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Governing the Algorithm: A Mediation Analysis of Digital Transformation, Bureaucratic Discretion, and Service Quality in a Developing Democracy

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ABSTRACT

Governments worldwide are implementing digital transformation policies to enhance public service delivery. However, the impact of these algorithm-driven systems on street-level bureaucrats remains critically under-examined. This study investigates the complex pathways through which Indonesia's e-government policy affects bureaucratic work and service outcomes. This study employed a mixed-methods explanatory sequential design. Quantitative data were collected from 500 public officials across five Indonesian provinces. An E-Government Implementation Index (EGII) was constructed. We used Ordinary Least Squares (OLS) regression and a formal mediation analysis with bootstrapping to analyze the relationships between EGII, Perceived Bureaucratic Discretion (PBD), and Bureaucrat-Perceived Public Service Quality (B-PSQ). This was supplemented by 20 in-depth, semi-structured interviews to explain the statistical findings. Regression analysis confirmed a significant negative association between EGII and PBD ($\beta = -0.47, p < 0.001$) and a significant positive association between EGII and B-PSQ ($\beta = 0.62, p < 0.001$). The mediation analysis revealed that EGII has a strong, positive direct effect on B-PSQ (Effect = 0.57, $p < 0.001$) and a small but significant negative indirect effect through the reduction of PBD (Effect = -0.05, $p < 0.01$). Qualitative data revealed that officials feel constrained by "algorithmic cages" that, while improving efficiency, limit their ability to handle exceptional cases, thereby risking service equity for marginalized citizens. In conclusion, Indonesia's digital transformation presents a complex trade-off. It successfully enhances administrative efficiency but simultaneously curtails the beneficial discretion of frontline bureaucrats, creating a small but significant drag on service quality. Effective digital governance requires a hybrid model that embeds algorithmic systems within a framework that empowers, rather than replaces, human judgment.

1. Introduction

The global landscape of public administration is undergoing a profound metamorphosis, driven by the relentless advance of digital technology.¹ Governments worldwide are increasingly adopting digital transformation policies, aspiring to create more efficient, transparent, and citizen-centric public

services.² This paradigm shift, often encapsulated under the umbrella of e-government or digital governance, involves replacing traditional paper-based, face-to-face bureaucratic processes with integrated, automated, and algorithm-driven systems.³ The theoretical promise of this transformation is compelling: reduced transaction



costs, streamlined workflows, data-driven decision-making, and a fundamental reconfiguration of the state-citizen relationship.⁴ Developing nations, in particular, have embraced this agenda as a panacea for long-standing challenges of bureaucratic inefficiency, corruption, and inadequate service delivery.⁵

The Republic of Indonesia, Southeast Asia's largest economy, stands as a critical case in this global movement. For decades, its public administration has been characterized by complex regulations, procedural redundancy, and significant regional disparities.⁶ In response, the Indonesian government has launched an ambitious national strategy for digital transformation, primarily articulated through Presidential Regulation No. 95 of 2018 concerning the Electronic-Based Government System (SPBE).⁷ This regulation mandates the integration of digital technologies across all levels of government with the explicit goal of realizing "clean, effective, transparent, and accountable governance and high-quality and reliable public services".⁸ The SPBE framework represents a monumental effort to modernize the state apparatus through shared infrastructure, data interoperability, and integrated service portals.

However, beneath the optimistic rhetoric of digital modernization lies a complex and often overlooked tension. The logic of algorithmic governance, which underpins policies like the SPBE, is one of standardization, formalization, and control. It seeks to translate complex legal and administrative rules into computer code, thereby minimizing ambiguity and ensuring uniform application.⁹ This logic directly challenges a cornerstone of classical public administration theory: the concept of bureaucratic discretion.

The concept of discretion itself is deeply dualistic. On one hand, as articulated by scholars from Weber to Lipsky, discretion is the essential freedom that public officials—particularly "street-level bureaucrats" who interact directly with citizens—possess to make

choices in the implementation of public policy.¹⁰ This autonomy is not a flaw in the system but a feature that allows bureaucrats to interpret vague laws, adapt rules to unique circumstances, and ultimately humanize the machinery of the state.¹¹ It is the space where rigid policy meets complex reality. On the other hand, in many contexts, including Indonesia's, unchecked discretion has a well-documented "dark side," fostering opportunities for corruption, favoritism, and arbitrary decision-making.¹² Indeed, a primary impetus for algorithmic governance is precisely to curb this harmful discretion by making processes transparent and rules-based.

This creates the central paradox this study seeks to investigate: What happens when a technological solution designed to eliminate harmful discretion simultaneously constrains the beneficial discretion necessary for equitable and adaptive governance? The central problem this study addresses is the critical lack of empirical understanding of how macro-level digital transformation policies impact the micro-level realities of bureaucratic work and its outcomes. While the Indonesian government measures the success of SPBE through indices of digital maturity, there is a "black box" regarding its effects on the professional lives and decision-making capacity of civil servants. Does the algorithm, in its quest for uniformity, effectively place bureaucrats in an "algorithmic cage," stripping them of the professional judgment necessary to serve a diverse society? Or does it free them from routine tasks to focus on more complex work? More importantly, how does this dynamic ultimately shape the quality of public service delivery—not just in terms of speed, but also in terms of equity, accessibility, and responsiveness?

This study aims to fill this critical gap by conducting a comprehensive analysis of the relationship between the implementation of Indonesia's digital transformation policy, the level of bureaucratic discretion, and the quality of public service delivery. The novelty of this research is



threefold. First, it employs a mixed-methods explanatory sequential design, which triangulates quantitative data from a large-scale survey with rich qualitative insights from interviews, allowing for a robust and nuanced analysis. Second, unlike previous studies focused on macro-level policy or citizen-side usage, this research delves into the administrative core of the state, examining the lived experiences of public officials on the front lines of digital change. Third, and most significantly, it utilizes a formal mediation analysis to statistically model the precise pathways of impact, disentangling the direct effects of digitalization on service quality from the indirect effects that operate through the erosion of bureaucratic discretion. By doing so, this study moves beyond a simplistic techno-optimist or techno-pessimist dichotomy, offering an evidence-based understanding of the complex trade-offs inherent in governing the algorithm.

2. Methods

This study utilized a mixed-methods explanatory sequential design, a robust approach for exploring complex social phenomena where quantitative results are explained in more detail by subsequent qualitative findings. The design proceeded in two distinct phases. The first phase involved a quantitative cross-sectional analysis based on a survey of public officials to identify and quantify the statistical relationships between digital policy implementation, bureaucratic discretion, and public service quality. The second phase involved a qualitative analysis of in-depth interviews designed to explain and elaborate upon the statistical patterns observed in the first phase, providing rich, contextualized insights into the mechanisms driving the relationships. The unit of analysis was the individual public official nested within their respective government agency and province. To ensure a representative and comparative analysis, this research covered five major Indonesian provinces selected for their diverse socio-economic profiles and varying levels

of e-government maturity, as classified by the Ministry of Administrative and Bureaucratic Reform's 2019 SPBE evaluation index: Province A (high maturity), Province B (high-medium), Province C (medium), Province D (medium-low), and Province E (low).

A survey was administered to a sample of N=500 public officials using a stratified random sampling process. The sample was proportionally distributed across the five selected provinces. Within each province, officials were drawn from three key public service sectors chosen for their high degree of citizen interaction and central role in the SPBE agenda: Office X, Y, Z. The final dataset included demographic variables (age, gender, education level, years of service), organizational variables (agency type, training hours), and the core theoretical variables.

To complement the quantitative data, 20 semi-structured interviews were conducted. A purposive sampling strategy was employed to select four officials from each of the five provinces, representing a mix of managerial and frontline positions to capture a wide range of perspectives. Interviews were guided by a detailed protocol designed to elicit narratives about officials' experiences with new digital systems, changes in their daily work routines, their ability to handle non-standard requests, and their perceptions of citizen feedback. Interviews continued until theoretical saturation was reached, where new interviews no longer yielded significant new insights into the core themes.

The central independent variable measures the extent of digital policy implementation at the agency level. An E-Government Implementation Index (EGII) was constructed as a composite score based on five survey items measured on a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). A preliminary exploratory factor analysis confirmed that all five items loaded strongly onto a single factor, supporting their use as a unidimensional index. The items were: (1) "My daily tasks are fully integrated into a digital information system; (2) The use of digital systems for



service delivery is mandatory in my agency; (3) Data and processes are highly standardized across different service units; (4) I rely primarily on algorithmic or automated outputs to make decisions for service applicants; (5) Inter-agency data sharing is seamless and occurs in real-time. The EGII for each respondent was calculated as the mean score of these five items. The scale demonstrated high internal consistency in the current sample (Cronbach's $\alpha = 0.88$).

This variable captures the degree of autonomy and flexibility officials feel they have in their roles. It was measured using a 5-item scale adapted from established public administration literature, with responses on a 5-point Likert scale. Items included: (1) I have significant freedom to decide how to carry out my work; (2) I am able to bend the rules when necessary to help a citizen with a unique problem; (3) My professional judgment is trusted and valued by the system; (4) I feel more like a processor of information than a problem-solver. (Reverse-coded); (5) The procedures I must follow are rigid and allow for no exceptions. (Reverse-coded). The scale showed high reliability (Cronbach's $\alpha = 0.85$).

This variable measures the perceived quality of service delivery from the bureaucrat's perspective. It was constructed as a composite index based on the SERVQUAL model, adapted for the public sector. The 5-item scale measured: (1) Efficiency: "Our new digital systems have significantly reduced the time it takes to serve citizens."; (2) Reliability: "The services we provide are consistent and error-free." (3) Responsiveness: "We are able to promptly respond to and resolve citizen inquiries."; (4) Transparency: "Citizens can easily track the status of their service requests online." (5) Equity: "Our services are delivered fairly and without bias to all citizens.". The scale demonstrated excellent internal consistency (Cronbach's $\alpha = 0.91$).

The choice to measure service quality from the bureaucrat's perspective was made to capture the internal, administrative assessment of the SPBE policy's effectiveness against its own goals of efficiency

and standardization. However, we explicitly acknowledge this as a significant limitation. This measure is subject to potential common method bias (CMB) and may not reflect the lived experience of citizens, particularly those on the margins. This limitation is addressed further in the discussion. To isolate the effects of the core variables, the analysis controlled for several individual and organizational factors known to influence bureaucratic behavior: Age (in years), Education Level (1=High School to 4=Master's/PhD), Years of Service, and Digital Literacy Training (total hours of relevant training received in the last two years).

The analysis began with descriptive statistics and bivariate correlations. The core of the analysis involved two steps. First, we estimated two Ordinary Least Squares (OLS) regression models to test the primary associations. The use of OLS for Likert composite scales is a common and accepted practice in social science research, assuming the resulting scores approximate interval-level data.

$$\text{Model 1: PBD} = \beta_0 + \beta_1(\text{EGII}) + \beta_2(\text{Controls}) + \varepsilon$$

$$\text{Model 2: B-PSQ} = \beta_0 + \beta_1(\text{EGII}) + \beta_2(\text{PBD}) + \beta_3(\text{Controls}) + \varepsilon$$

Second, to formally test the hypothesis that PBD mediates the relationship between EGII and B-PSQ, we conducted a mediation analysis using the PROCESS macro for SPSS (Model 4) with 5,000 bootstrap samples. This method estimates the direct effect of EGII on B-PSQ, the indirect effect via PBD, and the total effect, providing confidence intervals to assess the significance of the indirect pathway.

Prior to OLS regression, all necessary assumptions were verified. Multicollinearity was assessed using the Variance Inflation Factor (VIF) scores; all VIFs were below the conservative threshold of 5. Normality of residuals was confirmed using Q-Q plots and the Shapiro-Wilk test. Homoscedasticity was checked using scatterplots of residuals versus predicted values and confirmed with a non-significant Breusch-Pagan



test. Interview transcripts were analyzed using a three-stage thematic analysis approach: (1) Open Coding to identify initial concepts; (2) Axial Coding to group codes into broader categories (such as "procedural rigidity," "loss of professional judgment"); and (3) Selective Coding to refine and integrate themes into a cohesive narrative that explains the quantitative results.

3. Results and Discussion

Table 1 presents the descriptive statistics for the key variables. The mean E-Government Implementation Index (EGII) was 3.45 (SD=0.78), suggesting a moderate level of digital transformation

across the sample. The mean for Perceived Bureaucratic Discretion (PBD) was 2.89 (SD=0.65), indicating that officials felt slightly more constrained than autonomous. In contrast, the mean Bureaucrat-Perceived Public Service Quality (B-PSQ) score was relatively high at 4.12 (SD=0.55).

The results of the OLS regression analyses, presented in Table 2, show the direct associations between the variables. Model 1, which regressed PBD on EGII and controls, was statistically significant ($F(5, 494) = 45.8, p < 0.001$) and explained 31.2% of the variance in PBD ($R^2 = 0.312$). As hypothesized, the EGII had a strong, significant, and negative coefficient ($B = -0.47, p < 0.001$).

Table 1. Descriptive statistics of key variables.

A summary of the core variables from a sample of **N=500** public officials.

VARIABLE	MEAN	STD. DEV.	MIN	MAX
E-Govt. Implementation Index (EGII) ⓘ	3.45	0.78	1.20	5.00
Perceived Bureaucratic Discretion (PBD) ⓘ	2.89	0.65	1.00	4.80
Bureaucrat-Perceived PSQ (B-PSQ) ⓘ	4.12	0.55	2.20	5.00
Age (Years)	41.3	8.5	25	60
Education Level (1-4) ⓘ	3.10	0.60	1	4
Years of Service	15.6	9.2	1	38
Digital Literacy Training (Hours)	44.2	15.1	10	80

The standardized coefficient ($\beta = -0.54$) indicates a powerful effect: a one standard deviation increase in EGII is associated with a 0.54 standard deviation decrease in PBD. This provides robust support for the hypothesis that more intensive digital implementation curtails officials' autonomy. Model 2, which regressed B-PSQ on EGII, PBD, and controls, was also highly significant ($F(6, 493) = 68.2, p < 0.001$) and had strong

explanatory power ($R^2 = 0.448$). The EGII demonstrated a strong, positive, and significant relationship with B-PSQ ($B = 0.62, p < 0.001$), with a large standardized effect ($\beta = 0.59$). This suggests that digital implementation is a powerful predictor of higher perceived service quality from the officials' perspective. Interestingly, PBD also had a small but significant positive coefficient ($B = 0.11, p < 0.05; \beta = 0.09$),



implying that even in a digitized environment, professional autonomy contributes positively to service quality. Furthermore, Digital Literacy Training

was a significant predictor ($B = 0.24$, $p < 0.001$; $\beta = 0.21$), underscoring the importance of human capital.

Table 2. OLS regression results for PBD and B-PSQ.

Examining the predictors of Perceived Bureaucratic Discretion (PBD) and Bureaucrat-Perceived Public Service Quality (B-PSQ).

VARIABLE	MODEL 1: PBD		MODEL 2: B-PSQ	
	B (SE)	β	B (SE)	β
(Constant)	3.85*** (0.21)		2.18*** (0.19)	
EGII	-0.47*** (0.04)	-0.54	0.62*** (0.03)	0.59
PBD	---	---	0.11* (0.05)	0.09
Age	-0.002 (0.003)	-0.02	0.004 (0.002)	0.06
Education Level	0.15* (0.07)	0.08	0.09 (0.06)	0.05
Years of Service	-0.004 (0.005)	-0.03	-0.002 (0.004)	-0.02
Digital Literacy Training	0.08 (0.009)	0.04	0.24*** (0.008)	0.21
R ²	0.312		0.448	
Adj. R ²	0.305		0.441	
F-statistic	45.8***		68.2***	

Note: B = Unstandardized Coefficient; β = Standardized Coefficient; SE = Standard Error.
Significance levels: * $p < 0.05$, *** $p < 0.001$

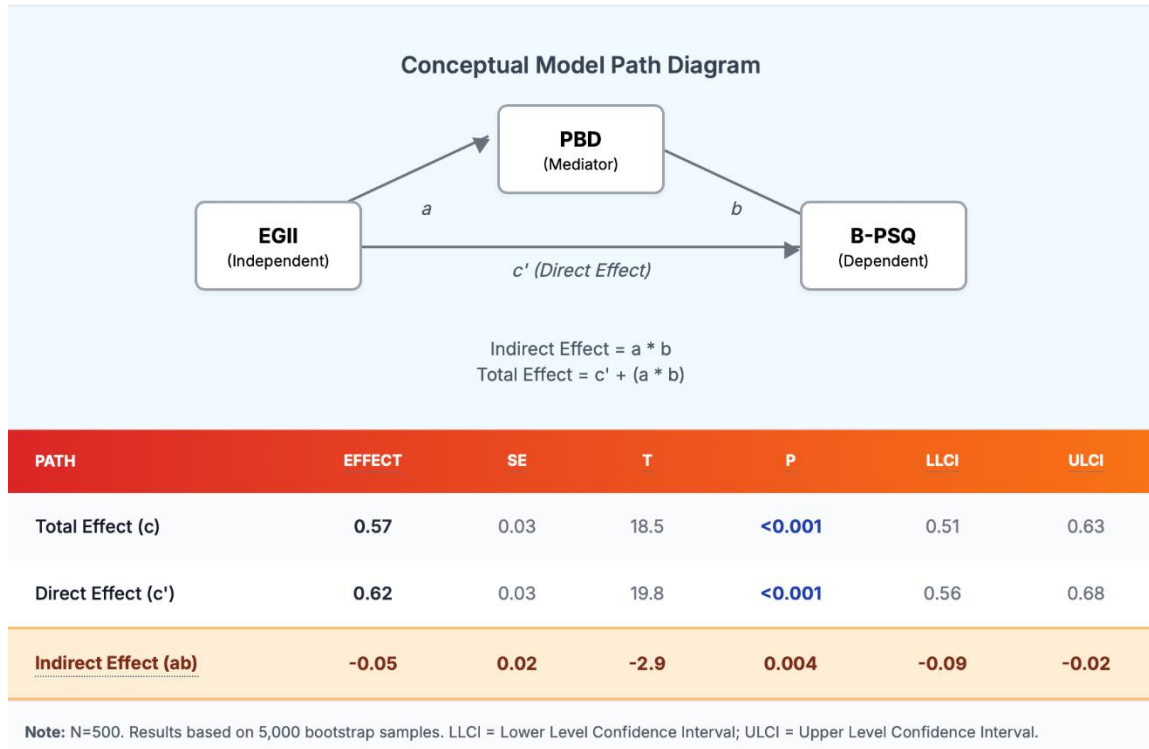
To unpack the complex relationship between EGII, PBD, and B-PSQ, a mediation analysis was conducted. The results, shown in Table 3 and illustrated in the path diagram in Figure 1, reveal the distinct pathways of influence. The analysis shows a significant total effect of EGII on B-PSQ (Effect = 0.57, $p < 0.001$). This total effect is composed of two significant pathways. The direct effect of EGII on B-PSQ remains strong and positive (Effect = 0.62, $p < 0.001$). This suggests that digital systems directly improve service quality perceptions through mechanisms like increased speed and standardization.

Crucially, the analysis reveals a significant indirect effect (Effect = -0.05, $p < 0.01$). The 95% bootstrap confidence interval [-0.09, -0.02] does not contain zero, confirming the significance of this mediation path. This negative indirect effect indicates that EGII reduces PBD, and this reduction in discretion, in turn, has a small but statistically significant negative impact on B-PSQ. In essence, while digitalization's primary effect is positive, it simultaneously creates a negative pathway by curtailing the beneficial aspects of discretion, acting as a partial suppressor on the overall positive outcome.



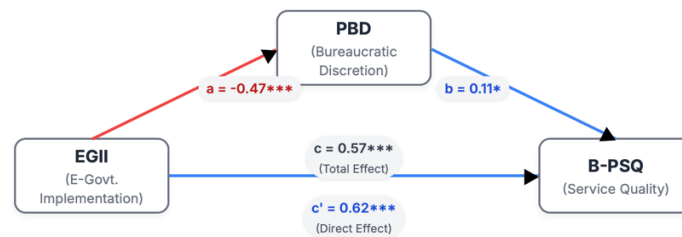
Table 3. Mediation analysis of the indirect effect.

Decomposition of the effect of E-Govt. Implementation (EGII) on Service Quality (B-PSQ) via Bureaucratic Discretion (PBD).



Path Diagram of PBD as a Mediator

Visualizing the direct, indirect, and total effects of E-Government Implementation on Public Service Quality.



Interpretation

— **Negative Path (a):** Higher e-government implementation significantly reduces the perceived discretion of bureaucrats.

— **Positive Path (b):** Higher discretion, in turn, is associated with a small but significant increase in perceived service quality.

Key Finding: The Indirect Effect

The journey from EGII to B-PSQ through PBD has a negative indirect effect ($a * b = -0.05$). This means that while digitalization directly improves service quality (Path c'), it also simultaneously creates a small drag on quality by reducing beneficial bureaucratic discretion.

Significance Levels: * $p < 0.05$, *** $p < 0.001$

Figure 1. Path diagram of PBD as a mediator.



The thematic analysis of the 20 interviews revealed three core themes that explain and add depth to the quantitative results, particularly the mechanisms behind the direct and indirect effects found in the mediation analysis.

Theme 1: The algorithmic cage and the decline of professional judgment

This theme directly corresponds to the negative relationship between EGII and PBD. Officials described feeling constrained by new digital systems, using metaphors of being a "robot" or trapped in an "algorithmic cage". This captures the de-skilling process where the tacit knowledge and problem-solving abilities of experienced bureaucrats are supplanted by rigid procedures.

"Before, people came to me with their problems. A lost document, a complex inheritance issue for a family card... I could listen, understand the context, and find a solution that was within the spirit of the law. Now, the system dictates everything. If the applicant's data doesn't fit perfectly into the required fields, the system rejects it. My hands are tied. I can't override it. My years of experience feel... irrelevant. I just click buttons." – Senior Official, Office X, Province A (High EGII).

Theme 2: The paradox of efficiency: standardization vs. equity

This theme unpacks the competing direct and indirect effects. Officials universally acknowledged that new systems were faster and more transparent, aligning with the strong positive direct effect of EGII on B-PSQ.

"There is no doubt, things are much faster. What used to take two weeks now takes two days... Citizens are happier because the process is clear and the timeline is certain. There is no more 'negotiating' or illegal fees. From an efficiency and anti-corruption standpoint, it is a massive success." – Official, Office Y, Province B (High-Medium EGII).

However, this efficiency came at a cost, reflecting the negative indirect effect. The standardization

enforced by the algorithm could penalize the most vulnerable citizens—those with low digital literacy or unique problems not anticipated by the system's designers.

"The new system requires an email address and a national ID number to register for insurance benefits. But what about the elderly farmer from a remote village who has neither? Before, I could use my discretion... and process his application manually. Now, the system simply says 'Error: Invalid Data.' For this man, the 'more efficient' system is an unbreachable wall. Is that truly a quality service?" – Worker, Office C, Province E (Low EGII).

This theme reveals that bureaucrats are not passive. Instead, they actively find ways to navigate the new hybrid environment. This can manifest as developing "workarounds"—informal methods to handle exceptional cases that the official system cannot.

"The system is the formal rule. But we still have our informal networks. If the system blocks a valid application due to a data mismatch... I don't just tell the citizen 'no.' I call my friend in that agency, and we try to figure it out human-to-human. We then fix the data so the system will accept it. We are essentially creating a human layer to support the digital layer." – Mid-level Manager, Province D (Medium EGII).

The findings present a nuanced, evidence-based picture of digital transformation's impact. The statistical models, enriched by qualitative narratives, confirm a fundamental tension: algorithmic governance is a powerful tool for enhancing administrative efficiency, yet it poses a significant challenge to the adaptive capacity of the state by eroding the discretion of its frontline agents. This discussion explores the mechanisms underpinning these findings and their broader implications.

The strong negative relationship between EGII and PBD confirms a central tenet of the study. The mechanism driving this is the inherent logic of digital systems, which operate through formalization and



standardization. This process, by its nature, squeezes out the ambiguity necessary for discretionary judgment. This finding speaks directly to the "duality of discretion." On one hand, the SPBE policy is succeeding in its goal of curbing harmful discretion. The standardization praised by the PTSP official for eliminating illegal fees is a clear policy victory. It reduces opportunities for corruption and ensures a uniform application of rules, a long-sought goal in Indonesian bureaucratic reform.¹¹⁻¹³

On the other hand, the system is unable to distinguish between this harmful discretion and the beneficial discretion described by the worker in Province E. The algorithm, in its quest for control, eliminates both. This phenomenon can be understood as a form of "digital Taylorism," where complex professional work is deconstructed into machine-monitorable tasks. The unintended consequence is the de-professionalization of the civil service and the creation of a brittle bureaucracy, unable to respond effectively to novel situations not foreseen by the system's architects.¹⁴⁻¹⁶

The mediation analysis provides a powerful lens through which to understand the service quality paradox. The strong, positive direct effect of EGII on B-PSQ captures the "efficiency dividend" of digitalization. From the bureaucrat's perspective, services are faster, more reliable, and more transparent—all key components of quality. This finding validates the government's techno-optimist rationale for the SPBE policy.^{17,18}

However, this perspective must be critically examined through the lens of our study's primary methodological limitation: the measurement of service quality from the bureaucrat's viewpoint. This internal perspective may not capture the citizen's experience and is susceptible to common method bias. The qualitative findings serve as a crucial corrective, suggesting that these efficiency gains can come at the cost of equity. The story of the elderly farmer is a stark example of what Virginia Eubanks terms "automating

inequality," where high-tech tools, designed for a digitally-literate, formally-documented "standard" citizen, systematically police and punish the poor and marginalized. This aligns with a broader literature on data justice, which argues that supposedly neutral technical systems can embed and even amplify existing social inequalities. The negative indirect effect identified in our mediation analysis, though small, is the statistical ghost of these equity concerns. It represents the quality lost when the human "shock absorber" function of street-level bureaucracy is removed, creating new digital barriers for the most vulnerable.^{19,20}

A vital contribution of this study is its illumination of bureaucratic agency in the face of technological determinism. The qualitative theme of "Navigating the Hybrid Space" shows that officials are not passive cogs in the digital machine. Their use of "workarounds" and informal networks should not be seen merely as resistance, but as a form of street-level innovation and technological appropriation. This behavior represents a critical, uncoded form of system maintenance, where human agents actively bridge the gaps between the rigid demands of the algorithm and the complex needs of the public. This suggests that the most effective public administration model in the digital age is not fully automated, but a "hybrid" one that successfully combines the strengths of algorithmic processing with the irreplaceable value of human judgment. The small but significant positive coefficient of PBD on B-PSQ in our regression model lends quantitative weight to this interpretation. Service quality is optimized not when discretion is eliminated, but when it is appropriately channeled and supported.²⁰

The findings lead to a clear policy imperative: to move beyond designing "bureaucrat-proof" systems and towards designing systems that augment bureaucratic capacity. This requires developing a principle of "discretion by design." Rather than being an abstract goal, this can be translated into concrete



design features: (1) Tiered Systems: Employing algorithms to automatically process and approve the vast majority of "standard" applications that meet all criteria, while automatically flagging non-standard, incomplete, or complex cases for mandatory review by experienced human officials. This leverages automation for efficiency while reserving human cognition for complexity; (2) Structured Overrides: Building clear, auditable "override" functionalities into digital systems. A frontline official could flag an exceptional case, and with a manager's digital sign-off and a mandatory written justification, could override the system's rejection. This maintains accountability while providing necessary flexibility; (3) Human-in-the-Loop Feedback: Creating formal, integrated feedback channels where officials can systematically report on cases the algorithm handles poorly. This data should be used not to punish officials, but to iteratively improve the algorithm and its underlying rules, creating a learning system that adapts over time. Implementing such features requires a significant investment in the human capital of the civil service, focusing on the critical thinking and ethical judgment required to govern alongside intelligent systems—a need underscored by the strong positive effect of digital literacy training in our model.

4. Conclusion

This study set out to analyze the implications of Indonesia's digital transformation on its street-level bureaucracy. Our findings reveal a fundamental paradox. On one hand, e-government implementation is a powerful driver of administrative efficiency and standardization, providing a clear vindication of the policy's stated goals. On the other hand, these gains are achieved by curtailing bureaucratic discretion. Our mediation analysis statistically demonstrates that while the direct effect of digitalization on perceived service quality is strongly positive, it is partially suppressed by a negative indirect effect operating through the erosion of this discretion. The "algorithmic

cage" may standardize processes, but it can also prevent bureaucrats from responding to the complex human realities that do not fit neatly into a digital form. The risk is a state that is technically proficient but lacks the wisdom and empathy to serve all its citizens justly.

The primary policy implication is the urgent need for a more human-centric approach to digital transformation. Policymakers must design systems with "discretion by design," building in structured flexibility and feedback mechanisms. Ultimately, the success of Indonesia's digital journey will depend not on the sophistication of its code, but on its ability to forge a new synergy between the efficiency of the algorithm and the indispensable discretion of the human bureaucrat. A significant limitation of this study is its reliance on bureaucrat-perceived data for service quality. Future research is critically needed to triangulate these findings with large-scale citizen satisfaction surveys, especially those targeting vulnerable populations, to provide a complete picture of the true impact of governing by algorithm.

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