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Public Sentiment Toward AI and Digitalization in Government Services: A Sentiment Analysis Approach to Assess Bureaucratic Readiness and Trust

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ABSTRACT

Given the speed at which technology is developing, public administration is about to enter a crucial transitional phase in which digitalization and artificial intelligence (AI) are being increasingly incorporated into government services. This study examines how the general public feels about digitalization, especially the use of AI in government agencies, with an emphasis on possible changes in bureaucracy and the resulting dynamics of trust. This study intends to map prevalent sentiments, both positive and negative, surrounding AI-driven reforms in public services by using sentiment analysis on a sizable dataset of public comments sourced from YouTube news videos about government digitalization and user reviews from nine priority government applications. To find the prevailing narratives and emotional tones reflected in citizen responses, the analysis looks into frequently used keywords and phrases. It also evaluates whether the sentiment trends indicate resistance, skepticism, or optimism about digitalization and AI's potential to replace conventional administrative and public service roles. The results are used to assess how prepared government institutions are for the AI era and to suggest tactical methods for dealing with these administrative obstacles. Finally, by offering data-driven insights into public trust and expectations and suggestions for promoting openness, diversity, and flexibility in public administration, this study adds to the conversation on digital governance. Understanding public opinion is crucial to ensuring moral implementation and upholding the integrity of public service as governments increasingly use automated systems.

Introduction

Artificial Intelligence (AI) has emerged as a transformative force in global governance, promising operational efficiency, policy precision, and innovation in public service delivery. Governments worldwide are experimenting with citizen service chatbots, algorithmic decision-making systems, and predictive analytics to respond swiftly and accurately to public demands. However, behind this immense potential lie serious challenges: the risks of algorithmic bias, lack of process transparency, weak accountability mechanisms, and the potential erosion of public trust in state institutions. In the digital era, public trust is no longer determined merely by the availability of technology but by citizens' perception of the government's capacity to deploy it responsibly and ethically.

In the Indonesian context, these global dynamics intersect with a bureaucracy that is still navigating an uneven digital transformation. Although digital infrastructure is gradually being built and several public services have migrated to online platforms, human resource readiness, particularly among Civil Servants

(Aparatur Sipil Negara, ASN), remains the decisive factor for successful AI adoption. Previous surveys indicated minimal exposure of ASN to AI literacy (Kementerian PANRB, 2023). However, the latest findings from the National Institute of Public Administration (Lembaga Administrasi Negara, LAN) through its "2025 Survey on Job Disruption and Future Skills for Civil Servants" provide a more comprehensive and up-to-date picture: among 7,965 ASN respondents across 84 institutions, 75.25% recognize that their jobs are at risk of disruption due to digitalization and automation, particularly administrative routine positions such as data entry and manual archiving (LAN, 2025).

LAN plays a central and strategic role in addressing these challenges. As the mandated institution responsible for developing ASN competencies, LAN is not only the guardian of bureaucratic capacity standards but is also expected to be an innovator in designing training curricula relevant to the AI era, including modules on AI governance, ethics, and algorithmic accountability. Interestingly, the 2025 LAN Survey reveals that the most needed skills for ASN are not purely technical but a blend of soft and hard skills: Public Ethics and Values (69.35%), Collaborative Leadership (57.23%), Empathy and Effective Communication (57.23%), Critical Thinking (50.07%), and Technology Literacy (45.03%). These findings underscore that digital bureaucratic transformation is not merely about tools, but equally about values, culture, and leadership (LAN, 2025).

To understand the complex dynamics between public perception and bureaucratic readiness for AI adoption, this study is grounded in an integrated theoretical framework drawn from three key social theories:

1. ***The Digital Public Sphere (Habermas, 1989)***

   Habermas's concept of the public sphere, a space where citizens freely discuss societal problems and influence political action, is foundational to understanding how public opinion is formed in democratic societies (Habermas, 1989). In the digital era, social media platforms such as Twitter (X), Instagram, and YouTube have become new arenas of public discourse, which scholars term the digital public sphere (Marres, 2017). Comments, posts, and interactions on these platforms are not merely individual expressions but collective texts that reflect societal attitudes toward state policies, including AI-driven governance. Thus, analyzing public sentiment on AI in bureaucracy isnot just a technical exercise; it is a sociological inquiry into how legitimacy and resistance are constructed in the digital age.

2. ***Trust in Institutions (Giddens, 1990; Fukuyama, 1995)***

   Trust, as Giddens (1990) argues, is the bedrock of modern social life, especially in abstract systems such as bureaucracy and technology. Fukuyama (1995) further conceptualizes trust as social capital, enabling institutions to function effectively. In the context of public administration, trust is not merely about service efficiency but about social legitimacy: do citizens believe that the bureaucracy can manage technology fairly, transparently, and accountably? Therefore, sentiment analysis becomes more than emotion detection; it is a barometer of institutional legitimacy. Positive sentiment reflects confidence in the state's capacity, whereas negative sentiment signals a crisis of trust.

3. ***Digital Inequality (van Dijk, 2006)***

   Van Dijk's (2006) framework reminds us that digital transformation is not experienced equally. Digital inequality encompasses not only access to technology but also disparities in digital literacy, usage skills and confidence in navigating digital systems. In Indonesia, this inequality is shaped by geographic divides (urban vs. rural), generational gaps (digital natives vs. senior officials), and socioeconomic status. The LAN 2025 survey confirms this: while Generation Z proactively prioritizes AI and Big

Data skills (11.08%), Baby Boomers show minimal interest (2.78%) (LAN, 2025). This disparity indicates that public sentiment toward AI is not monolithic but stratified. Resistance in one region or demographic may stem not from ideological opposition but from structural exclusion.

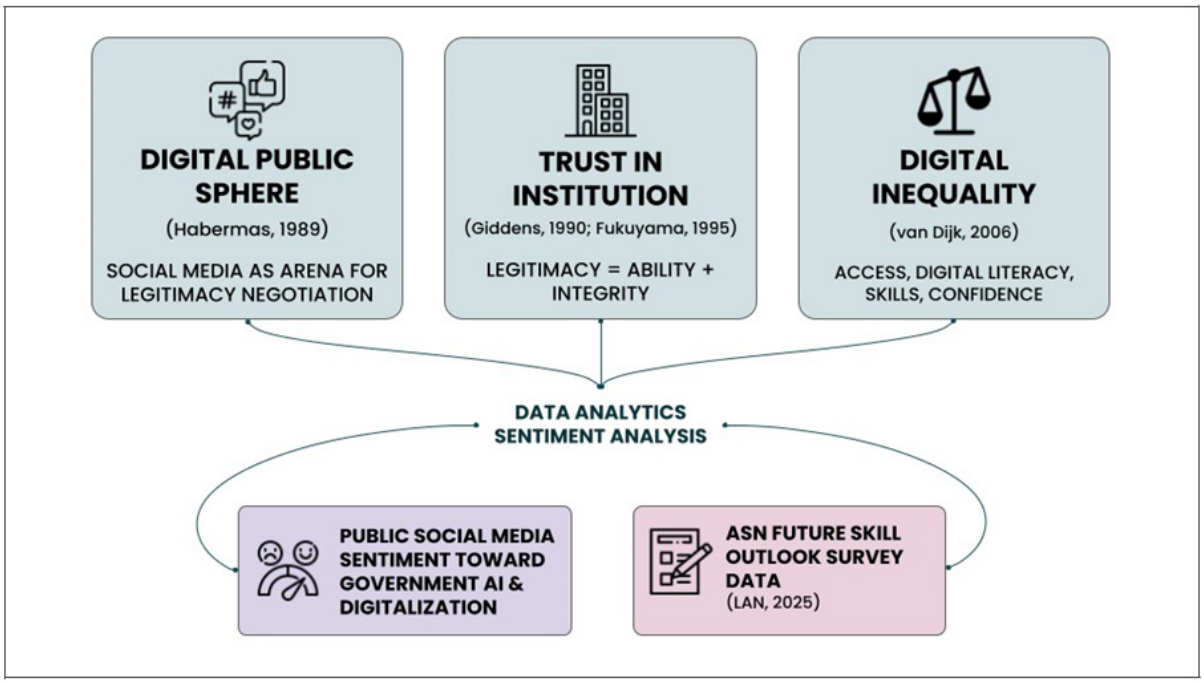

Figure 1. Analytical Framework: Public Perception of AI in E-Government Platforms

This study does not treat these theories as abstract concepts but as analytical lenses to interpret real-world data.

- Through the lens of the digital public sphere, social media comments are analyzed as legitimate political discourse—not noise.ï% Through the lens of institutional trust, sentiment scores are interpreted as indicators of bureaucratic legitimacy or crisis.
- Through the lens of digital inequality, variations in sentiment are contextualized by disparities in access, literacy, and generational experience, as evidenced by LAN's survey data.

Crucially, this approach elevates Natural Language Processing (NLP) sentiment analysis beyond a technical tool. It becomes a sociological instrument that decodes how digital discourse reflects deeper social dynamics: trust, resistance, and inequality in the age of AI governance. Despite the growing interest in AI governance, research in Indonesia remains dominated by technical assessments and infrastructure evaluations. Public voices, particularly those expressed through digital discourse, remain largely unexplored. However, in a digital democracy, policy legitimacy is determined not only by system efficiency but also by citizen acceptance and trust.

This study aims to bridge this gap by analyzing public sentiment toward AI adoption in Indonesian government institutions through real-time digital discourse data, while simultaneously linking the findings to the latest empirical evidence from the 2025 LAN Survey on ASN readiness and competency needs. Specifically, this study addresses three core questions.

(1) To what extent do citizens accept or resist the automation of public services? (2) How is public trust in the government evolving in the AI era?

(3) What do citizens expect from governance that is not only digital, but also open, inclusive, and adaptive?

By integrating insights from public discourse (via Habermas, Giddens, and van Dijk) and bureaucratic capacity (via LAN's empirical data), this study offers a new framework for understanding governmental AI adoption: not as a technological challenge, but as an institutional, ethical, and trust-based one.

Methodology

This study employs a mixed-methods approach within a digital sociology framework, combining descriptive mapping of online discourse with a qualitative thematic interpretation. The analysis is grounded in three theoretical perspectives: Habermas's notion of the public sphere (1989), which positions social media as arenas of deliberation and legitimacy claims; Giddens's and Fukuyama's concept of institutional trust (1990, 1995), which captures confidence and skepticism toward state institutions; and van Dijk's theory of digital inequality (2006), which highlights access barriers, literacy gaps, and socio-geographic divides. In this view, social media platforms such as Twitter (X), Instagram, and YouTube are not merely channels of communication but dynamic arenas where citizens articulate expectations, express distrust, negotiate state legitimacy, and co-construct the social meaning of digital governance in real time.

Data were collected from publicly available comments on high-engagement independent content (e.g., explainer videos, investigative reports, and citizen testimonials) related to digitalization and AI-driven governance initiatives. These initiatives include the rollout of digital ID and single sign-on systems (e.g., *SatuSehat*), the deployment of AI chatbots in public service centers (e.g., *Halo Kemendagri, Layanan 112*), the automation of tax and permit systems (e.g., *e-Faktur, OSS RBA*), and public debates on algorithmic bias in social assistance or law enforcement.To ensure thematic relevance, purposive sampling was conducted using keywords in Bahasa.

Indonesia, related to digital governance and AI.

The observation period covered the past five years, from 2020 to 2025, a period marked by rapid digital transformation and rising hype around artificial intelligence in public sector innovation, covering major policy rollouts, system failures, data breaches, and viral citizen complaints. Platform selection was guided by their distinctive discursive qualities, with YouTube chosen for long-form commentary and citizen testimonials. Content selection followed an engagement threshold of at least 500 likes, 100 comments, and 1000 views. This ensured that the analysis focused on salient issues that resonated widely, rather than marginal or isolated opinions.

In addition to social media discourse analysis, this study collected and analyzed 427,191 user reviews from the Google Play Store for nine priority government applications (Table 2). These reviews, written in Bahasa Indonesia, were pre-processed and used to train and evaluate a sentiment classification model, as well as to conduct n-gram and thematic analyses. This dual-data approach allows for triangulation between public debate (YouTube) and user experience (app reviews), offering a more holistic view of digital trust dynamics.

From an initial corpus of more than 12,000 public comments, a purposive sample of 1,500 high-engagement comments was selected for in-depth thematic analysis, with the sample size determined by the

principle of thematic saturation. The analytic process followed a hybrid inductive-deductive coding scheme. First, two researchers conducted open coding of 300 comments to identify the emergent themes. These codes were then deductively mapped onto the three theoretical pillars. Axial coding was used to cluster subthemes into broader categories, such as transparency demands, fear of exclusion, and generational friction. Finally, selective coding identified core narratives, including contrasting frames of "AI as an efficiency tool" versus "AI as a threat to human dignity."

Recurring normative themes included demands for transparency ("*Buka algoritmanya!*"), accountability ("*Kalau salah, siapa yang tanggung jawab?*"), fairness and non-discrimination ("*Jangan sampai yang gaptek kena diskriminasi*"), human oversight ("*Jangan serahkan semua ke mesin*"), and accessibility ("*Bagaimana dengan warga desa yang internetnya lemot?*"). These expressions were not treated as isolated complaints but as indicators of underlying societal values, institutional expectations, and structural anxieties, consistent with the interpretive tradition of digital sociology and critical policy analysis.

To avoid analyzing discourse in isolation, the findings were triangulated with empirical data from the LAN 2025 *Future Skills Outlook for ASN* survey. For instance, public distrust toward "faceless algorithms" was cross-referenced with LAN data showing that only 45.03% of civil servants reported adequate technology literacy, thus providing a rational basis for skepticism. Youth demands for "faster, smarter services" were connected to LAN's finding that Gen Z prioritized AI and Big Data skills (11.08%), reflecting alignment between public expectations and bureaucratic potential. Likewise, complaints of rural exclusion were validated against LAN's geospatial data, which highlighted the uneven digital capacity across provinces. This integration allowed the analysis to move beyond "what citizens say" toward "why they say it," grounding interpretations in the material realities of bureaucratic readiness.Ethical rigor was maintained by collecting only publicly posted data, anonymizing user identifiers, and documenting researcher positionality through reflexive journals. However, several methodological limitations must be acknowledged. Social media users tend to be younger, urban, and digitally literate, thereby underrepresenting older citizens, rural populations, and marginalized groups, a structural limitation that reflects van Dijk's "second-level digital divide." Moreover, content visibility is shaped by opaque platform algorithms, meaning that high engagement does not necessarily equate to representativeness. This was mitigated by diversifying platform sources and balancing institutional and organic content. Finally, the findings are temporally specific, reflecting a 12-month window in which public sentiment may shift rapidly in response to new policies or crises.

Results and Findings

The dataset for this study was collected from publicly available YouTube videos that explicitly discussed the role of Artificial Intelligence (AI) and digitalization in Indonesian public governance. Rather than focusing solely on technical aspects of Natural Language Processing (NLP), the selection was guided by the sociological question: "How is digital trust negotiated in the public sphere?" In this sense, YouTube functions not only as a data source but also as a digital public arena where institutions, journalists, and citizens interact through discourse, debate, and commentary.

The sampling strategy followed a purposive approach, emphasizing thematic relevance (AI, bureaucracy, digital trust), and public engagement (such as likes and comments). Five representative videos were selected to illustrate varying perspectives, ranging from state-driven narratives to grassroots critiques. This balance ensures that the dataset reflects both top-down institutional communication and bottom-up public reactions to the event.

To better illustrate the data sources used in this study, Table 1 presents two examples of the YouTube videos included in the sample. These videos were selected based on thematic relevance, high public engagement, and discursive richness, offering insights into how digital trust and AI-related concerns are discussed in the Indonesian public sphere.

Table 1. Sample of YouTube Videos Discussing AI and Digitalization in Indonesian Public Governance

Video Title	Channel	Link	Views	Likes	Comments
Heboh 'Kiamat PNS' Beredar Isu Diganti Robot AI Dipercepat, Ini Sektor yang Diganti & Penjelasan BKN	Tribunnews	https://www.youtube.com/watch?v=G0B97RlwrG4	83.656	583	501
"Kiamat" PNS Semakin Dekat	CNBC Indonesia	https://www.youtube.com/watch?v=QxUOj8NcrNE	3.039.121	23.000	13.497

The dataset comprised 13,998 individual comments extracted from a diverse set of YouTube videos. These comments were selected from both mainstream media channels and independent content creators to ensure a variety of perspectives. The comments were systematically extracted, cleaned, and pre-processed into a structured text corpus, forming the foundation for both sentiment and thematic analyses. This rich corpus allows for a nuanced understanding ofpublic sentiment, discursive patterns, and societal concerns around AI, digitalization, and public trust in government-related narratives.

In addition to YouTube as a source of public discourse, this study also analyzed user-generated content from Google Play Store reviews of 9 (nine) official Indonesian government applications. These apps were selected based on their relevance to digital public services and volume of user feedback. Reviews on the Play Store offer a unique lens into the user experience (UX), service performance, and public trust in government-provided digital tools. Unlike YouTube comments, Play Store reviews provide both qualitative textual feedback and quantitative ratings (1 to 5 stars), making it possible to analyze not only what users say but also how satisfied they are.

Table 2. Sample of Government Apps and Public Reviews from Google Play Store

Application	Ministry	Link	Downloads	Reviews
Satu Sehat	Ministry of Health	https://play.google.com/store/apps/details?id=com.telkom.tracencare&hl=id	50 Million	106.265
Mobile JKN	BPJS	https://play.google.com/store/apps/details?id=app.bpjs.mobile&hl=id	50 Million	102.683
Info BMKG	Meteorology, Climatology, and Geophysical Agency	https://play.google.com/store/apps/details?id=com.Info_BMKG&hl=id	10 Million	20.154
M-Paspor	Ministry of Immigration	https://play.google.com/store/apps/details?id=id.go.imigrasi.paspor_online&hl=id	5 Million	16.706

Ruang GTK	Ministry of Education	https://play.google.com/store/apps/details?id=id.belajar.app&hl=id	5 Million	19.895
Digital Korlantas POLRI	Indonesian Police	https://play.google.com/store/apps/details?id=id.qoin.korlantas.user&hl= id	5 Million	61.233
SIGNAL - Samsat Digital Nasional	Indonesian Police	https://play.google.com/store/apps/details?id=app.signal.id&hl=id	5 Million	58.727
POLRI PRESISI	Indonesian Police	https://play.google.com/store/apps/details?id=superapps.polri.presisi.presisi&hl=id	5 Million	25.018
iPusnas	Indonesian Library	https://play.google.com/store/apps/details?id=mam.reader.ipusnas&hl=id	1 Million	16.501

In total, 427,191 individual user reviews were collected from the Google Play Store for nine government applications. These reviews were extracted using a custom scraping script andprocessed to capture both textual content (for sentiment and thematic analysis) and numeric ratings (for user satisfaction assessment).

Two complementary approaches were used. First, sentiment analysis using Natural Language Processing (NLP) was conducted to categorize public comments into positive, negative, or neutral perceptions of AI in governance. This quantitative layer provides a broad overview of the reception of digital initiatives. Second, manual thematic coding was used to identify recurring frames of discourse, guided by Habermas's concept of the public sphere, Giddens and Fukuyama's trust in institutions, and van Dijk's digital inequality.

By combining machine learning tools and human interpretation, the analysis seeks to capture both the emotional climate (sentiment) and the substantive themes (narratives of trust, fear, or inequality).

Public Sentiment and Discourse on YouTube

To capture the broader public sentiment surrounding AI and digital transformation in government, this study also analyzed user comments on viral YouTube videos discussing the potential replacement of civil servants by automation. YouTube, as a platform for both commentary and casual discourse, provides rich qualitative data that reflect public perceptions, emotional responses, and societal narratives about technological changes in public administration.

As visualized in the word cloud [see Figure 2], several frequently occurring terms include "*pns*" (civil servant), "*gak kerja*" (not working), "*manusia*" (human), "robot," and, notably, the word "*setuju*" (agree) appears prominently. This indicates a significant level of optimism among commenters regarding the use of AI and digital tools to replace human civil servants, particularly in response to inefficiencies or perceived underperformance of human civil servants. However, relying solely on individual keywords may overlook important nuances in meaning and context of the text. To explore these subtletiesfurther, the analysis proceeds with an examination of N-gram patterns, focusing on recurring word combinations that reveal deeper emotional tones and underlying narratives.

Figure 2. Wordclouds of YouTube comments

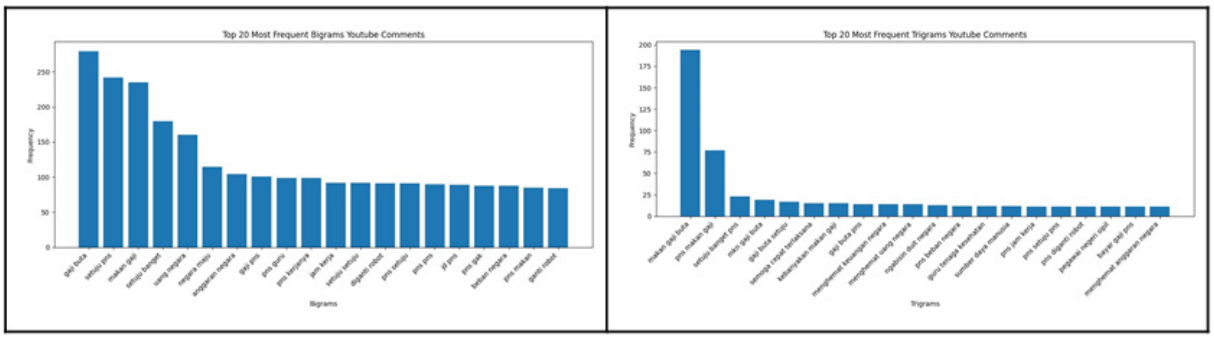

Figure 3. Top Phrases in Youtube comments (N-gram analysis)

The N-gram analysis of YouTube comments further reveals nuanced public sentiment toward the digitalization of government services and AI's potential role in replacing civil servants. Commonly found bigrams such as "*gaji buta*" (getting paid for doing nothing), "*setuju banget*" (totally agree), "*uang negara*" (government funds), and "*diganti robot*" (replaced by robot) reflect strong public frustration with the perceived inefficiencies and misallocation of public funds. This sentiment is echoed in trigrams such as "*makan gaji buta*" (getting paid for doing nothing), "*semoga cepat terlaksana*" (Hopefully it will be implemented soon), and "*menghemat keuangan negara*" (to reduce government spending), suggesting a prevalent belief that automation could enhance budget efficiency and accountability within the bureaucracy. These expressions indicate a notable level of optimism and support for AI-driven transformation, especially when framed around themes of productivity and fiscal responsibility.

However, not all responses reflect this enthusiasm. The appearance of professions like "*guru tenaga kesehatan*" (teachers and health workers) in the trigram set suggests a line of resistance, with some commenters acknowledging that not all roles should be replaced by AI, particularly those requiring empathy, judgment, or human interaction. This duality illustrates a public perception that is supportive of digital reform in principle yet skeptical about its universal applicability.

To explore these mixed sentiments more deeply, the analysis turns to highly liked comments, those with the most public agreement, offering a richer context and clearer articulation of citizen attitudes toward AI in public service.

Table 3. Most Liked YouTube Comments on AI and Public Service Digitalization

Comments in Bahasa Indonesia	Comments in English	Likes
Saya setuju sistem pemerintah kota dan daerah semuanya serba otomatis menggunakan komputerisasi dan teknologi, karena kinerja yang lamban dari PNS, pelayanan yang sangat buruk, serta suap-menyuap yang semakin mengkhawatirkan. Syukurlah jika ini segera dilakukan.	I support full automation in city and local governments through computerization and technology, because civil servants often work slowly, public services are very poor, and corruption is becoming more worrying. I'm glad if this can be implemented soon.	2.908
PNS harus upgrade diri dengan skill, attitude dan integrity. AI bukan segalanya karena butuh validasi. Jadilah PNS yg bernilai lebih.	Civil servants must upgrade themselves with skills, attitude, and integrity. AI isn't everything, it still needs human validation. Be a civil servant with added value.	1.294
Setuju terutama semua staf kelurahan, kecamatan, dan dinas² Pemda yg berhubunhan langsung melayani masyarakat lbh cocok diganti AI.. Shg pelayanan lbh cepat. Tp utk pekerjaan² yg sifatnya menghasilkan analis² saya pikir AI tdk mampu mengantikan peran ini	I agree, especially that all staff in urban villages, subdistricts, and local government offices who directly serve the public are better replaced by AI, so services can be faster. But for jobs that involve producing analysis, I don't think AI can fully replace that role.	749
Setuju bgt. Dengan adanya teknologi ini bisa mengurangi jumlah pns yg cuma menjadi beban apbn. Plus mengurangi beban masyarakat dlm menghadapi ulah pns nakal yg sengaja bikin ribet urusan administratif sehingga terpaksa bayar uang sogokan demi memperlancar urusan. Walaupun tenaga PNS masih tetap akan di butuhkan sampe kapanpun, minimal jumlahnya nggak sebanyak skrg yg cuma makan gaji buta tapi malas kerja	Totally agree. With this technology, we can reduce the number of civil servants who are just a burden on the national budget. It also lessens the burden on the public in dealing with corrupt officials who intentionally make administrative processes difficult so people feel forced to pay bribes to get things done. Even though civil servants will still be needed in the future, at least the number won't be as high as it is now, many are just getting paid for doing nothing and are lazy to work.	589

Several comments showed strong optimism toward the use of AI and automation in public services. For example, one user said they support "*full automation... because civil servants often work slowly*," while another stated that technology can help "*reduce the number of civil servants who are just a burden on the national budget*." These comments suggest that many people believe that digitalization can improve government performance by reducing corruption, speeding up administrative processes, and saving public money. In this view, AI is seen as a solution to bureaucratic inefficiency and a way to make services more reliable and fairer.

However, there were also comments that reflected resistance or skepticism. For example, one user said that "*AI isn't everything; it still needs human validation*," and another said that AI may not be able to replace jobs that involve "*producing analysis*." These opinions suggest that while people may accept the use of AI in some areas, they still believe that human workers are needed, especially for tasks that require judgment, critical thinking, or ethical decision-making. This shows a more careful view of digital transformation, where technology is seen as a helpful tool but not a complete replacement for human roles.

User Experience and Evaluation of Government Apps

To complement the analysis of public discourse on YouTube, this section examines citizen feedback derived from Google Play Store reviews of nine official government apps. These applications span a range of public services, from health and education to law enforcement, and are managed by various state institutions. The goal was to understand how everyday users evaluate these digital tools in terms of usability, performance, and trustworthiness. The indicators analyzed are *download counts* as a proxy for adoption and reach and *rating distributions* (1 to 5 stars) as indicators of satisfaction or dissatisfaction.

Download counts are often used as a proxy for adoption and reach, indicating how widely an application is utilized within a population. As shown in Table 2, Satu Sehat (Ministry of Health) and Mobile JKN (BPJS) stand out with over 50 million downloads each, significantlyhigher than other government applications. This high adoption rate is largely driven by the mandatory nature of these apps, as they are essential tools for accessing healthcare services and the national health insurance in Indonesia. Thus, their widespread use reflects not only public interest but also policy-driven enforcement, positioning them as digital gateways to critical public services in India.

User rating distributions, ranging from one to five stars, serve as key indicators of user satisfaction or dissatisfaction with digital public services. A higher proportion of 4- and 5-star ratings generally reflects a positive user experience, whereas a dominance of 1- and 2-star ratings suggests widespread frustration, technical issues, or unmet expectations. Figure 2 illustrates the percentage distribution of user ratings across nine government applications, offering insights into how each platform is perceived by its users in terms of functionality, reliability, and overall service quality.

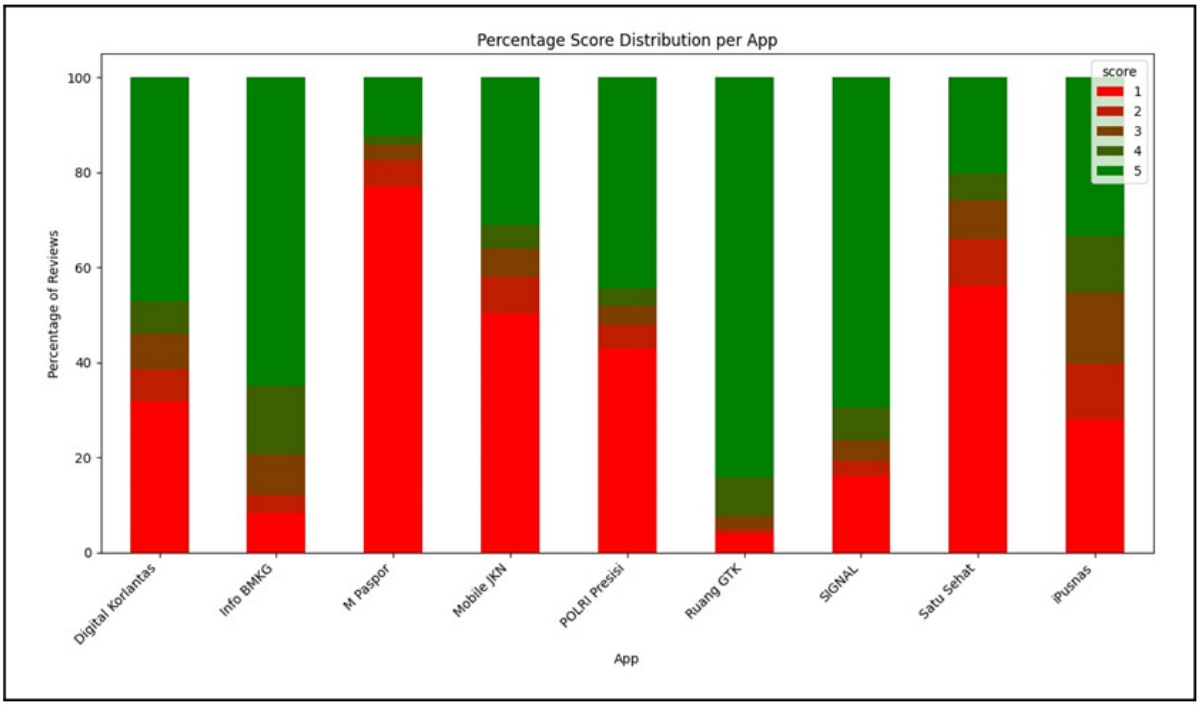

Figure 4. User Ratings Across Nine Government Applications

Figure 4 shows that the three applications with the highest proportion of positive ratings (3, 4, and 5 stars) are Ruang GTK (education sector), Info BMKG (disaster information), and SIGNAL (vehicle tax service). These results suggest that users generally find these apps to be functional and reliable. In contrast,

the highest volume of low ratings (1 and 2 stars) was recorded by M-Paspor, Satu Sehat, and Mobile JKN, all of which serve critical functions in passport processing and healthcare services. Notably, despite their massive user base, Satu Sehat and Mobile JKN received disproportionately high negative ratings, highlighting persistent dissatisfaction.

These findings underscore a recurring pattern: essential government apps are not always the most appreciated, and popularity (in terms of downloads) can mask deep-seated usability issues. Conversely, apps that serve more focused audiences and deliver specific, well-defined tasks tend to generate higher satisfaction.

To better understand the reasons behind these user sentiments based on numeric ratings, a word cloud analysis was performed. This visualization captures the most frequently used terms inuser reviews, allowing deeper insight into the recurring issues, expectations, and perceptions expressed by the public toward each application.

Figure 5. Wordclouds of Government App Reviews

The word cloud analysis revealed clear distinctions between positive and negative user reviews. In reviews with positive sentiment, commonly used words include "*terima kasih*" (thanks), "*membantu*" (helpful), "*bagus*" (good), "*mudah*" (user-friendly), and "*cepat*" (fast)—suggesting that users appreciate

efficient, user-friendly, and helpful features. On the other hand, negative reviews frequently feature words such as "*error*," "*ribet*" (complicated), "*susah*" (troubled), and "*tolong perbaiki*" (please fix it), indicating frustration over technical issues, complicated processes, and unreliable functionality.

Although word clouds provide an overview of recurring vocabulary, they lack contextual depth. To uncover more specific patterns in how users express satisfaction or complaints, the analysis proceeds with N-gram modeling. This technique captures commonly occurring word pairs (bigrams) and triplets (trigrams) to identify frequently mentioned phrases and recurring expressions in user feedback.

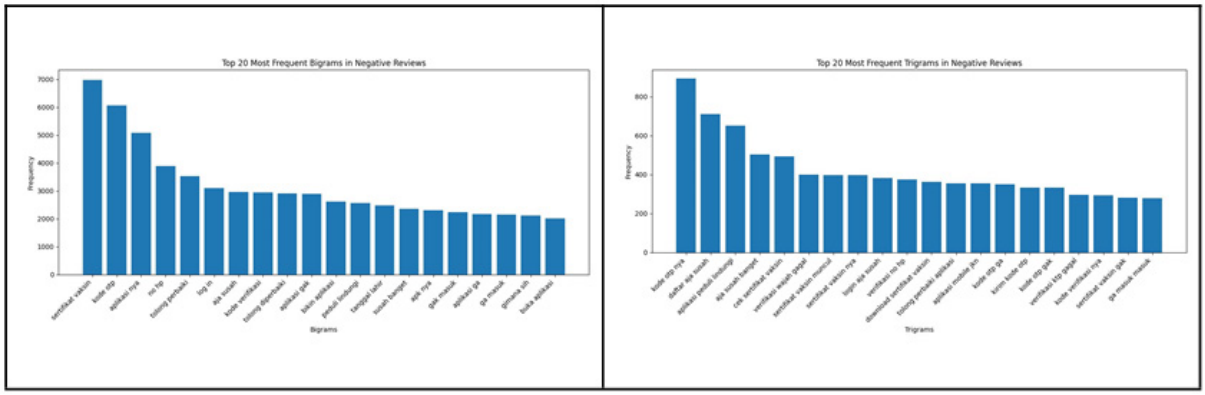

Figure 6. Top Phrases in Government Negative App Reviews (N-gram analysis)

The N-gram analysis of negative user reviews reinforced the patterns identified in the earlier sentiment and word cloud findings. The use of bigrams and trigrams offers a clearer insight into users' specific frustrations and emotional tones. Frequently occurring bigrams in negative reviews include phrases such as "*tolong diperbaiki*" (please fix it), "*ga masuk*" (The app isn't launching), and "*susah banget*" (very difficult), which reflect recurring technical problems and poor user experience. Likewise, trigrams such as "*daftar aja susah*" (it's difficult to register), "*login aja susah*" (it's difficult to log in), "*... aja susah banget*" (It's really hard to …), "*tolong perbaiki aplikasi*" (please fix the apps), and "*gak masuk masuk*" (the app is not launching) indicate a shared narrative of users struggling with access, registration, and app reliability. The consistent appearance of these phrases suggests that for many users, basic tasks such as logging in or registering become major pain points, leading to a buildup of frustration and loss of trust.

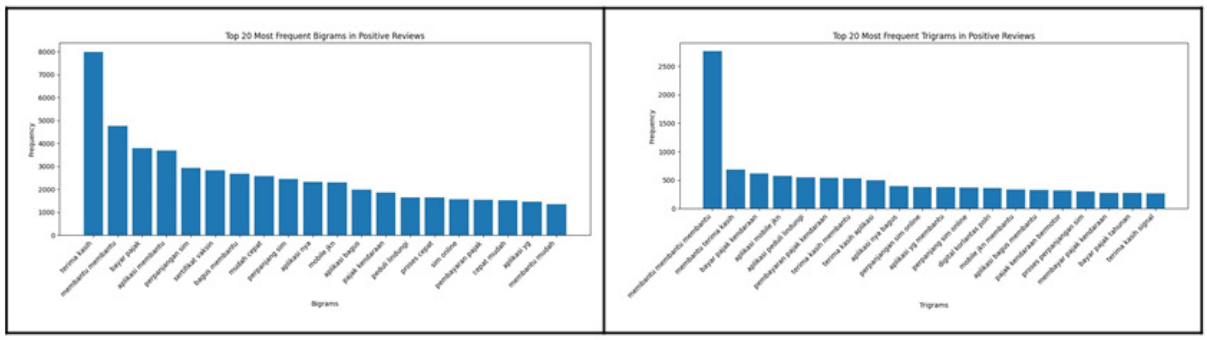

Figure 7. Top Phrases in Government Positive App Reviews (N-gram analysis)

In contrast to the negative reviews, the N-gram analysis of positive user feedback highlights expressions of appreciation and satisfaction with the functionality and ease of use of the applications. Commonly occurring bigrams such as "*aplikasi membantu*" (helpful app), "*bagus membantu*" (good,

helpful), "*terima kasih*" (thanks), "*mudah cepat*" (easy, fast), and "*proses cepat*" (fast process) suggest that users value apps that are straightforward, efficient, and effective in delivering public services. Likewise, trigrams such as "*membantu terima kasih*" (helpful, thanks), "*aplikasi nya bagus*" (good app), "*aplikasi yg membantu*" (helpful app), and "*aplikasi bagus membantu*" (good app, helpful) reinforce a tone of gratitude and endorsement. These phrases indicate that when government apps perform reliably and meet user expectations, they are not only well received but also actively appreciated.

The combined insights from the word cloud and N-gram analysis reveal a complex mix of skepticism and resistance, alongside pockets of measured optimism toward the digitalization ofpublic services. On the one hand, the frequent appearance of negative phrases such as "*login aja susah*," "*tolong diperbaiki*," and "*gak masuk masuk*" reflects persistent frustrations with system reliability and accessibility, suggesting **resistance** rooted in everyday technical barriers and distrust in institutional readiness. On the other hand, positive expressions like "aplikasi membantu," "*mudah cepat*," and "*aplikasi bagus membantu*" indicate that when digital tools function effectively, they are met with **optimism** and public appreciation. These polarized narratives suggest that while some citizens remain hopeful about the potential of AI and digital platforms to enhance public service delivery, many still experience **skepticism** driven by poor implementation, reinforcing the need for more robust, inclusive, and user-centered digital governance strategies.

Practical Implications

The findings suggest that adopting AI in Indonesian bureaucracy is not only a technical undertaking but also an institutional and ethical transformation. While machine learning models demonstrate credible accuracy in classifying public sentiment, the persistence of complaints about accessibility and reliability underscores the risk of eroding public trust if AI deployment is not accompanied by responsiveness and inclusivity.

For the National Institute of Public Administration (LAN), this entails redefining its institutional role. The LAN cannot remain confined to a training function; it must position itself as a strategic node in AI governance, tasked with three priorities: (1) formulating ethical and regulatory frameworks that safeguard transparency and accountability; (2) strengthening bureaucratic capacity not only in technical competencies but also in value-based governance; and (3) fostering public dialogue that bridges optimism and skepticism, ensuring that AI adoption reflects societal expectations and mitigates generational and digital divides.

In short, the use of AI in government will not only depend on how accurate the algorithms are, but also on whether the state can use the technology in a way that is ethical, inclusive, and open to public discussion.

Discussion

The analysis of more than 427.191 public comments using NLP revealed three dominant sentiment patterns. Optimism appeared in expressions emphasizing efficiency and convenience, such as "*faster and more practical*" or "*no need to queue anymore.*" Skepticism was evident in concerns about transparency and accountability, with comments like "*if the system fails, who will take responsibility?*" Meanwhile, resistance emerged in worries about replacing human roles, for instance, "*civil servants should not be replaced by robots, otherwise people will be confused.*" Temporally, optimism tended to dominate at the beginning of policy announcements, while skepticism and resistance increased following system breakdowns or policy controversies, demonstrating that public sentiment is dynamic and context dependent.

From the perspective of Habermas's public sphere theory, social media functioned as a discursive arena in which citizens negotiated the legitimacy of state-led digital transformation. Comments were not simply isolated opinions but rather collective discourses on justice, accountability, and bureaucratic readiness. Negative sentiments, therefore, should not be read as outright rejection oftechnology, but rather as critiques of bureaucratic culture perceived as ethically and institutionally unprepared.

The findings also highlight the ambivalent nature of institutional trust. On the one hand, citizens expressed support when efficiency was demonstrably improved; on the other, doubts persisted about whether bureaucratic institutions could ensure accountability and fairness. This resonates with Giddens and Fukuyama's insights that trust constitutes essential social capital for institutional sustainability. In this sense, AI in public service delivery represents not only technical innovation but also a test of bureaucratic legitimacy.

Furthermore, the analysis points to enduring digital inequalities, as emphasized by van Dijk. Urban and digitally literate users were more critical of algorithmic bias and data privacy issues, while citizens in rural or less-connected regions more frequently voiced frustrations over poor access and limited digital literacy. For instance, internet penetration in Maluku and Papua is approximately 69.26%, significantly lower than in Java, which reaches around 84.69% (APJII,

2025). In addition, nearly 70% of villages lacking 4G signal coverage are located in Eastern Indonesia, according to Indonesia's Telecommunications and Information Accessibility Agency (AntaraNews, 2022). A 2021 report further highlighted that only 17–20% of villages in Maluku and Papua have access to quality Internet connections (Bloomberg Technoz, 2023). These disparities reflect how resistance to AI is shaped not only by the fear of automation but also by deeper feelings of exclusion from the broader digital transformation.

Taken together, these findings suggest that the success of bureaucratic digitalization cannot be measured solely by technical performance indicators, such as speed or efficiency. Rather, it depends critically on whether digital governance can generate legitimacy and trust. The integration of NLP-based sentiment analysis with thematic interpretation shows that public trust is the key variable: without it, digitalization risks deepening resistance, but when AI strengthens transparency and inclusivity, optimism flourishes. Ultimately, digital technologies in Indonesian bureaucracy should be understood as a socio-political project, not merely a technical one. AI in public services will only gain broad acceptance if it is positioned not as a substitute for human officials but as a tool that supports ethical, accountable, and citizen-centered bureaucratic reform.

Conclusion

The findings of this study highlight that the adoption of Artificial Intelligence (AI) in Indonesian bureaucracy constitutes not only a technical challenge but, more fundamentally, an institutional and ethical one. While AI promises enhanced efficiency, precision, and accessibility in public services, the evidence also reveals a significant risk of eroding public trust if its deployment is not anchored in strong governance principles.

First, recurring frustrations with system errors and service unreliability underscore that technical robustness is a nonnegotiable foundation. Citizens will resist or grow skeptical of digitalization and AI-enabled services if basic functions, such as authentication, data access, or continuity of use, fail to perform consistently.

Second, the prevalence of user pleas such as "*tolong diperbaiki*" (please fix it) signals the necessity of responsive and adaptive governance. Bureaucratic AI systems must embed continuousfeedback loops, allowing policymakers and developers to identify pain points rapidly and implement timely updates.

Third, the coexistence of skepticism and optimism in public sentiment demonstrates that trust depends on transparency, accountability, and inclusivity. AI in governance must be explainable (transparent decision-making), auditable (accountable to oversight bodies), and equitable (inclusive across socioeconomic and generational divides). The findings from the 2025 LAN Survey on digital inequalities reinforce the urgency of designing systems that close, rather than deepen, access gaps.

Finally, AI adoption should not be viewed merely as a technological modernization project but as an opportunity to renew the social contract of digital governance. Integrating ethical safeguards, inclusive design, and citizen-centric responsiveness can transform skepticism into optimism and ensure that digital governance remains adaptive, transparent, and socially legitimate.

For the National Institute of Public Administration (LAN), these findings call for paradigmatic reorientation. The LAN cannot remain confined to its traditional role as a training provider; rather, it must evolve into a strategic and normative institution that steers the ethical adoption of AI in governance. This requires three layers of action.

1. Ethical and institutional frameworks should develop regulatory architectures that safeguard transparency, accountability, and inclusivity in bureaucratic practices.
2. Hybrid capacity building, strengthening bureaucratic competence not only in technical AI literacy but also in ethics, empathy, communication, and critical thinking. Differentiated training modules should address the varying needs of younger civil servants (advanced data skills) and senior officials (confidence building and ethical literacy).
3. Trust-building mechanisms include institutionalizing transparency through algorithmic audits, public communication strategies, and participatory oversight frameworks. A dedicated Center of Excellence for AI Governance within the LAN could serve as a hub for monitoring societal sentiment in real time using NLP tools, thereby informing both training and policy interventions.

In summary, the LAN is uniquely positioned to act as both a driver of digital transformation and a guardian of public legitimacy in the AI era. By aligning its training, research, and advisory functions with the imperatives of ethical and inclusive governance, LAN can ensure that the Indonesian bureaucracy does not merely adopt AI but does so in a transparent, accountable, and trusted manner.

Limitations & Future Research

Limitations

This study had several limitations. First, the dataset was drawn primarily from social media platforms such as Twitter and YouTube, which over-represent digitally active communities while under-representing older citizens, rural populations and individuals with limited Internet access. Second, while thematic coding was cross-validated through inter-coder reliability checks, interpretation bias remains possible, given the contextual and often sarcastic nature of online discourse. Third, the temporal scope captures evolving trends within a specific political and technological window, which may not reflect longer-term dynamics of trust and resistance to AI ingovernance. Finally, our analysis relies on observable digital traces and does not capture the "silent majority" who engage with government services but do not comment publicly online.

Future Research

Future studies could address these gaps in several ways. Expanding data collection to include offline surveys, focus group discussions, or interviews with non-digital populations would provide a more inclusive understanding of public sentiment. Second, cross-country comparative research could highlight cultural and institutional differences in adopting AI in public administration. Third, longitudinal studies that track attitudes over multiple years could shed light on whether trust in digital governance stabilizes, increases, or declines over time. Finally, integrating sentiment analysis with behavioral data (e.g., service usage statistics and complaint records) could bridge the gap between what citizens say and how they interact with AI-enabled government systems.

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