International Symposium on Green Innovation, Governance, and Sustainability
Vol. 4 No. 1 | 2026
E-ISSN 3047 - 1877

Digitalization of Public Services and Digital Red Tape: A Systematic Literature Review

Saniyatus Saidah[1], *Siti* Nur Koidah[2], *Dian* Anita Nuswantara[3], dan *Ika* Permatasari[4]

[1-4]Master of Accounting, Faculty of Economics and Business, Universitas Negeri Surabaya, Surabaya, Indonesia

Abstract. Digitalization and integration of public services are expected to cut bureaucracy and create public value, but they can also generate new administrative burdens known as *digital red tape*. This study aims to synthesize the trends and forms of digital public service integration, the new forms of administrative burden for citizens and public officials, and the triggering factors and mitigation strategies. The method used is a *systematic literature review* (SLR) following the PRISMA guidelines, with a search of the Scopus database on October 18, 2026. Of the 127 articles identified, 62 met the criteria and were analyzed using thematic content analysis. The results show five forms of integration: unified portals, data interoperability based on the *once-only* principle, intelligent automation based on artificial intelligence (AI), co-creation and *open-source* platforms, and public value creation. On the other hand, 51 articles confirm the emergence of new burdens in the form of *learning costs*, *compliance costs* and *digital sludge*, psychological burdens, digital exclusion, and *time tax* for citizens, as well as *technostress*, duplicated data entry, and the burden of verifying AI outputs for public officials. The triggering factors include sectoral egos, regulatory disharmony, *top-down* technological determinism, bureaucratic politicization and *vendor lock-in*, as well as gaps in digital literacy and infrastructure. The literature proposes six mitigation strategies, including user-centered design, mandatory interoperability, hybrid governance, and *human-in-the-loop* oversight of AI. The benefits of integration and the new burdens are two sides of the same service design and institutional readiness. This article offers an integrated synthesis of these four aspects and their implications for policymakers, including in the Indonesian context.

Keywords: Administrative burden; Digitalization of Public Services; Red tape; Systematic literature review

1 Background

Digital transformation in the public sector is not merely about moving paper forms onto a computer screen; it reconfigures how government is run and how agencies interact with

[1]Corresponding author: saniasaidah123@gmail.com

citizens. This shift changes the yardstick of success: digitalization can no longer be judged solely by adoption rates or system quality, even though most e-government evaluation research (51.4%) still focuses on output and input rather than real outcome [1].

Digital service integration promises concrete benefits. Estonia's X-Road platform, with its once-only architecture, is considered more effective in increasing public satisfaction and trust [2]. However, digitalization and integration do not always reduce bureaucratic burden. The concept of digital red tape is rooted in the literature on red tape and administrative burden. Global reviews show that digitalization often fails to cut red tape because of organizational inertia, interface misalignment, and duplicated procedures [3]. For public officials, the burden takes the form of repeated data-entry requirements, system rigidity, and technostress [4]. For citizens, digital-by-default policies shift administrative workload onto them and generate learning cost and compliance cost, especially for vulnerable groups [5]; citizens even become accidental caseworkers when they have to handle complex cases on their own [6]. In cities that already have an integrated service application, such as Yogyakarta, obstacles persist in the form of limited access and digital literacy among citizens and the readiness of public officials' human resources, so face-to-face outreach at the neighborhood (RT/RW) level is still needed alongside online channels [5],

This burden is not evenly distributed. Automation excludes citizens in atypical situations [7], and e-ID systems that depend on private banks lead to the exclusion of immigrants [8]. New technologies also bring limitations: Generative AI brings efficiency as well as a new form of digital red tape in the form of hallucination risks and accountability problems [9], and Tang proposes that every digital friction be tested through three evaluation gates before it is justified in the name of risk protection [10].

The institutional and socio-technical factors behind this phenomenon are fairly consistent across the literature. Sectoral egos and the fragmentation of information architecture hinder integration [3], compounded by rigid per-agency budget structures and unclear roles among institutions [11]. The proposed mitigation strategies include user-centered service design, hybrid governance, meta-governance and shared funding [11], human-in-the-loop oversight of AI [9], and public libraries as social infrastructure for digital inclusion [5]. In Indonesia, digitalization in indigenous communities requires a governance framework that combines digital and conventional approaches to avoid exclusion [12], while marginalized groups still face limited digital literacy, high device costs, and interfaces that do not yet accommodate people with disabilities [13].

Nevertheless, studies on the digitalization of public services still tend to address particular aspects in isolation. Earlier systematic reviews generally focus on digitalization initiatives in general [3], evaluations of e-government implementation [1], or specific technologies such as Generative AI [9]. The links among the benefits of digital integration, new administrative burdens, and the role of institutional factors and mitigation strategies have not been discussed in an integrated manner. This article fills that gap through an SLR that answers three research questions:

RQ1: What are the global development trends and forms of integration of public service systems/applications designed to improve bureaucratic efficiency and create public value?

RQ2: How, and in what forms, does the integration of public service applications instead generate new administrative burdens (*digital red tape* and *digital compliance burden*) for public officials and the public?

RQ3: What institutional and socio-technical factors trigger *digital red tape*, and what governance strategies does the literature propose to mitigate it?

2 Research method

This study uses the Systematic Literature Review (SLR) method based on the PRISMA 2020 guidelines [14]. The search was conducted in the Scopus database because of its broad coverage of internationally indexed, peer-reviewed journals in public administration, public policy, and government information systems.

2.1 Literature search

The search was conducted on October 18, 2026 using the Boolean formula TITLE-ABS-KEY (("digital public service" OR "e-government" OR "digital government" OR "digital public administration") AND ("administrative burden" OR "red tape" OR "digital red tape" OR "compliance burden" OR "sludge" OR "time tax" OR "digital divide") AND ("public value" OR "efficiency" OR "interoperability" OR "governance")). The keywords were grouped into four strings, each aimed at the intersection of RQ1–RQ2 (5 articles), RQ1 (45), RQ2 (12), and RQ3 (65), for a total of 127 identified articles.

2.2 Inclusion and exclusion criteria

The criteria were established before selection. Articles were included if they were peer-reviewed journal articles or proceedings of reputable international conferences published in 2016–2026, examined the digitalization of public services, system integration, digital red tape, administrative burden, or digital governance, were written in English or Indonesian, and were available in full text. Editorials, book reviews, popular articles, and studies focusing purely on private e-commerce, commercial banking, or hardware technology were excluded.

Screening was carried out in stages (Figure 1): 15 duplicates were removed, 3 articles were excluded because they were not peer-reviewed or were published before the time range, and 47 of the 109 articles were excluded because the full text could not be accessed, leaving 62 articles for analysis.

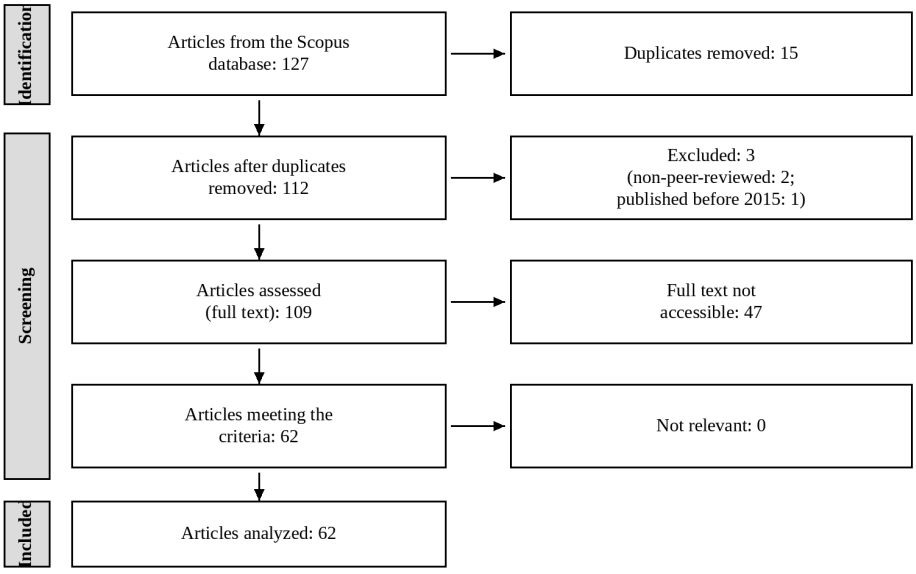


Fig. 1. Summary of the PRISMA flow of the article identification and selection process.

2.3 Content analysis

The articles that passed screening were analyzed using thematic content analysis [15]. This method was chosen because the three RQs require the synthesis of different kinds of findings: the forms and trends of integration (RQ1), the forms of new administrative burden (RQ2), and the triggering factors and mitigation strategies (RQ3). Data from each article (author, year, country, sector, design and method, findings, form of burden, affected parties, triggering factors, mitigation strategies, limitations, quality, and relevance) were extracted into a single table.

3 Results and discussion

3.1 Study characteristics

The 62 articles analyzed were published in 2018–2026 and are dominated by recent studies: 17 articles in 2025 and 26 articles in 2026, or 69.4% of the corpus. Geographically, the studies are distributed across Europe (25 articles), global or cross-regional (12), non-Indonesian Asia (9), Indonesia (8), South/Latin America (5), Africa and the Pacific (2), and the Middle East (1). This distribution shows that the challenges of *digital red tape* and digital bureaucratic compliance burden are experienced by both developed and developing countries.

3.2 Trends and forms of digital public service integration (RQ1)

Thematic synthesis identifies five complementary forms of integration (Table 1). Coding is multi-label, so the accumulated N exceeds 62 studies.

Table 1. Synthesis of the forms of public service system integration and public value creation (RQ1).

Form of integration	N	Main mechanisms and impact
Unified portalization (*one-stop service*, *super apps*, *life-event orientation*)	34	Consolidating sectoral applications into a single portal; life-event orientation (birth, business, retirement) simplifies the interface and cuts information search time [11].
Data interoperability and single authentication (once-only)	18	Citizens' data and documents need to be submitted only once; agencies verify data with each other automatically through encrypted platforms such as Estonia's X-Road [2].
Intelligent automation (AI, LLM, GenAI, process mining)	60	LLMs/GenAI are evolving from chatbots into interpretive bureaucratic agents that guide citizens and help officials draft responses [9]; in Norway, process mining instantly processed 64.8% of child benefit claims [7].
Co-creation and open-source platforms	17	A quadruple helix ecosystem (government, academia, private sector, citizens) designs services; participatory open-source platforms capture citizen input in real time and prevent vendor lock-in.
Bureaucratic efficiency and public value creation	59	Four value dimensions: economic (savings on postage and paper budgets), administrative (data accuracy, efficient resource allocation), citizen (24/7 access, trust in government), and democratic (open data, public participation).

3.3 New administrative burdens (RQ2)

A total of 51 articles confirm the emergence of new digital administrative burdens, while 11 articles discuss it only partially because they focus on the positive impact of digitalization in reducing burdens or on evaluations of digital competitiveness. The synthesis groups digital red tape into two targets: citizens and public officials (Table 2).

Table 2. Typology of digital red tape and public administrative burden (RQ2).

Form of burden	N	Mechanisms and findings
Citizens (citizen-facing)		
Learning costs and accidental caseworker	35	Digital-by-default policies shift administrative work onto citizens, who must learn complicated legal rules and navigate unintuitive interfaces [5, 6].
Compliance costs and digital sludge	45	Repeated document uploads, layered identity verification, and excessive authentication requirements [10].
Psychological costs and digital anxiety	25	Cyber anxiety, fear of document rejection due to input errors, loss of the human touch and bureaucratic empathy [5], and privacy concerns due to AI surveillance.
Digital exclusion and digital divide	50	In Finland, e-ID's dependence on private banks excludes 16% of non-EU/OECD immigrants [8]; similar gaps are experienced by indigenous communities [12], people with disabilities [13], and rural residents.
Time tax and automation inequality	19	Typical claims are processed in 5 days, whereas atypical cases are excluded from automation and wait 35.9 days, or 7 times longer [7].
Public officials (bureaucracy-facing)		
Technostress and duplicated data entry	58	Double data entry when new systems are not integrated with legacy systems; in electronic health records in England, rigid automation formats trigger technostress and staff burnout [4].
Low algorithmic transparency and AI hallucination	37	The obligation to re-verify LLM/GenAI outputs to prevent errors caused by hallucination and algorithmic bias [9].

3.4 Triggering factors and mitigation strategies (RQ3)

New burdens arise under certain conditions, namely when service design, institutional readiness, and user capability are misaligned. Table 3 summarizes five institutional and socio-technical triggering factors and six governance mitigation strategies proposed in the literature.

Table 3. Triggering factors and mitigation strategies for digital red tape (RQ3).

Factor/strategy	N	Mechanism
Triggering factors		
Institutional silos and sectoral egos	22	Fragmented databases across agencies, isolated applications, and refusal to share data out of concern over losing budget autonomy [3, 11].
Regulatory disharmony and rigid law	39	Overlapping and rigid rules create uncertainty about e-service standards and confuse citizens' complaint pathways.

Factor/strategy	N	Mechanism
Top-down technological determinism	10	Projects are designed on technocratic assumptions, ignoring the routines of street-level bureaucrats and assuming that all citizens are highly digitally literate [4].
Bureaucratic politicization, patronage, and vendor lock-in	8	Politicization of positions and patronage appointments hinder digital innovation; dependence on private vendors triggers vendor lock-in [8].
Digital literacy and ICT infrastructure gaps	38	Inequality in internet infrastructure and ICT literacy weakens e-service adoption [5, 13].
Mitigation strategies		
User-centered and life-event-based design	28	Interface redesign based on citizens' life paths, smartphone-first architecture, and simplification of legal language.
Semantic interoperability and mandatory once-only	14	Mandatory application of the once-only principle and interoperability platforms (X-Road, OOTS) to eliminate duplicated data entry [2].
Hybrid governance and social infrastructure	7	Physical services (human backup) and funding for public libraries and indigenous community leaders as intermediaries assisting with digital services [5, 12].
Sludge audits and the BRFF framework	5	Three-gate testing (incremental protection, lower-burden alternatives, rights floor) and periodic sludge audits [10].
Responsible AI governance	15	Human-in-the-loop control and transparency audits of AI automation to ensure legal accountability [9].
Open bureaucracy, meta-governance, and human resource capacity	30	Flexible recruitment of ICT specialists, strengthening of central government meta-governance, and digital competency training through MOOCs [11].

3.5 Synthesis and discussion

The synthesis of the three RQs reveals a consistent pattern: the benefits of digital integration and new administrative burdens are not mutually exclusive but two sides of the same design and institutional readiness. Each form of integration in RQ1 carries a characteristic burden risk in RQ2, which is triggered by particular factors in RQ3 and addressed through specific strategies (Table 4). A unified portal that is not accompanied by institutional integration leads to duplicated procedures because of sectoral egos [11], whereas registry-based automation is highly efficient for standard cases but excludes atypical cases because the data architecture is designed for typical cases [7].

Table 4. Synthesis of the links among forms of integration, burdens, triggering factors, and mitigation.

Form of integration (RQ1)	New burden risks (RQ2)	Triggering factors (RQ3)	Mitigation (RQ3)
Unified portals and service platforms	Duplicated verification procedures, official coordination burden, system rigidity	Sectoral egos, rigid per-agency budgets, unclear roles and legal mandates [3, 11]	Meta-governance, shared funding, interoperability standards [11]
Digital-by-default self-service	Learning, compliance, and psychological	Assumption of evenly distributed digital capability, closure of	Human backup, public libraries, life-event-based interfaces [5, 6]

Form of integration (RQ1)	New burden risks (RQ2)	Triggering factors (RQ3)	Mitigation (RQ3)
	burdens on citizens; accidental caseworker	physical service offices [5, 6]	
Automation, registries, and e-ID	Exclusion of atypical cases and immigrants; authentication complexity	Data architecture that favors typical cases; identity verification through banks [7, 8]	Inclusive information architecture, non-bank public e-ID tokens, assistance [7, 8]
AI and LLMs	Algorithmic opacity, hallucination, verification burden, technostress	Absence of AI governance, officials' limited technical understanding [9]	Human-in-the-loop, transparency audits, digital leadership training [9]

These findings reinforce earlier reviews that identified organizational inertia, interface misalignment, and duplicated procedures as causes of the failure to cut *red tape* [3], while also complementing reviews that each highlight a single aspect [1, 9]. This SLR connects all of these aspects: different forms of integration carry different burden profiles, and the same institutional factors, namely fragmentation, limited capacity, and rigid design, recur across almost all forms of integration. Evaluation that remains adoption-oriented [1] also means that new burdens tend to go undetected, because success indicators rarely include the burdens borne by citizens and public officials.

Eight articles are located in Indonesia, seven of which were published in 2025–2026. These studies report the limited success of Super Apps in medium-sized and small cities due to constraints in funding, infrastructure, and human resources; disparities in literacy and infrastructure across regions; sectoral egos at the urban village (*kelurahan*) level; overlapping central and regional regulations; and barriers in literacy, device costs, and interfaces that are not yet disability-friendly [13]. A hybrid approach based on local wisdom is reported to increase trust and inclusion [12]. Thus, Indonesia's challenges are consistent with the global triggering factors, with an emphasis on inter-regional infrastructure gaps and fragmentation between central and regional regulations.

3.6 Limitations and future research agenda

This SLR has methodological limitations, namely restricting the search to Scopus, the inaccessibility of the full text of 47 articles, and the dominance of qualitative and cross-sectional studies in several regions. The future research agenda includes longitudinal testing of the impact of digital red tape on public official burnout, developing a quantitative scale to measure digital sludge, and a comparative analysis of the effectiveness of the once-only principle in developing countries in Asia and Africa.

4 Conclusions and recommendations

4.1 Conclusions

This study synthesizes 62 articles selected based on PRISMA. Digital public service integration is designed in five main patterns that are reported to generate economic, administrative, citizen, and democratic value (RQ1), but it does not automatically reduce bureaucratic burden: 51 articles confirm the emergence of new administrative burdens for citizens and public officials (RQ2). These burdens do not arise randomly, as the literature

points to five triggering factors and proposes six governance strategies (RQ3). Overall, the benefits of integration and the new burdens are two sides of the same service design and institutional readiness, and adoption-oriented evaluation makes these burdens tend to go undetected. Indonesia's challenges (8 articles) are in line with the global triggering factors.

4.2 Recommendations

For policymakers, service integration needs to be treated as an institutional agenda, not merely a technology project, by strengthening meta-governance and shared funding, applying the once-only principle through interoperability standards, and harmonizing central and regional regulations. Digital-by-default policies should be accompanied by physical service channels and assistance, for example through public libraries or indigenous community leaders. For service providers, design needs to be user-centered, evaluation should cover the time burden, compliance costs, and verification borne by citizens and public officials (for example through periodic sludge audits), and the use of AI needs to be accompanied by human-in-the-loop oversight and training of public officials. For future researchers, in addition to the agenda in subsection 3.6, empirical research in Indonesia needs to be expanded because only 8 articles have been identified, especially those measuring digital administrative burden at the regional level, accompanied by searches in databases beyond Scopus.

References

1. E.I. Dobrolyubova, Evaluating digital government performance using surveys: international literature review and prospects for the future research. Public Adm. Issues (2022)
2. C.T. Nguyen, C. Mako, Increasing citizen satisfaction with e-public administration: SERVQUAL and holistic governance model in comparison (selected literature review). Systems **14**, 30 (2025) https://doi.org/10.3390/systems14010030
3. J.J.P. Latupeirissa, N.L.Y. Dewi, I.K.R. Prayana, M.B. Srikandi, S.A. Ramadiansyah, I.B.G.A.Y. Pramana, Transforming public service delivery: a comprehensive review of digitization initiatives. Sustainability **16**, 2818 (2024) https://doi.org/10.3390/su16072818
4. S. Giest, N. Raaphorst, Unraveling the hindering factors of digital public service delivery at street-level: the case of electronic health records. Policy Des. Pract. **1**, 141–154 (2018) https://doi.org/10.1080/25741292.2018.1476002
5. Indrayani, I. I., Priyowidodo, G., & Yogatama, A. (2024). A phenomenography perspective on digital transformation in public service: Conceptions of Jogyakarta Smart Service (JSS). *The Journal of Society and Media, 8*(1), 41–63. https://doi.org/10.26740/jsm.v8n1.p41-63
6. C.Ø. Madsen, I. Lindgren, U. Melin, The accidental caseworker – how digital self-service influences citizens' administrative burden. Gov. Inf. Q. 101653 (2022) https://doi.org/10.1016/j.giq.2021.101653
7. K.K. Larsson, Digitization or equality: when government automation covers some, but not all citizens. Gov. Inf. Q. 101547 (2021) https://doi.org/10.1016/j.giq.2020.101547
8. L. Kemppainen, T. Kemppainen, A. Kouvonen, Y.-K. Shin, E. Lilja, T. Vehko, H. Kuusio, Electronic identification (e-ID) as a socio-technical system moderating migrants' access to essential public services – the case of Finland. Gov. Inf. Q. 101839 (2023) https://doi.org/10.1016/j.giq.2023.101839
9. Jonathan, Generative AI and digital transformation in the public sector: a systematic review (2026) https://doi.org/10.1007/s44163-026-02077-3

10. K. Tang, Justification as a revisable state: a behavioral risk–friction fit framework for digital public services. Front. Behav. Econ. (2026)
11. B. Zyzak, Collaborative platforms in digital government: structural and cultural barriers to coordination. Int. Public Manag. J. (2026) https://doi.org/10.1080/10967494.2026.2712553
12. A. Jabbar, Y. Astuti, J. Ahmad, A.A. Adnan, A. Putra, Bridging digital transformation and local wisdom: towards inclusive and sustainable public service delivery in indigenous communities. Front. Sustain. (2026)
13. G.H. Djatmiko, O. Sinaga, S. Pawirosumarto, Digital transformation and social inclusion in public services: a qualitative analysis of e-government adoption for marginalized communities in sustainable governance. Sustainability (2025)
14. M.J. Page et al., The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ **372**, n71 (2021) https://doi.org/10.1136/bmj.n71
15. V. Braun, V. Clarke, Using thematic analysis in psychology. Qual. Res. Psychol. **3**, 77–101 (2006) https://doi.org/10.1191/1478088706qp063oa