022).

#### **4.2.4.3. Why it matters for SP4N-LAPOR!'s success**

SP4N-LAPOR! is intended to give every citizen a voice, but without digital inclusion, that vision falls short. If only the digitally connected urban population can file complaints, while farmers in

East Nusa Tenggara or fisherfolk in Sulawesi are left out, public service gaps will persist, and inequality will widen.

#### **4.2.4.4. A truly inclusive future**

For SP4N-LAPOR! to truly serve all Indonesians, digital equity must be at its core. It should not just be a tool for those who are already comfortable online, but also a bridge for those still finding their digital footing. After all, good governance is not just for the connected – it’s for everyone.

#### **4.2.5. Citizen engagement and co-creation in public services: Why it matters**

In today’s world, involving citizens in shaping public services is more important than ever. Governments are increasingly realizing that public service delivery works best when it’s a two-way street – when citizens are not just passive recipients but active partners. This is where the ideas of citizen engagement and co-creation come in. These concepts highlight the need for citizens and government officials to work together to solve problems and improve services, not just in times of crisis, but as an ongoing practice.

Scholars in digital governance emphasize that digital platforms alone aren’t enough; what truly matters is how these tools empower citizens to get involved and stay engaged (Tangi et al., 2021). It’s not just about having a space to complain – it’s about creating a space where people can collaborate with the government to make things better.

##### **4.2.5.1. SP4N-LAPOR!: More than a complaint box?**

Indonesia’s SP4N-LAPOR! platform is often celebrated as a success story in digital governance. It has made it easier for citizens to raise concerns about public services and monitor how their complaints are handled. This is a huge step forward for transparency and accountability (Wildhani et al., 2023). But let’s be honest, right now, it still functions mostly as a one-way complaint channel.

What happens after you submit a complaint? You might get an update when your issue is “resolved,” but what about real dialogue with the government? What about being part of the solution? This is where SP4N-LAPOR! could go further.

##### **4.2.5.2. Why Citizen Involvement Beyond Complaints Is Critical**

When citizens are actively included in solving public problems, everything changes – because people understand their communities better than anyone. They live with the issues daily, grasp their root causes, and often have practical, context-specific solutions. Research consistently shows that collaboration between citizens and governments leads to more effective and trusted public services. Citizens often offer insights officials might overlook; for instance, residents may understand why flooding keeps occurring in their neighborhood or suggest a more affordable way to repair a broken bridge (Hassett et al., 2024).

When communities co-create solutions, they are more likely to embrace and maintain the improvements, ensuring long-term success (Voorberg et al., 2015). Perhaps most importantly, this process builds trust – when people see their voices valued and their ideas turned into action, it shifts their view of government from a distant authority to a genuine partner, nurturing a sense of shared responsibility and “being in this together” (Meijer, 2016).

#### **4.2.5.3. Co-creation: A new future for SP4N-LAPOR!?**

So, what could this look like in Indonesia? Imagine SP4N-LAPOR! evolving beyond a simple complaint desk into a dynamic space for citizen-government collaboration. First, the platform could enable joint problem-solving, where filing a complaint becomes just the beginning. After reporting an issue – like persistent traffic congestion – residents could be invited into follow-up discussions to brainstorm solutions based on their daily experiences, aligning with global evidence showing that citizen involvement often leads to more innovative and effective public services (Hassett et al., 2024). Second, community forums could become a key feature, creating virtual spaces where citizens and local officials regularly meet to discuss ongoing concerns – like waste management or broken infrastructure – and develop solutions together. Such co-creation platforms have proven successful in enhancing trust and service outcomes in other participatory governance models (Voorberg et al., 2015).

Finally, feedback beyond closure could ensure continuous improvement. When an issue is marked as “resolved,” citizens could be prompted to share whether the fix actually worked – did the flooding stop, or was the health clinic’s service quality improved? Real-time feedback loops like these are essential for fostering adaptive governance and ensuring services truly meet public needs (Meijer, 2016).

#### **4.2.5.4. A platform for partnership, not just complaints**

Turning SP4N-LAPOR! into a platform for partnership – where complaints are just the beginning – would align Indonesia with global best practices in digital governance. Platforms across the world are showing that technology works best when it strengthens relationships between governments and citizens, not when it merely acts as a buffer.

The future of SP4N-LAPOR! could be one where citizens are co-creators, working side by side with the government to build stronger, more responsive public services. After all, the best public services are built together.

#### **4.2.6. Impact assessment in public service delivery: Why it matters**

When we talk about platforms like SP4N-LAPOR!, it’s easy to focus on the number of complaints submitted or the government’s response rate. But the real question is: Has it actually made public services better for citizens?

This is where impact assessment becomes essential. It’s not just about checking whether complaints are answered – it’s about evaluating whether people’s lives have improved as a result. Has

the quality of public services gone up? Are issues like delayed permits, broken infrastructure, or poor health services being reduced over time?

#### **4.2.6.1. Beyond numbers: Are complaints leading to real change?**

Let's say a citizen in Central Java reports a broken bridge. The government fixes it, marks the complaint as "resolved," and the platform records a successful response. But what if the bridge collapses again three months later? Was that truly a success? Or, imagine a health clinic in a remote village receives frequent complaints about staff absenteeism. The complaints might be acknowledged, but does that clinic now provide better, more reliable care?

Without proper impact evaluation, we risk celebrating surface-level achievements—like quick responses—while the root causes of poor public services remain unresolved (Van Dooren et al., 2015).

#### **4.2.6.2. Measuring what matters**

Governments around the world are increasingly moving beyond merely tracking outputs, such as response times, and focusing instead on measuring real outcomes, like whether public services are genuinely improving people's lives (OECD, 2019). For SP4N-LAPOR!, this shift could mean asking deeper questions: Has the average time to resolve complaints gone down over the past three years? Are the same issues, like broken roads or water shortages, being reported repeatedly, or are they being fixed for good? And perhaps most importantly, are citizens more satisfied with public services after using the platform? Research highlights that measuring citizen satisfaction and monitoring whether problems recur provides governments with vital insights, not only into the efficiency of their responses but also into whether their actions are leading to lasting solutions or simply applying short-term patches (Van Dooren et al., 2015). By focusing on what truly matters to citizens—lasting improvements—SP4N-LAPOR! could transform from a complaints portal into a driver of real, community-centered progress.

#### **4.2.6.3. Current gaps in SP4N-LAPOR!'s evaluation**

While SP4N-LAPOR! does well in tracking response speed—how quickly complaints are addressed—there is little publicly available information on what happens after that initial fix. Important questions remain unanswered: Does repairing a damaged road actually lead to fewer complaints in the long run, or does the problem keep returning? Are government offices that frequently receive complaints taking steps to improve their service culture, or are they simply reacting to issues as they arise? These gaps in evaluation mirror challenges seen globally, where governments often prioritize quick fixes over assessing long-term service quality and citizen satisfaction (Van Dooren et al., 2015). Yet, this presents an opportunity for Indonesia. By embracing more robust evaluation practices—tracking not just how fast problems are addressed, but whether they stay resolved and lead to better experiences for citizens—Indonesia could position itself as a leader in citizen-centered governance innovation (OECD, 2019). This kind of outcome-focused approach has been shown to build trust and improve service delivery in other countries,

transforming feedback platforms from mere complaint desks into engines for lasting public sector improvement (Hart & Newcomer, 2024).

#### **4.2.6.4. What can be done?**

To truly strengthen SP4N-LAPOR! as a platform for citizen-driven service improvement, the system could evolve beyond tracking responses and begin capturing what matters most—whether problems are being solved for good and services are improving. Tracking recurring issues using data analytics could help identify patterns, such as frequent water supply disruptions in a particular neighborhood or delays in permit processing, allowing authorities to address root causes rather than offering short-term fixes (Van Dooren et al., 2015). Citizen follow-up surveys could become standard practice after a complaint is marked “resolved,” asking questions like: “Was the problem truly fixed? Are you satisfied with the solution?” This approach, used effectively in other countries, not only ensures accountability but also builds public trust by valuing citizen feedback (OECD, 2019). Finally, a service quality dashboard could display both response speed and long-term improvements, making government performance transparent and helping citizens see the bigger picture of progress—an approach that has been linked to increased citizen satisfaction and engagement in governance (Hart & Newcomer, 2024).

#### **4.2.6.5. Why it matters**

If we can't measure impact, we can't truly improve it. SP4N-LAPOR! holds enormous potential to transform the relationship between citizens and public services in Indonesia—but its real value will come not just from speeding up responses, but from driving lasting change. A quick fix might temporarily silence a complaint, but what if the same pothole reappears every rainy season? Or does the same local clinic continue turning patients away due to overcrowding? International experiences show that the most effective public feedback systems focus not only on how fast governments react but also on whether those reactions lead to long-term service improvements and fewer complaints in the future (OECD, 2019; Van Dooren et al., 2015). Ultimately, a great system doesn't just respond to problems—it helps prevent them from happening again. That's the future SP4N-LAPOR! could create, if impact becomes the goal.

#### **4.2.7. How virtual organizations can be optimized to improve e-government effectiveness in Indonesia**

A deeper understanding of interoperability reveals that it is far more than just a technical hurdle; it is a crucial foundation for enabling smooth collaboration between government agencies. True interoperability means more than connecting systems—it requires building clear data-sharing protocols, developing middleware solutions, and aligning the workflows of different institutions to ensure that information can flow seamlessly and in real time. To truly optimize virtual organizations and strengthen e-government effectiveness in Indonesia, a holistic approach is needed—one that tackles not only technological gaps but also organizational and cultural barriers. This involves investing in reliable ICT infrastructure, enhancing system interoperability, fostering a culture of digital readiness among public officials, safeguarding data with robust cybersecurity measures,

embracing advanced technologies like AI and blockchain, encouraging citizens to actively engage, and ensuring that policies are well-coordinated to support long-term digital transformation.

**Strengthening ICT Infrastructure:** A strong ICT infrastructure is fundamental to the success of virtual organizations. In Indonesia, the digital divide remains a significant challenge, especially in rural and remote areas. Investments in high-speed internet connectivity, modern hardware, and cloud-based technologies are critical for enabling government agencies to adopt virtual organization frameworks effectively (Zou et al., 2023). Initiatives such as Making Indonesia 4.0 should prioritize enhancing ICT infrastructure to support e-government systems like SP4N-LAPOR! (Wagola et al., 2023).

Strengthening ICT infrastructure and interoperability is not merely about improving technical capacity; it is the backbone of enabling seamless collaboration across virtual organizations in SP4N-LAPOR!, ensuring that decentralized actors can work in real-time synchronization.

**Improving Interoperability:** Many government agencies in Indonesia still rely on outdated, standalone systems, which create barriers to collaboration. Enhancing interoperability by adopting standardized protocols and using middleware solutions can help integrate diverse systems seamlessly. For instance, the use of open-source platforms and APIs can facilitate efficient data exchange while reducing costs, ensuring smooth integration between government systems, enhancing interoperability, and promoting innovation through collaborative development. This approach not only streamlines public service delivery but also empowers developers to create customized solutions tailored to specific administrative needs, ultimately improving responsiveness and citizen satisfaction (Kawabata & Camargo, 2023; Khan & Tariq Majeed, 2019).

**Fostering Organizational Readiness and Training:** Resistance to change is a common issue in the public sector when introducing virtual organizations. To address this, targeted training programs and workshops should be implemented to build digital literacy and confidence among government employees. By familiarizing staff with new technologies and emphasizing the benefits of digital transformation, these efforts can create a culture of innovation and adaptability (Fernandez & Rainey, 2017). Leadership training programs are equally important to empower decision-makers to drive change effectively (Elsan Mansaray, 2019).

**Ensuring Robust Cybersecurity:** Handling sensitive citizen data requires strong cybersecurity measures to protect against data breaches and cyberattacks. SP4N-LAPOR! must prioritize developing a robust security framework that includes encryption, multi-factor authentication, and regular system audits. Additionally, establishing a dedicated cybersecurity task force can enhance oversight and ensure rapid responses to emerging threats (Glyptis, Christofi, Vrontis, Giudice, et al., 2020; Srinivas et al., 2019b).

**Leveraging Advanced Technologies:** Integrating advanced technologies such as artificial intelligence (AI) and blockchain can significantly enhance the efficiency and security of virtual organizations. AI can streamline operations by automating routine tasks like sorting complaints or analyzing patterns in citizen feedback, while blockchain ensures transparency (Ertz & Boily, 2019) a handling

(Ertz & Boily, 2019). These technologies can be strategically adopted to optimize SP4N-LAPOR!'s functionality and build public confidence in the system (Khan & Tariq Majeed, 2019).

**Encouraging Citizen Participation:** Citizen engagement is essential for the success of e-government platforms. Tools like SP4N-LAPOR! should be designed with user-friendly interfaces and features that encourage active participation. Real-time updates on complaint statuses and transparency in government actions can build trust and motivate citizens to engage more with the platform (Liao et al., 2020). Public awareness campaigns highlighting the benefits of using SP4N-LAPOR! can further enhance public trust (Rohayati & Abdillah, 2024).

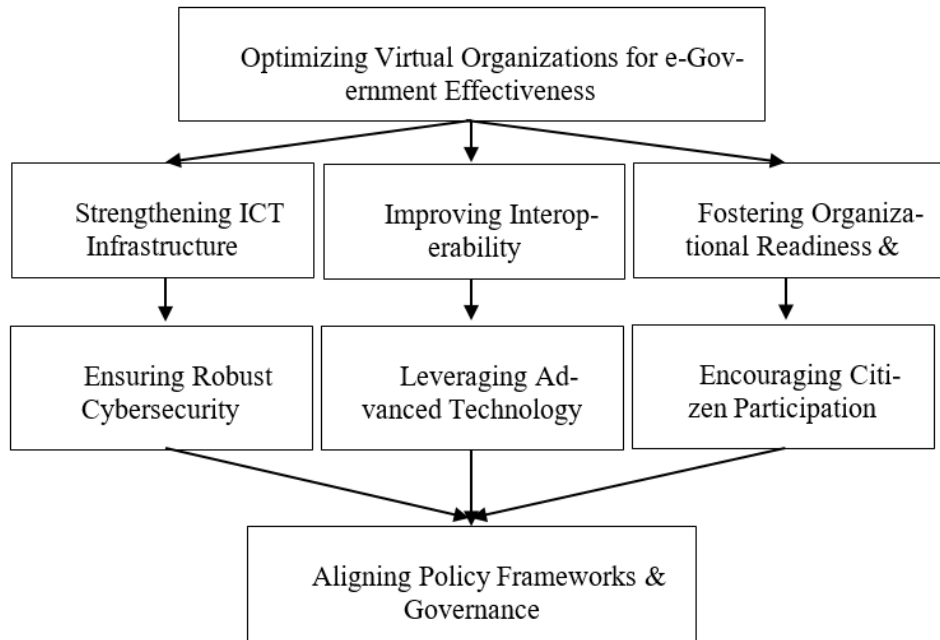
**Aligning Policy Frameworks and Governance:** To ensure the long-term sustainability of virtual organizations, policies supporting digital inclusion and e-government initiatives must be aligned with national development strategies. A coordinated policy framework ensures consistency across various government programs, addressing broader socio-economic disparities while strengthening digital governance (Kawabata & Camargo, 2023; Wagola et al., 2023). Clear governance structures and leadership commitment are crucial to implementing these policies effectively.

By addressing these areas, Indonesia can fully optimize virtual organizations like SP4N-LAPOR! to enhance e-government effectiveness. Investments in technology, capacity building, cybersecurity, and citizen engagement are essential for creating a robust, inclusive, and efficient e-government system that fosters trust and delivers improved public services.

Optimizing virtual organizations to enhance e-government effectiveness in Indonesia requires a well-rounded approach that addresses technological, organizational, and societal needs. At the foundation lies the strengthening of ICT infrastructure to ensure reliable connectivity and access across urban and rural areas. Improving interoperability between systems facilitates smooth collaboration and data sharing among government agencies. Fostering organizational readiness through training programs equips employees with the skills and confidence to embrace digital transformation. Robust cybersecurity measures protect sensitive data, while advanced technologies like AI and blockchain streamline operations and build trust. Encouraging citizen participation ensures inclusivity and transparency, and aligning policy frameworks with national goals provides the foundation for long-term sustainability. The flowchart below illustrates these interconnected strategies and their importance in optimizing virtual organizations.

Figure 3. *Optimizing virtual organizations for e-government effectiveness in Indonesia*

This visual highlights the optimization strategies necessary to maximize SP4N-LAPOR!'s potential, emphasizing the need for ICT infrastructure upgrades, cybersecurity, and digital literacy training.



Source: Compiled by the author based on Zou et al. (2023), (Khan & Tariq Majeed, 2019), Fernandez & Rainey (2017), Wagola et al. (2023), and other referenced sources (2025).

The flowchart outlines the essential strategies for optimizing virtual organizations to improve e-government effectiveness in Indonesia. Strengthening ICT infrastructure ensures access for all regions, while interoperability enables seamless collaboration. Training programs build organizational readiness and foster innovation among government employees. Cybersecurity measures protect citizen data and enhance trust, and advanced technologies like AI and blockchain improve efficiency and transparency. Engaging citizens through user-friendly platforms encourages active participation, building stronger relationships between the government and the public. Aligning all these efforts with cohesive policy frameworks ensures consistency and sustainability. Together, these strategies position virtual organizations like SP4N-LAPOR! to deliver efficient, inclusive, and transparent public services, driving Indonesia's digital governance forward.

## 5. Theoretical implications

The analysis further strengthens Zou et al. (2023) e-government model, emphasizing that technological capability and institutional processes are mutually reinforcing. Lipnack & Stamps' (2000) virtual organization framework is particularly evident in SP4N-LAPOR!'s cross-agency collaboration, where decentralized complaint handling has enhanced operational agility, but requires robust ICT support to fully function.

The analysis could further benefit from a more explicit integration of digital transformation theory, highlighting how SP4N-LAPOR!'s development aligns with broader public sector modernization efforts driven by ICT adoption. Additionally, the inter-organizational collaboration framework can be expanded to emphasize the dynamic nature of multi-agency partnerships, especially when leveraging digital tools to achieve synchronized service delivery and citizen engagement.

This study adds valuable insights to the growing body of knowledge on e-government and virtual organizations, emphasizing their transformative potential in modern governance. It highlights how virtual organizations, with their digitally structured frameworks, improve the operational effectiveness of platforms like SP4N-LAPOR! by enhancing efficiency, responsiveness, and transparency in public service delivery. These findings reinforce the importance of digital transformation theories in shaping effective public administration systems.

The research also contributes to theories of inter-organizational collaboration by demonstrating the critical role of integrated workflows in virtual organizations. It underscores how decentralization and real-time communication can break down bureaucratic silos, aligning with Lipnack & Stamps (2000) concept of networked organizations. Moreover, it builds on Zou et al. (2023) e-government framework by showcasing how digital platforms can foster inclusivity and strengthen trust between governments and citizens.

Additionally, the study sheds light on the challenges of change management and technological adoption in the public sector. By identifying barriers such as resistance to change, technological limitations, and coordination difficulties, the research provides a theoretical basis for addressing these issues. This aligns with (Elsan Mansaray, 2019) principles of change management, emphasizing the importance of leadership and organizational readiness in successfully implementing digital governance initiatives.

Finally, this study points to exciting opportunities for future research, particularly in exploring the role of emerging technologies such as artificial intelligence and blockchain in optimizing virtual organizations. It encourages further exploration of how these technologies can enhance e-government platforms, offering a pathway for advancing both theoretical and practical understanding of digital transformation in governance.

## 6. Practical implications

This study provides valuable practical insights for enhancing the effectiveness of SP4N-LAPOR! and advancing e-government initiatives in Indonesia. By showcasing how virtual organizations improve efficiency, responsiveness, and collaboration among government agencies, it offers actionable recommendations for policymakers and administrators aiming to modernize public service delivery. The successful integration of digital tools and decentralized structures into platforms like SP4N-LAPOR! demonstrates how governments can respond more effectively to citizen complaints while building transparency and trust.

A key practical takeaway is the need to strengthen ICT infrastructure to ensure reliable access across both urban and rural areas. Investments in high-speed internet and modern digital tools are

essential to ensure virtual organizations can operate effectively, particularly in underserved regions. The study also highlights the importance of capacity-building efforts, such as training government employees to enhance digital literacy and prepare them for adopting and managing virtual frameworks.

Equally important is the need for robust cybersecurity measures to protect sensitive citizen data and maintain public trust in e-government systems. Establishing dedicated cybersecurity teams and leveraging advanced technologies like artificial intelligence and blockchain can significantly improve data security and operational efficiency. Encouraging citizen engagement through user-friendly platforms and transparent feedback mechanisms further enhances trust and participation in public services.

Lastly, aligning policy frameworks to support sustained digital transformation is critical. Clear governance structures, strong leadership, and cohesive national strategies are necessary to ensure the long-term success of virtual organizations in e-government. By addressing these practical considerations, Indonesia can unlock the full potential of platforms like SP4N-LAPOR! to create a more inclusive, efficient, and responsive public service system.

## 7. Limitations and future research

Due to the reliance on secondary data, this study lacks direct input from SP4N-LAPOR! administrators, government officials, and citizens. Future research could strengthen these findings through interviews and surveys to validate the identified challenges and proposed solutions.

While this study provides valuable insights, it is not without limitations, which open avenues for future exploration. The research relies primarily on secondary data to analyze the role of virtual organizations within SP4N-LAPOR! and their contribution to e-government effectiveness. Although this approach offers meaningful perspectives, future studies could incorporate primary data collection, such as interviews with government officials and users, or surveys with stakeholders. This would provide a richer, more nuanced understanding of the challenges and benefits of virtual organizations.

Another limitation lies in the study's focus on SP4N-LAPOR! within the Indonesian context, which may limit the applicability of its findings to other regions or e-government platforms. Future research could explore comparative studies across different countries or systems to identify common challenges and innovative solutions that can be broadly applied.

Additionally, while this research emphasizes the potential of technologies like artificial intelligence and blockchain, it does not delve into their technical application within SP4N-LAPOR!. Future studies could investigate the feasibility, costs, and practical implementation of these technologies to enhance the system's efficiency and security.

Lastly, the study does not extensively address the long-term sustainability of virtual organizations as part of evolving e-government frameworks. Future research could focus on how these systems can adapt to advancements in technology, policy shifts, and changing citizen expectations. By

addressing these areas, future studies can deepen our understanding of how virtual organizations can effectively drive innovation and inclusivity in digital governance.

## 8. Conclusion

Virtual organizations in e-government, such as Indonesia's SP4N-LAPOR!, are not just structural improvements—they serve as drivers of bureaucratic reform and more responsive public service delivery. They help break down barriers between government institutions, enabling faster coordination and improving transparency. However, their effectiveness is often held back by issues like poor coordination, limited digital infrastructure, resistance to new systems, security concerns, and difficulty connecting different platforms.

Strengthening virtual organizations requires improving digital infrastructure and ensuring government employees are well-trained to adapt to new technologies. Cybersecurity measures must be prioritized to safeguard data, while innovations like AI and blockchain can help automate processes and build public trust. Additionally, creating uniform systems across government agencies and encouraging citizen participation through accessible and transparent platforms can help maximize their impact.

Although SP4N-LAPOR! has contributed to improved complaint handling and transparency, sustaining its impact will require structured monitoring mechanisms and stronger policy alignment, particularly across decentralized administrative levels. This is particularly important in rural and underserved areas where internet access and administrative capacity remain challenges. Tailoring solutions to different regions is key to ensuring that virtual organizations can support truly inclusive and effective governance.

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### Author Contributions

Aris Sarjito: Paper lead; significant contributor; methodology; validation; resources; data curation; writing and review; project administration.

All authors have read and agreed to the published version of the manuscript.

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