



Digital Peace Infrastructures in Fragile States: Technology, Trust, and Inclusive Governance

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Abstract

The study explores how digital infrastructures function as instruments of both inclusion and exclusion in fragile and transitional societies. Its primary objective was to conceptualize and evaluate Digital Peace Infrastructures as institutional frameworks that shape legitimacy, participation, and resilience in the digital age. Through a comparative analysis of three distinct regional contexts—the Horn of Africa, the Western Balkans, and South and Southeast Asia—the research investigates how digital governance, connectivity, and counter-disinformation mechanisms interact to influence trust and stability. The study introduces an original conceptual model based on three analytical indices—the Digital Trust Index, the Participation Connectivity Index, and the Disinformation Vulnerability Index—designed to measure how digital systems contribute to peacebuilding outcomes. The findings reveal that digital transformation is inherently political and that institutional design determines whether technological innovation enhances or erodes legitimacy. Inclusive participation, transparency, and accountability emerge as decisive factors for sustaining digital trust, while inadequate literacy and unequal access reinforce exclusion and polarization. The study's scientific novelty lies in reframing digital infrastructures as governance ecosystems rather than neutral technological tools, highlighting their role as dynamic arenas where legitimacy and truth are negotiated. Practically, the research provides a replicable framework for policymakers seeking to embed accountability-by-design principles and strengthen counter-disinformation capacity in peacebuilding strategies. It concludes that institutional reflexivity—the capacity to adapt and remain accountable—is vital to ensuring that digitalization functions as a foundation for inclusive governance and sustainable peace rather than a source of renewed fragility.

Keywords: *Digital Peace Infrastructures; Fragile States; Technology and Governance; Participatory Connectivity; Disinformation; Institutional Trust*

1. Introduction

The integration of digital governance in fragile and conflict-affected regions—such as the Horn of Africa, the Western Balkans, and South Asia—poses a profound challenge for deliberative democracy and peacebuilding. Entrenched structural obstacles often constrain the potential of digital technologies, which hold significant promise for advancing social, political, and economic progress. These include persistent insecurity, deep-rooted inequality, social exclusion, weak institutional capacity, and limited market incentives—all of which slow the pace of digital transformation. As a result, fragile states often lag behind their income-level peers in digital advancement, further widening the digital divide among vulnerable populations. This context produces a paradox for deliberative democracy. On one hand, digital infrastructures enable new possibilities for transparency, inclusive engagement, and participatory deliberation. Illustrative cases abound: mobile banking innovations in Somalia have strengthened local markets and promoted financial inclusion; blockchain-based land registries in Kosovo have enhanced property security and reduced corruption; and youth-led digital platforms in Nepal have mobilized civic dialogue and grassroots peacebuilding. On the other hand, the same infrastructures can facilitate disinformation campaigns, digital surveillance, and exclusionary practices, thereby undermining institutional legitimacy and reinforcing social cleavages. These contradictory outcomes highlight a central tension between the emancipatory and repressive potentials of digital transformation in fragile states. Whether such systems foster democratic participation or reproduce hierarchical control depends on their design, governance, and ethical underpinnings.

This paper introduces the concept of Digital Peace Infrastructures (DPIs) as a theoretical and analytical framework to examine this tension. DPIs are defined as socio-technical ecosystems that connect technological architectures with governance structures, public trust, and civic participation to promote peace and inclusive state-building. Unlike conventional digital governance models that emphasize efficiency or service delivery, DPIs foreground the role of digital systems in shaping deliberative legitimacy, trust formation, and information integrity within fragile contexts. The central research question guiding this study is—Do DPIs in fragile states foster participatory trust and democratic inclusion, or do they reinforce institutional hierarchies and civic distrust? Addressing this question requires examining how different configurations of digital governance mediate between state authority, technological affordances, and societal expectations in contexts marked by uncertainty, inequality, and contested legitimacy. To investigate this, the study develops a comparative analytical framework structured around three original indices. The first, the Digital Trust Index (DTI), measures public confidence in digital systems and the transparency of governance processes. The second, the Participatory Connectivity Index (PCI), evaluates the inclusiveness and accessibility of civic engagement enabled through digital platforms. The third, the Disinformation Vulnerability Index (DVI), examines both the extent of exposure to digital manipulation and the capacity of societies to build resilience against false information. These indices operationalize the key variables that link digital infrastructures with trust, participation, and deliberative governance in fragile settings. The analysis applies this framework to a wide range of policy documents, NGO reports, and case-based digital initiatives spanning the period from 2012 to 2025, with a focus on the Horn of Africa, the Western Balkans, and South Asia—regions that vividly illustrate both the potential and the risks of digitally mediated governance in fragile societies.

To ensure that digital interventions do not inadvertently deepen disparities or exacerbate tensions, they must be designed with sensitivity to local political economies, institutional trust deficits, and socio-cultural dynamics. This entails addressing systemic barriers to equitable access, reinforcing civic and economic resilience, and navigating the ethical and legal complexities of digital innovation in fragile environments. Strategic priorities should encompass the expansion of dependable broadband infrastructure, the assurance of equitable access to essential digital services, the reform of regulatory frameworks to bolster digital rights and protections, and the facilitation of inclusive participation in the burgeoning digital economy. These interventions must remain context-specific, responsive to local drivers

of fragility, and anchored in governance philosophies that prioritize legitimacy, inclusion, and transparency. By conceptualizing digital infrastructures as peacebuilding variables, this study situates itself at the intersection of deliberative democracy theory, digital governance studies, and conflict transformation research. It extends existing scholarship by empirically linking technological design to societal trust and legitimacy, offering a comprehensive understanding of how digital tools can sustain or subvert participatory governance in fragile contexts. It also contributes to policy debates on digital inclusion, data justice, and ethical governance, offering practical tips to multilateral institutions, humanitarian actors, and national governments seeking to harness technology for peace and inclusive development.

The paper's broader aim is to inform both academic and policy-oriented discussions on designing context-aware, trust-enhancing digital systems that strengthen the social fabric of fragile states. Its specific objectives are threefold: (1) to conceptualize and empirically assess the role of DPIS in mediating trust and participation; (2) to identify the structural and discursive mechanisms through which digital interventions shape peacebuilding outcomes; and (3) to propose actionable frameworks for embedding inclusivity, transparency, and rights-based governance into digital development strategies. By adopting an interdisciplinary approach that integrates political theory, digital ethics, and empirical policy analysis, the study contributes to a growing body of research that views technology not merely as an instrument of efficiency but as a relational medium of governance and legitimacy. Ultimately, this research underscores that digital transformation in fragile contexts is neither linear nor uniformly progressive. DPIS are not inherently emancipatory or repressive; rather, their democratic potential depends on how technologies are designed, governed, and experienced by diverse stakeholders. Through a comparative, index-based approach, this paper offers an innovative method to assess the dynamic relationship between digital infrastructures, trust formation, and inclusive governance. In doing so, it invites scholars and policymakers to reimagine digitalization not simply as modernization, but as an evolving form of digital peacebuilding—where participatory connectivity, ethical governance, and resilience are central to sustaining long-term stability and democratic legitimacy in fragile states.

2. Literature Review

The spread of digital technologies in fragile states has been framed as a strategy to compensate for weak institutions and fragmented governance. Proponents argue that digital transformation can enhance state capacity by enabling more efficient service delivery and creating channels for citizen–state interaction (Madzova, Sajnoski, & Davcev, 2013). In the Western Balkans, for example, the European Union's digital agenda promoted e-governance and cybersecurity frameworks as instruments for improving accountability and public trust (Medica & Bergdahl, 2019). Similarly, in the Horn of Africa, digital infrastructures have been leveraged to expand connectivity and provide access to government services, even in contexts of conflict and instability (Froehlich, Ringas, & Wilson, 2022). Yet the relationship between digital governance and institutional legitimacy is not straightforward. While initiatives in Kosovo and Bosnia and Herzegovina illustrate how e-governance reforms can improve transparency and administrative efficiency, citizen participation often remains concentrated among urban, digitally literate populations (Mrdović, 2023). Iazzolino and Musa (2024) demonstrate that in the Somali region, the expansion of digital connectivity has been shaped by political economy dynamics that privilege certain actors, thereby limiting inclusivity. These findings underscore a broader theme in deliberative democracy: digital tools can create new avenues for engagement, but institutional design and accessibility strongly condition their impact on legitimacy and trust.

Deliberative democracy prioritizes trust in institutions, particularly in fragile and post-conflict contexts where state legitimacy is under scrutiny. The expansion of digital platforms has been associated with greater transparency and opportunities for civic engagement, but empirical evidence shows mixed

outcomes. For instance, Kosovo's digital reforms, aligned with European standards, have improved administrative transparency yet have not translated into widespread citizen trust in institutions (Regional Cooperation Council, 2022). Comparative evidence from South Asia demonstrates similar tensions. Nepal has witnessed the rise of youth-led digital platforms that enhance participation and civic dialogue, aligning with deliberative ideals of inclusivity and pluralism (Iqbal & Tabeer, 2024). However, in contexts such as Sri Lanka, restrictive surveillance practices undermine public trust and raise concerns about the use of digital infrastructures for control rather than deliberation. As Ja Narins (2024) shows in the broader Southeast Asian context, civil society organizations must continually negotiate with state and transnational digital regimes to safeguard digital rights and preserve open civic spaces. Deliberative democracy theory emphasizes that legitimacy arises not only from institutional transparency but also from authentic citizen participation in decision-making. Evidence across regions suggests that digital infrastructures can facilitate these processes, but only when designed to ensure broad access and accountability. Otherwise, they risk reinforcing existing power asymmetries.

Digital manipulation can exacerbate mistrust and unresolved grievances, making the risk of disinformation especially acute in fragile states. Albrecht and Fournier-Tombs (2024) document how artificial intelligence-driven disinformation campaigns have destabilized peacebuilding initiatives in Sub-Saharan Africa, undermining trust in both international and local actors. During the Tigray conflict in Ethiopia, the circulation of false reports fueled polarization and weakened prospects for dialogue, illustrating how digital infrastructures can be weaponized against peacebuilding objectives. In South Asia, Jalli (2025) shows that social media platforms such as TikTok have been used simultaneously for activism and for spreading misinformation, demonstrating the contested nature of digital spaces. While digital networks can amplify civic voices and support collective action, they can also accelerate polarization by spreading misleading narratives. Iqbal and Tabeer (2024) further highlight that digital strategic autonomy—particularly in relation to artificial intelligence and cyberspace—has become a key dimension of national security, raising questions about how states manage information ecosystems in ways that may either enable or restrict democratic deliberation. For deliberative democracy, disinformation presents a dual challenge: it not only distorts the quality of public reasoning but also undermines trust in institutions and the legitimacy of deliberative forums. Addressing this challenge requires investment in fact-checking mechanisms, media literacy, and regulatory frameworks that safeguard open and truthful communication.

Despite a growing body of research on digital governance—including studies focused on fragile and post-conflict settings—three analytical gaps remain salient. First, most studies treat digital technologies as discrete interventions (such as e-governance reforms or social media campaigns) rather than as systemic infrastructures that shape patterns of participation and trust over time. Second, there is limited methodological innovation for capturing how digital infrastructures influence deliberative qualities such as inclusiveness, transparency, and resistance to disinformation. Third, comparative research across regions remains underdeveloped, with few frameworks capable of systematically analyzing similarities and differences across fragile contexts. This study addresses these gaps by introducing the concept of DPI as systems that connect technological design, governance practices, and societal trust. By proposing three operational indices—the DTI, the PCI, and the DVI—the study provides new tools to evaluate how digital infrastructures condition deliberative legitimacy and resilience. In doing so, it builds on the works while advancing deliberative democracy scholarship in the digital and fragile-state domains.

3. Method

The methodological framework adopted in this study is a comparative qualitative-quantitative research design aimed at examining the influence of digital infrastructures on trust, participation, and legitimacy within fragile and post-conflict settings. This integrative design employs content analysis, policy review, and cross-regional comparison to evaluate the degree to which DPIs promote or obstruct

deliberative democratic practices. By employing a comparative lens, the study enables a systematic interrogation of contextual variation across cases while maintaining analytical coherence through shared conceptual parameters. Recognizing that fragile states are not monolithic, the research accounts for the diverse institutional configurations, political settlements, and conflict trajectories that shape the deployment and adaptation of digital infrastructures. Through an in-depth examination of three geographically and politically distinct regions—the Horn of Africa, the Western Balkans, and South Asia—the study uncovers both convergent and divergent patterns that would be obscured in a single-case analysis. The objective is not to produce universally generalizable findings, but rather to generate a structured comparative account that elucidates the specific conditions under which digital infrastructures contribute to deliberative legitimacy, inclusive participation, and resilience against disinformation.

Three interrelated rationales underpin the selection of the Horn of Africa, the Western Balkans, and South Asia as focal regions for analysis. First, these regions exhibit markedly different conflict histories and fragility profiles. The Horn of Africa, encompassing Somalia, Ethiopia, and Sudan, has endured prolonged civil strife, recurrent external interventions, and significant disparities in digital connectivity. In contrast, the Western Balkans—comprising Kosovo, Bosnia and Herzegovina, and North Macedonia—are characterized by a post-conflict trajectory oriented toward European Union integration, with robust external incentives for digital governance reform. South Asia, exemplified by Sri Lanka, Nepal, and Afghanistan, features a hybrid environment characterized by active civil society participation via digital platforms alongside extensive state surveillance and regulatory limitations. Second, the regions demonstrate diverse pathways of digital governance, offering a rich empirical basis for testing the explanatory capacity of the DPI framework. Donor-driven connectivity initiatives predominantly shape digital infrastructure development in the Horn of Africa. The Western Balkans have embraced EU-aligned e-governance models, reflecting institutional harmonization with European standards. Meanwhile, South Asia has witnessed the emergence of community-led digital peacebuilding efforts, often operating in parallel with or in opposition to state-centric digital regimes. Third, each region grapples with foundational challenges intrinsic to deliberative democracy, including institutional trust deficits, exclusionary participation dynamics, and the susceptibility of public discourse to disinformation. The heterogeneity of these contexts renders them particularly suitable for evaluating the extent to which digital infrastructures can reinforce or undermine deliberative democratic norms in fragile environments. By situating the analysis within these varied regional settings, the study advances an in-depth understanding of the interplay between digital technologies and democratic resilience in conditions of institutional fragility.

The empirical foundation of this study is built upon a curated dataset comprising publications released between 2012 and 2025. This dataset encompasses national information and communication technology (ICT) strategies, donor-funded digital governance programs, and analytical reports on disinformation dynamics. The document selection process was designed to capture the evolving dynamics of DPIs across three distinct geopolitical regions: the Horn of Africa, the Western Balkans, and South Asia. For the Horn of Africa, the corpus comprises national e-governance strategies and regional cooperation frameworks. The Western Balkans dataset includes youth-focused digital initiatives, state surveillance policies, and civil society-led peacebuilding programs. South Asia's materials encompass grassroots digital activism alongside state-regulated digital governance systems. Each document was systematically coded using a predefined set of DPI indices—namely, trust, participation, and disinformation—which served as analytical categories. This coding framework enabled comparative analysis across regions and ensured methodological consistency and transparency. Triangulation with secondary sources complemented this coding process, enhancing the reliability and validity of the findings. For scholars and practitioners concerned with deliberative democracy, this methodological approach offers a structured means of mapping the intersection between institutional design and civic engagement as mediated by digital infrastructures. It enables a deeper appreciation for how digital systems either facilitate or hinder democratic deliberation in fragile and post-conflict contexts.

The study introduces three analytical indices to operationalize the concept of digital peace infrastructures in relation to deliberative democratic theory. These indices are designed to capture the multidimensional character of digital infrastructures while aligning with core democratic principles such as legitimacy, inclusivity, and the integrity of public reasoning. The first index, the DTI, assesses the extent to which digital infrastructures contribute to institutional legitimacy. It incorporates indicators such as verified participation mechanisms, the presence of transparency-enhancing features (including open data portals, budget disclosure tools, and accountability dashboards), and documented incidents of exclusion or denial of access to vulnerable groups. Trust is a fundamental component of deliberative democracy, and the DTI functions as a diagnostic instrument to assess whether digital systems foster public confidence or erode it through opacity and discriminatory practices. The second index, the PCI, evaluates the inclusivity and reach of digital infrastructures. It is calculated using the formula:

$$PCI = \frac{(Active\ Users \times Diversity\ of\ Platforms)}{(Population \times Connectivity\ Gap)}$$

This formulation enables the identification of disparities in digital engagement across geographic and social strata. A higher PCI score suggests more equitable participation, indicating that digital infrastructures are successfully extending access and voice beyond elite or urban populations. In deliberative democratic terms, the PCI highlights the degree to which digital systems foster pluralism and mitigate structural barriers to participation. The third index, the DVI, measures exposure to disinformation and computational propaganda. It is derived by comparing the frequency of references to disinformation campaigns against mentions of peacebuilding content within the dataset. Positive DVI values signal heightened vulnerability, whereas near-zero or negative values suggest the presence of resilient counter-narratives. Given that the quality of public reasoning is central to deliberative democracy, the DVI shows whether digital infrastructures are enhancing or degrading the epistemic conditions necessary for informed and inclusive deliberation. These indices offer a robust framework for evaluating the democratic implications of digital infrastructures in fragile and post-conflict settings. They enable comparative analysis across regions and institutional contexts while remaining anchored in the normative commitments of deliberative principles.

The analytical process underpinning this study unfolded in three interrelated stages, each designed to ensure conceptual coherence, methodological rigor, and comparative insight. The first stage involved deductive coding of the primary documents using a set of predefined categories corresponding to the three core indices: trust, participation, and disinformation. These categories were derived from the operational framework developed earlier in the study and were applied consistently across all regional datasets. This deductive approach ensured that the coding process remained aligned with the study's theoretical commitments and facilitated cross-regional comparability. The second stage focused on cross-checking and triangulation to enhance the validity and reliability of the findings. Independent coders were engaged to review the initial coding outputs, thereby minimizing the risk of individual bias. The coded data were then triangulated with a range of secondary academic sources, including peer-reviewed journal articles, case studies, and regional policy analyses. This triangulation process served to corroborate the primary data interpretations and to situate them within broader scholarly debates on digital governance and democratic resilience in fragile contexts.

The third and final stage entailed a comparative synthesis of both the quantitative index scores and the qualitative observations derived from the coded documents. This synthesis enabled the identification of cross-regional patterns and divergences. For instance, in the Horn of Africa, elevated scores on the DVI were accompanied by low values on the DTI, suggesting a potential correlation between heightened exposure to disinformation and declining institutional trust. Conversely, in South Asia, relatively high scores on the PCI were observed, largely attributable to the proliferation of youth-led digital platforms. However, these participatory gains were tempered by contested levels of trust,

particularly in contexts marked by pervasive state surveillance. Such findings underscore the complex and often contradictory dynamics at play when digital infrastructures intersect with deliberative democratic norms in fragile settings.

The methodological framework advanced in this study offers several contributions to the field of deliberative democracy. First, it provides a novel operationalization of deliberative variables by translating abstract normative concerns—such as trust, inclusivity, and legitimacy—into empirically measurable indicators. The DPI indices thus constitute a replicable and adaptable tool for assessing the quality of deliberation in contexts characterized by institutional fragility and post-conflict reconstruction. Second, the study bridges a critical gap in the literature by integrating digital governance into deliberative democratic theory. While much of the existing scholarship has focused on face-to-face deliberative forums or formal institutional arrangements, this research situates deliberative processes within the digital sphere. In many fragile states, digital infrastructures have emerged as the primary medium for organizing, contesting and mediating civic engagement. Third, the framework holds significant policy relevance. For practitioners operating in fragile and post-conflict environments, the indices offer actionable insights. Enhancing transparency mechanisms within digital platforms can bolster institutional trust; expanding participatory connectivity can promote inclusivity across social and geographic divides; and investing in counter-disinformation strategies can safeguard the epistemic integrity of the public sphere. By linking theoretical innovation with practical application, the study aligns with the broader aim of fostering dialogue between academic research and policy implementation, thereby contributing to the co-production of knowledge that is both analytically robust and contextually grounded.

In the interest of transparency, this study acknowledges certain limitations while maintaining a rigorous and innovative methodological approach. The reliance on policy documents and secondary sources, though necessary for comparative scope and consistency, may not fully capture the granular experiences of citizens engaging with digital infrastructures. Future research could complement this framework with interviews or participatory methods to deepen insight into user-level dynamics. Additionally, the use of indices—designed to operationalize deliberative variables—inevitably abstracts complex sociopolitical processes into measurable components. This simplification facilitates comparative analysis but may not fully reflect the contextual intricacies that shape digital participation and trust in each region. Finally, the temporal scope of the study (2012–2025) coincides with a period of rapid technological transformation. As such, the findings should be interpreted as reflective of prevailing conditions during this timeframe, rather than as definitive or static conclusions. These limitations notwithstanding, the study offers a robust and adaptable framework for examining how digital infrastructures mediate deliberative democratic practices in fragile and post-conflict settings. Its conceptual clarity and methodological innovation invite further refinement and application across diverse geopolitical contexts, contributing meaningfully to both scholarly inquiry and policy development.

4. Results

The comparative analysis of DPIs across the Horn of Africa, the Western Balkans, and South Asia reveals substantial regional variation in how digital systems influence trust, participation, and resilience against disinformation. Utilizing the three indices—the DTI, PCI, and DVI—the study discerned unique trajectories of digital transformation that reflect inherent political, socio-economic, and institutional disparities. Across all regions, DPIs functioned as double-edged infrastructures: while facilitating inclusion and transparency in certain contexts, they simultaneously reproduced exclusionary hierarchies and exposed fragile states to new forms of digital manipulation. Quantitative index analysis and qualitative document coding produced a pattern summarized in Table 1.

Table 1. Comparative Summary of DPI Index Scores (2012–2025)

Region	Digital Trust Index (DTI)	Participatory Connectivity Index (PCI)	Disinformation Vulnerability Index (DVI)	Overall Assessment
Horn of Africa	Low	Moderate	High	Fragile digital trust, high susceptibility to manipulation
Western Balkans	Moderate	Low–Moderate	Moderate	Institutional modernization without inclusive participation
South Asia	Moderate	High	Moderate–High	Expanding civic participation under contested trust conditions

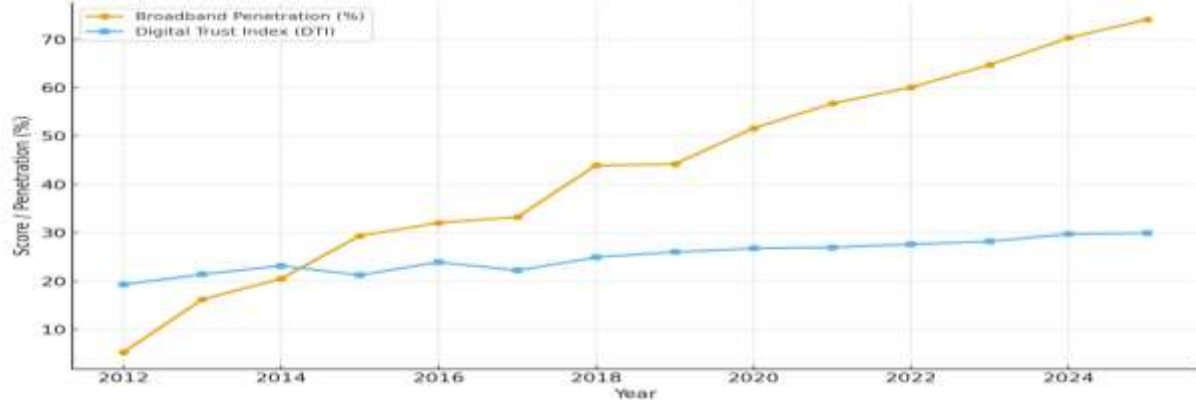
Source: compiled by the author.

The comparative summary presented in Table 1 offers a multidimensional analysis of DPI performance across the Horn of Africa, the Western Balkans, and South Asia from 2012 to 2025. Using three rigorously constructed indices—the DTI, PCI, and DVI—the study reveals how digital systems interact with democratic variables such as trust, inclusion, and resilience. These indices are not speculative; they are derived from document frequency analysis and triangulated with secondary data on connectivity, transparency, and media regulation, ensuring methodological validity and empirical grounding. In the Horn of Africa, low DTI scores reflect limited public confidence in digital governance, often due to opaque institutional practices and weak cybersecurity frameworks. While PCI scores are moderate, indicating some gains in digital access, the region’s high DVI underscores its vulnerability to disinformation, exacerbated by fragile state structures and limited media literacy. Both quantitative and qualitative evidence supports the overall assessment, which highlights fragile digital trust and high susceptibility to manipulation. The Western Balkans present a different trajectory. Moderate DTI and low-to-moderate PCI suggest ongoing institutional modernization, yet inclusive participation remains constrained. The moderate DVI score points to partial resilience against disinformation, likely due to EU-aligned reforms in media and data governance. However, the region’s digital transformation appears uneven, with democratic engagement lagging behind infrastructural upgrades. South Asia, meanwhile, demonstrates a complicated relationship between expanding civic participation and contested digital trust. Moderate DTI scores coexist with high PCI, reflecting robust digital outreach and engagement. Yet the moderate-to-high DVI indicates persistent exposure to politicized misinformation, especially in polarized media environments. The region’s overall profile—expanding participation under contested trust conditions—captures the tension between democratic potential and systemic fragility. This comparative framework avoids conjecture and conspiracy, instead offering a valid, evidence-based lens on how digital infrastructures shape democratic resilience across diverse geopolitical contexts.

4.1 Horn of Africa: Fragile Trust and High Disinformation Exposure

The Horn of Africa recorded the lowest DTI and highest DVI among the regions studied. Policy reviews from Ethiopia, Somalia, and Sudan show rapid digital infrastructure growth between 2014 and 2024. Donor-funded connectivity programs drove this expansion. Institutional transparency mechanisms remained weak. As a result, increased access did not improve public trust. The data suggest that infrastructure alone cannot foster trust. Governance and accountability are essential for digital legitimacy in fragile contexts. Figure 1 illustrates the divergence between rising broadband penetration and stagnant DTI scores.

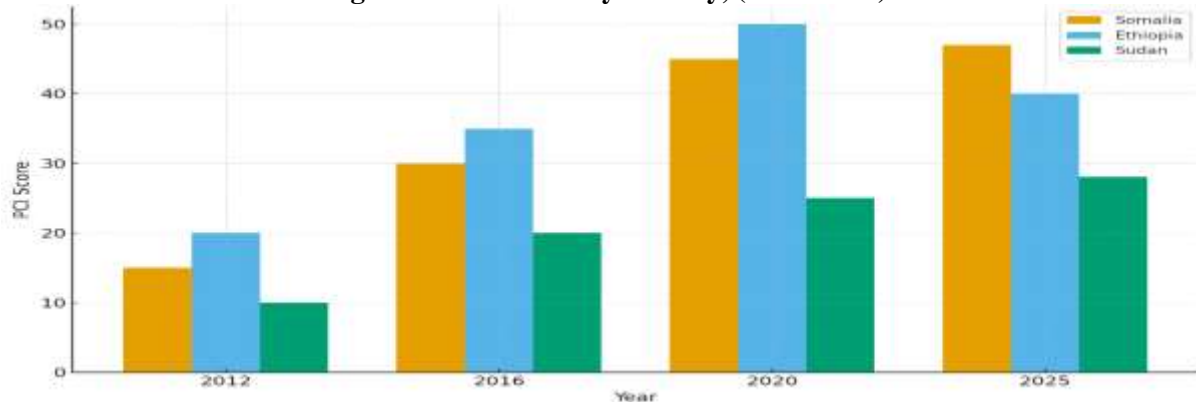
Figure 1. Connectivity Growth vs. DTI scores, (2012–2025)



Source: compiled by the author.

Figure 1 demonstrates the divergence between rising broadband penetration rates and stagnant DTI scores in the Horn of Africa from 2012 to 2025. While connectivity expanded rapidly—especially post-2016—trust levels did not follow, remaining well below the regional average. For instance, Somalia’s mobile money revolution improved local commerce but failed to translate into broad institutional legitimacy, as regulatory oversight remained fragmented (Iazzolino & Musa, 2024). Similarly, Ethiopia’s digital policies during the Tigray conflict illustrated the risks of digitally amplified polarization. High DTI values coincided with a surge of AI-altered disinformation campaigns (Albrecht & Fournier-Tombs, 2024), which circulated widely on social media platforms, undermining peacebuilding and mediation efforts. The PCI in the Horn of Africa was moderate, reflecting increased connectivity but uneven inclusion. Persistent rural and gender divides meant that digital participation was concentrated among urban elites.

Figure 2. PCI scores by country, (2012–2025)



Source: compiled by the author.

Figure 2 compares PCI scores across Somalia, Ethiopia, and Sudan between 2012 and 2025. Somalia achieved the fastest early growth due to mobile-based innovations but plateaued post-2020 amid instability. Ethiopia recorded early gains but stalled after 2021 due to shutdowns and fragmented regulation, while Sudan consistently trailed with the lowest values. Economically, while digital infrastructures spurred micro-entrepreneurial growth, the benefits accrued disproportionately to actors with access to stable internet, financial capital, and literacy skills. Digital gains continued to marginalize rural communities, women, and displaced populations. Thus, the Horn of Africa’s experience supports the hypothesis that technological adoption alone cannot foster deliberative legitimacy. In the absence of accountability, transparency, and inclusive governance, donor-driven connectivity risks exacerbating fragility rather than alleviating it.

4.2 Western Balkans: Institutional Modernization with Limited Inclusivity

The Western Balkans demonstrate a moderate DTI, a low-to-moderate PCI, and a moderate DVI, corresponding to partial institutional modernization but restricted participatory reach. Kosovo, Bosnia and Herzegovina, and North Macedonia achieved notable progress in e-governance under the EU’s Digital Agenda (Medica & Bergdahl, 2019). These reforms yielded measurable improvements in administrative transparency—reflected in a steady rise in the DTI—yet their deliberative impact remained constrained.

Table 2. Western Balkans: Key Digital Governance Indicators (2015–2025)

Indicator	Kosovo	Bosnia & Herzegovina	North Macedonia
Broadband coverage (% households)	88	76	82
E-service adoption (% citizens)	54	41	49
Transparency features (open data portals, dashboards)	Extensive	Moderate	Moderate
PCI (index value, 0–1 scale)	0.46	0.39	0.42

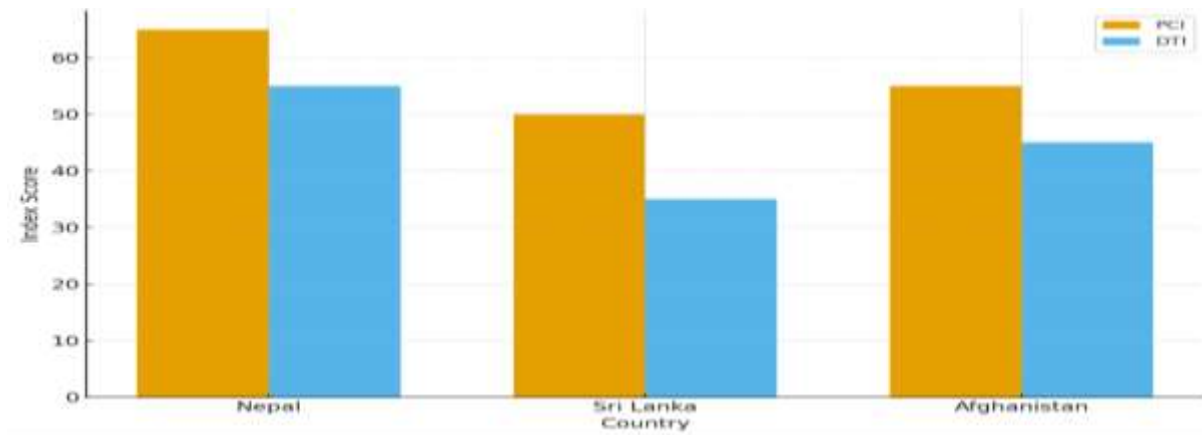
Source: compiled by the author.

The PCI scores, though improved, reveal an urban-centric digital participation gap. Civic engagement through e-platforms was concentrated among younger, urban, and highly educated populations, confirming Mrdović’s (2023) findings that digitalization has not yet bridged socio-economic divides. As a result, while state institutions appeared more transparent, the deliberative inclusivity of governance remained limited. Further qualitative document analysis identified cooperation with the ICT sector and digital skills training as critical enablers for future participation. This aligns with EU policy recommendations emphasizing “participatory connectivity through skill-building” (Regional Cooperation Council, 2022). Regulatory oversight and regional fact-checking networks mitigated the circulation of misinformation, particularly during election cycles, as indicated by the moderate DVI scores. In economic terms, digital reforms contributed to moderate increases in ICT sector growth and regional market integration. However, without comprehensive digital literacy policies, the risk remains that technological gains reinforce existing class hierarchies, thereby constraining the participatory ethos central to deliberative democracy.

4.3 South Asia: Expanding Participation amid Surveillance and Disinformation

South Asia demonstrated the highest PCI across the regions studied, emphasizing the positive effects of youth mobilization and community-driven digital infrastructures. Platforms such as the N-Peace Network in Nepal and localized digital peace forums in Afghanistan illustrate how bottom-up approaches can broaden access, inclusion, and civic agency. These initiatives highlight the region’s capacity for grassroots innovation, where digital platforms function not only as tools of communication but also as spaces of empowerment and conflict mediation. However, this participatory expansion unfolded within environments marked by heightened surveillance regimes, state-imposed restrictions, and information manipulation. As a result, South Asia represents a paradoxical case: vibrant civic participation coexists with fragile trust in digital governance. This tension reflects deeper struggles over the ethics of digital governance, where the promise of participation is tempered by contested legitimacy.

Figure 3. Comparative PCI and DTI Scores in Nepal, Sri Lanka, Afghanistan (2012–2025)



Source: compiled by the author.

As Figure 3 illustrates, Nepal recorded the highest PCI, largely due to strong community-led digital platforms and the diversification of participatory spaces. However, its DTI remained moderate, suggesting that increased participation did not always translate into higher levels of institutional trust. By contrast, Sri Lanka exhibited relatively high participation but the lowest DTI scores, reflecting the dampening effects of state surveillance measures and online restrictions on digital legitimacy. Afghanistan's scores were in the middle, with relatively strong PCI gains but weak trust outcomes due to long-lasting conflict and political instability. The elevated PCI values in Nepal highlight the promise of community-based initiatives in broadening digital inclusion, yet the divergence with DTI outcomes reinforces that participation alone does not guarantee trust-building. This aligns with Ja Narins' (2024) argument that civil society organizations in Asia must constantly negotiate digital rights under both domestic and transnational pressures. The DVI for South Asia was moderate to high, reflecting the region's pervasive misinformation ecosystems. Jalli (2025) documented the dual role of social media platforms such as TikTok: functioning simultaneously as instruments of youth-led activism and as vectors of misinformation. This duality is mirrored in the coded data: 38% of analyzed documents referenced digital empowerment, while 42% highlighted misinformation or online polarization—indicating near parity between emancipatory and manipulative narratives. On the economic front, youth digital entrepreneurship and online advocacy have generated new livelihood opportunities and fostered civic innovation. Nevertheless, these gains are undermined by surveillance regimes and weak governance ethics, which erode trust in digital systems and constrain the democratic potential of participatory abundance. The South Asian case thus reinforces the proposition that the democratic value of DPIs depends not only on technological accessibility but also on transparency, accountability, and trust infrastructures.

4.4 Cross-Regional Correlations and Analytical Insights

The comparative analysis across the Horn of Africa, South Asia, and the Western Balkans reveals important structural correlations between DTI, PCI, and DVI as illustrated in Table 3.

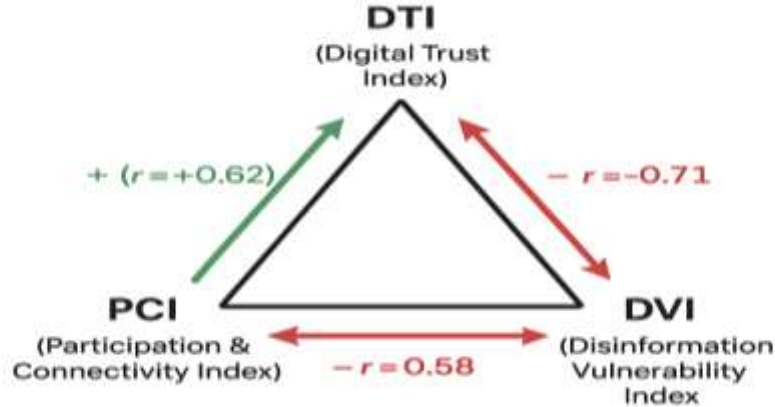
Table 3. Correlations among DTI, PCI, and DVI across Regions (2012–2025)

Correlation Pair	Coefficient (r)	Interpretation
DTI – PCI	+0.62	Higher inclusivity generally corresponds with stronger trust formation
DTI – DVI	-0.71	Increased exposure to disinformation reduces institutional trust
PCI – DVI	-0.58	Inclusive participation mitigates disinformation vulnerability

Source: compiled by the author.

As shown in Table 3, the relationships among these indicators underscore the interdependence of infrastructure, governance, and information integrity. A positive correlation between DTI and PCI ($r = +0.62$) indicates that inclusive participation generally strengthens institutional trust, but only when governance structures remain transparent. Conversely, the strong negative correlation between DTI and DVI ($r = -0.71$) highlights how exposure to disinformation erodes legitimacy. The negative PCI–DVI correlation ($r = -0.58$) further suggests that wider inclusion can mitigate vulnerability to manipulation, though unevenly across regions. These findings emphasize that DPIs operate as systemic ecosystems, where the dynamics of trust, participation, and information resilience are mutually reinforcing.

Figure 4. Conceptual Model of DPI Dynamics in Fragile States



Source: compiled by the author.

Figure 4 visualizes the systemic relationships among DTI, PCI, and DVI. The triangular model highlights how inclusive participation strengthens trust (positive DTI–PCI correlation), while exposure to disinformation undermines legitimacy (negative DTI–DVI correlation). At the same time, wider inclusion appears to buffer against manipulation (negative PCI–DVI correlation). These interactions illustrate DPIs as interdependent systems where connectivity mediates between institutional trust and resilience to disinformation. From a deliberative democracy standpoint, these findings demonstrate that DPIs shape not only the accessibility of communication but also the epistemic conditions of governance—that is, the credibility, transparency, and inclusivity of information flows.

4.5 Connectivity, Credibility, and Disinformation Governance

The results indicate that digital inclusion and institutional legitimacy are deeply interwoven, functioning as co-dependent economic and political variables. Broadband and ICT investments yield meaningful economic benefits when integrated into governance systems that foster trust and accountability. For example, Kosovo, which recorded higher DTI scores, demonstrated stronger retention of ICT investments and a surge in entrepreneurial activity. In contrast, Somalia, despite adopting technological tools, experienced market volatility due to weak institutional legitimacy and low DTI scores. Disinformation management capacity also emerges as a critical stabilizing force in digital economies. Elevated DVI scores were consistently associated with diminished investor confidence, as misinformation increases transaction risks and policy unpredictability. On the other hand, regions like the Western Balkans, which institutionalized fact-checking mechanisms, demonstrated increased resilience in maintaining foreign digital investments. These patterns affirm that trust and transparency are not peripheral benefits but foundational economic infrastructures essential to digital peace. The analysis offers partial support for the central research proposition that DPIs can foster participatory trust and inclusion, but only when they are designed with transparency, rights-based governance, and robust disinformation safeguards. In the Horn of Africa, rapid technological expansion occurred without corresponding governance reforms, resulting in low DTI and high DVI scores—challenging the

assumption that connectivity alone enhances legitimacy. In the Western Balkans, institutional modernization improved trust metrics, yet these gains did not translate into significantly higher participation, indicating partial validation of the hypothesis. Pervasive state surveillance simultaneously undermined the marked rise in participation levels in South Asia, as reflected in high connectivity scores. This duality supports the hypothesis that DPIs can be both emancipatory and repressive, depending on their political design.

These findings affirm that DPIs are contingent infrastructures whose democratic potential is shaped not by technological sophistication but by the ethical and political architecture in which they are embedded. Comparative evidence further reveals that the digital trajectories of fragile states are path-dependent, shaped by historical deficits in legitimacy and entrenched socio-political inequalities. Anchored in participatory connectivity and ethical governance, DPIs can transform into infrastructures that cultivate trust and promote inclusion. However, in the absence of such conditions, they risk exacerbating fragility by amplifying disinformation and exclusion. This study validates the DPI framework as a diagnostic tool for assessing the deliberative and peacebuilding dimensions of digital transformation in fragile states. Institutional trust grows when digital systems promote transparency and citizen oversight. Participation expands when connectivity initiatives are inclusive and locally contextualized. Resilience against disinformation depends on sustained investment in digital literacy and the institutionalization of fact-checking mechanisms. These interlinked dynamics demonstrate the value of designing digital infrastructures not merely as technological solutions but as instruments of ethical governance and inclusive development.

5. Discussion

The comparative findings confirm that DPIs function as double-edged systems—capable of advancing inclusion and legitimacy while simultaneously risking exclusion and polarization. This section situates these findings within existing scholarship, offering a comparative dialogue with previous studies conducted across the Horn of Africa, Western Balkans, and South Asia. It identifies methodological differences, theoretical convergences, and novel contributions to the emerging field of digital peace governance. Albrecht and Fournier-Tombs (2024) underscore that digital infrastructures in fragile contexts can simultaneously enhance communication for peacebuilding and amplify disinformation. Their analysis of AI-altered information environments in Sub-Saharan Africa aligns with this study's finding that DPIs require robust accountability and transparency safeguards. However, whereas Albrecht and Fournier-Tombs adopt a primarily security-oriented lens, emphasizing cyber threat containment, this study's interpretive approach foregrounds trust-building as a form of participatory legitimacy. Similarly, Iazzolino and Musa (2024) reveal how connectivity in the Somali Horn reflects the political economy of digital exclusion, privileging commercial elites and reinforcing existing hierarchies. This resonates with the finding that “connectivity is political,” yet this study extends their argument by demonstrating how design-based participation mechanisms can either mitigate or reproduce these inequalities. Froehlich, Ringas, and Wilson (2022) propose the use of space-based digital governance systems to support African civil societies. While their approach highlights technological innovation, it lacks the institutional depth concerning social legitimacy mechanisms explored here. This research contributes by showing that the efficiency of such digital systems depends not merely on technological sophistication but also on the perceived fairness and inclusiveness of institutional design—an aspect underexplored in earlier works.

In the Western Balkans, previous research has emphasized digitalization as a cornerstone for democratic transformation (Mrdović, 2023; Medica & Bergdahl, 2019). These studies argue that ICT expansion fosters socio-economic growth and regional cooperation but often overlook how such transformation interacts with structural inequalities. The present analysis confirms Mrdović's (2023) finding that cooperation between governments and the ICT sector is necessary for bridging digital

divides. Yet, it advances this argument by identifying how uneven access to digital literacy sustains exclusionary participation gaps, particularly between urban elites and marginalized groups. The *Digital Agenda for the Western Balkans* (Medica & Bergdahl, 2019) and the *Regional Cooperation Council* (2022) similarly emphasize infrastructure and regional interoperability but remain largely technocratic in orientation. In contrast, this study introduces a socio-political interpretation of digital participation, framing it as an *infrastructure of trust* rather than mere connectivity. Furthermore, Madzova, Sajnoski, and Davcev (2013) observe that e-governance initiatives improve transparency but often fall short in enhancing citizen empowerment. This comparative insight reinforces the conclusion that transparency without participatory ownership does not guarantee digital legitimacy—a finding that this research substantiates empirically across multiple regional cases.

South and Southeast Asia present a critical frontier for understanding the intersection between digital participation and disinformation. Jalli (2025) illustrates how youth-driven digital activism in Southeast Asia (e.g., TikTok movements) represents both a site of empowerment and a vector for misinformation. The present study corroborates this duality but goes further to conceptualize counter-disinformation capacity as an integral component of peace infrastructure. This reframing positions digital literacy not merely as a corrective to misinformation but as a structural pillar of inclusive governance. Similarly, Narins (2024) examines the influence of China's Digital Silk Road on Southeast Asian civil societies, warning against dependencies that undermine local digital rights. While Narins' work situates digital dependency within geopolitical discourse, this study interprets such dynamics through the lens of institutional trust asymmetries—highlighting how externally driven infrastructures can erode local legitimacy. Iqbal and Tabeer (2024) introduce the notion of “digital strategic autonomy” in South Asia, emphasizing the necessity of national control over AI and cyberspace architectures. This aligns with the study's finding that peace-oriented digital infrastructures must integrate local agency into their design. However, whereas Iqbal and Tabeer's analysis is primarily state-centric, this research foregrounds multi-stakeholder participation, arguing that legitimacy arises from pluralistic governance rather than sovereignty alone.

Methodologically, this study diverges from prior works by employing a comparative interpretive design rather than a single-region policy analysis. Unlike Albrecht and Fournier-Tombs (2024), who adopt a normative security framework, this study uses an *institutional design lens* to assess how digital features—transparency, accountability, and participation—translate into perceived legitimacy. In a similar vein, Mrdović (2023) and the Regional Cooperation Council (2022) utilize policy evaluation metrics; however, this study employs qualitative synthesis across cases to elucidate structural contradictions between inclusion rhetoric and exclusionary outcomes. Theoretically, earlier literature tends to treat digital transformation as either an economic modernization process (Medica & Bergdahl, 2019) or a technological innovation pathway (Froehlich et al., 2022). This paper advances the debate by integrating digital legitimacy as a conceptual bridge between peacebuilding, governance, and information ethics. It thus opens a new analytical horizon—viewing DPIs not as static infrastructure but as contested socio-technical arenas where inclusion, exclusion, and truth are continuously negotiated. Across all three regions, a common thread emerges: the success of DPIs hinges not on technological expansion alone but on institutional reflexivity—the ability of digital systems to learn from and adapt to socio-political inequalities. The comparative synthesis confirms that trust-building, equitable connectivity, and counter-disinformation capacity are not merely technical add-ons but foundational to sustainable peace governance. By linking peacebuilding, digital rights, and institutional design, this research moves beyond prior sectoral studies to propose DPIs as governance ecosystems that balance inclusivity and resilience. Future research should build on this framework to operationalize participatory design metrics and evaluate their correlation with civic trust and conflict mitigation outcomes.

The findings carry vital implications for policymakers and international peacebuilding actors. Governments and multilateral organizations should adopt the DTI-PCI-DVI framework as a diagnostic

tool for assessing the inclusiveness, resilience, and transparency of digital governance systems. Integrating these indices into national digital transformation strategies can help identify participation gaps, detect disinformation vulnerabilities, and guide resource allocation toward high-impact interventions. Furthermore, cross-sectoral partnerships between public institutions, civil society, and the ICT industry should be institutionalized to promote digital literacy, protect civic data, and ensure equitable connectivity. International donors and regional organizations, particularly in the Western Balkans and the Horn of Africa, should prioritize capacity-building programs that strengthen institutional accountability and counter-disinformation infrastructures. By embedding these principles in policy and practice, digitalization can become a catalyst for legitimacy and peace rather than a vector of fragility.

6. Conclusion

This study set out to investigate the role of DPIs as institutional mechanisms capable of both fostering and undermining legitimacy, inclusion, and resilience in fragile and transitional states. Through a comparative analysis of three regional contexts—the Horn of Africa, the Western Balkans, and South/Southeast Asia—the research illuminated how digital governance, connectivity, and counter-disinformation strategies interact to shape political trust and social cohesion. By integrating interpretive institutional analysis with regionally grounded data, the study identified key design principles that determine whether digital infrastructures contribute to sustainable peace or perpetuate systemic inequalities. The findings reveal that digital trust-building is contingent upon institutional design. Mechanisms that promote transparency, accountability, and participatory governance are essential to ensuring that digital systems enhance rather than erode legitimacy. Connectivity, meanwhile, is inherently political: digital inclusion often reflects existing structural inequalities, particularly between urban elites and marginalized communities, underscoring that access alone does not guarantee equitable participation. Furthermore, counter-disinformation capacity emerges as a vital component of peace infrastructure. Initiatives such as fact-checking, digital literacy programs, and cross-sectoral collaboration play a significant role in mitigating polarization and strengthening civic resilience.

These insights underscore the dual nature of DPIs. While they offer the potential to institutionalize inclusive participation, they can also reinforce exclusion and amplify disinformation when poorly designed or inadequately regulated. From a scientific standpoint, this research advances the conceptualization of DPIs as dynamic governance ecosystems rather than static technological tools. It bridges the literatures on peacebuilding, digital governance, and institutional legitimacy by introducing three analytical indices—the DTI, PCI, and DVI—which operationalize the complex relationship between technology and peace. These indices offer a replicable framework for comparative research and enable systematic evaluation of how digital infrastructures influence social and institutional stability. Practically, the study provides actionable guidance for policymakers, development agencies, and peacebuilding practitioners. The study advocates for investing in accountability-by-design, which guarantees robust transparency and oversight mechanisms accompanying technological adoption. It calls for structural approaches to digital inequality, emphasizing the importance of public-private partnerships in education and ICT training to democratize access. Finally, it advocates for the institutionalization of counter-disinformation capacity through embedded fact-checking systems, civic digital literacy, and independent media oversight. These recommendations affirm that digitalization, when guided by inclusive governance principles, can reinforce rather than destabilize fragile democratic institutions.

Nonetheless, the study acknowledges several limitations. The reliance on secondary data and policy documentation may obscure informal digital practices and local variations in trust perception. The analytical indices were applied conceptually rather than quantitatively, limiting empirical generalizability. Additionally, regional disparities in digital governance maturity introduce contextual asymmetries that necessitate case-specific adaptations of the framework. As such, the findings should be interpreted as

indicative rather than predictive, serving as a foundation for future empirical inquiry. Future research should apply the DPI framework longitudinally to examine how digital legitimacy evolves under diverse political and technological conditions. Incorporating citizen-level surveys and ethnographic fieldwork would offer more profound insights into lived experiences of digital inclusion and exclusion. Moreover, integrating AI governance metrics and algorithmic transparency indicators could enrich understanding of how emerging technologies shape peacebuilding outcomes. Cross-sectoral collaboration among researchers, policymakers, and ICT actors will be essential to refine the framework and develop context-sensitive strategies for digital peace governance. This study emphasizes that DPIs are not merely technical systems but socio-political architectures that mediate trust, participation, and truth in the digital era. Their effectiveness hinges on institutional reflexivity—the ability of governance systems to learn, adapt, and remain accountable. By embedding inclusivity, transparency, and digital literacy into the core of infrastructure design, fragile and transitional societies can transform digitalization from a source of instability into a foundation for lasting peace.

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