

## **THE IMPACT OF TECHNOLOGICAL DEVELOPMENTS ON THE EVOLUTION OF SPECIFIC FIELDS OF LEGISLATION: A COMPARATIVE ANALYSIS OF INDONESIA AND HUNGARY**

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**DOI: [10.47272/KIKPhD.2025.1.4](https://doi.org/10.47272/KIKPhD.2025.1.4)**

### **ABSTRACT**

This article examines how technological advancements have influenced the evolution of legislative frameworks in Indonesia and Hungary, focusing on data protection and e-government initiatives. The comparative analysis reveals that while both countries acknowledge similar challenges, they have adopted distinctly different regulatory approaches. Hungary's legislation demonstrates deep integration with European Union frameworks, resulting in comprehensive harmonization, while Indonesia has developed a more autonomous approach tailored to its unique context. This comparison provides valuable insights into how different legal systems navigate the complex intersection of technology and law, offering lessons for jurisdictions facing similar challenges.

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### **KEYWORDS**

Digital legislation, comparative law, data protection, e-government, administrative digitalization.

### **ARTICLE HISTORY**

SUBMITTED 30 Jan 2025 | REVISED 24 Feb 2025 | ACCEPTED 28 Feb 2025

## I. Introduction

The accelerating pace of technological innovation presents unprecedented challenges to legal systems worldwide, compelling legislators to develop new regulatory frameworks that balance innovation with protection of rights and societal interests. Technology often outpaces legal development, creating regulatory gaps that require responsive and adaptive legislative approaches.<sup>1</sup>

This article examines how Indonesia and Hungary—two countries with distinct historical, cultural, and legal backgrounds—have evolved their legislative frameworks in response to technological developments. Through comparative legal analysis of two critical domains—data protection and e-government initiatives—this study identifies convergences and divergences in legislative approaches, evaluates the effectiveness of different regulatory strategies, and extracts valuable lessons for other jurisdictions. These domains represent fundamental aspects of the modern digital state and demonstrate the intersection between technological change and legal evolution.

## II. Theoretical Framework and Methodology

### 1. Theoretical Framework

This study is grounded in the theoretical perspective of legal evolution in response to technological change, drawing upon Teubner's concept of reflexive law, which suggests that legal systems must develop mechanisms to respond adaptively to rapid societal and technological changes.<sup>2</sup> The research employs comparative law methodology focusing on functional equivalence rather than mere textual similarities in legal provisions.<sup>3</sup> The theoretical framework also incorporates legal transplant theory<sup>4</sup> and regulatory convergence concepts<sup>5</sup> to analyze how global standards influence domestic legislation, while employing digital constitutionalism<sup>6</sup> and digital state theory<sup>7</sup> to examine rights reconceptualization and administrative transformation in digital contexts.

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<sup>1</sup> Roger Brownsword and Karen Yeung (eds), *Regulating Technologies: Legal Futures, Regulatory Frames and Technological Fixes* (Hart 2008).

<sup>2</sup> Gunther Teubner, *Law as an Autopoietic System* (Zenon Bankowski ed, 1st edn, Blackwell 1993).

<sup>3</sup> Konrad Zweigert and Hein Kötz, *Introduction to Comparative Law* (Tony Weir tr, 3rd revised edition, Oxford University Press 1998).

<sup>4</sup> Alan Watson, *Legal Transplants: An Approach to Comparative Law* (2nd edn, Univ of Georgia Press 1993).

<sup>5</sup> John Braithwaite and Peter Drahos, *Global Business Regulation* (Cambridge University Press 2000).  
<https://doi.org/10.1017/9780521780339>

<sup>6</sup> Edoardo Celeste, 'Digital Constitutionalism: A New Systematic Theorisation' (2019) 33 *International Review of Law, Computers & Technology* 76. <https://doi.org/10.1080/13600869.2019.1562604>

<sup>7</sup> Jane E Fountain, *Building the Virtual State: Information Technology and Institutional Change* (Brookings Institution Press 2004).

## 2. Methodology

The research employs qualitative comparative legal analysis of primary legal sources and secondary materials, examining four key aspects for each domain: 1) current legal frameworks and their relationship to international standards, 2) implementation mechanisms and regulatory institutions, 3) practical effectiveness and societal impact, and 4) challenges and ongoing legislative developments.

## III. Brief Comparative Context

Indonesia and Hungary represent contrasting approaches to technological regulation shaped by their distinct legal traditions and external influences. Indonesia has experienced explosive digital growth, with internet penetration increasing from 0.9% in 2000 to over 73.7% in 2023,<sup>8</sup> creating pressure for accelerated legislative responses within its autonomous regulatory tradition. Hungary's digital transformation has progressed more gradually through structured EU accession processes that required extensive harmonization with European directives and regulations.

## IV. Data Protection and Privacy Legislation

### 1. Current Legal Framework and International Standards Relationship

Indonesia and Hungary represent fundamentally different approaches to data protection legislation. Indonesia enacted its comprehensive Personal Data Protection Law (Law No. 27/2022) in September 2022 after years of fragmented sectoral regulations, marking a significant advancement in its regulatory approach.<sup>9</sup> This law demonstrates selective adaptation of international frameworks, incorporating concepts like data controllers and processors, data subject rights, and impact assessments while modifying implementation timelines to align with domestic institutional capacities.<sup>10</sup> The Indonesian approach balances international harmonization with contextual adaptation, recognizing both cross-border data flow imperatives and unique domestic circumstances.<sup>11</sup>

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<sup>8</sup> Asosiasi Penyelenggara Jasa Internet Indonesia (APJII), 'Laporan Survei Internet APJII 2022-2023 (APJII 2023)' <<https://survei.apjii.or.id/survei/group/8>> accessed 19 June 2025.

<sup>9</sup> Hunter Dorwart and others, 'Indonesia's Personal Data Protection Bill: Overview, Key Takeaways, and Context - Future of Privacy Forum' (*Future of Privacy Forum*) <<https://fpf.org/blog/indonesias-personal-data-protection-bill-overview-key-takeaways-and-context/>> accessed 19 June 2025.

<sup>10</sup> Sinta Dewi Rosadi and others, 'Indonesia's Personal Data Protection Bill, 2020: Does It Meet the Needs of the New Digital Economy?' (2023) 37 *International Review of Law, Computers & Technology* 78 <https://doi.org/10.1080/13600869.2022.2114660>.

<sup>11</sup> Hardy Salim, 'Indonesia's Comprehensive Personal Data Protection Law Guide - Indonesia Guide | Doing Business in Indonesia' (*ASEAN Briefing*) <<https://www.aseanbriefing.com/doing-business-guide/indonesia/company-establishment/personal-data-protection-law>> accessed 19 June 2025. ("In

Hungary's data protection framework exemplifies deep European integration, beginning with its pioneering 1992 law establishing the Parliamentary Commissioner for Data Protection.<sup>12</sup> The Hungarian Information Act of 2011 consolidated data protection and freedom of information provisions, creating a foundation subsequently adapted to implement the GDPR in 2018.<sup>13</sup> Hungary has also implemented complementary legislation, including Act CCXXII of 2015 transposing the EU eIDAS Regulation and specialized provisions for law enforcement data processing through implementation of the Law Enforcement Directive.<sup>14</sup>

The comparative analysis reveals contrasting approaches to international standards adoption—Hungary's direct implementation of EU requirements creating high harmonization and cross-border compatibility, versus Indonesia's selective incorporation maintaining greater regulatory autonomy for contextual adaptation.<sup>15</sup> The divergent approaches evident in these frameworks reflect broader tensions between regulatory autonomy and international harmonization that characterize the global digital governance landscape. Indonesia's approach demonstrates what can be termed "selective convergence"—a purposeful adoption of international best practices while preserving policy space for distinctive national priorities.<sup>16</sup> This approach potentially creates a more contextually appropriate framework but raises

shaping the PDP Law, Indonesian lawmakers adapted principles from global standards like the EU GDPR to address both international compliance needs and local challenges").

<sup>12</sup> United Nations High Commissioner for Refugees (UNCHR) and TARKI Social Research Institute, 'Hungary Multi-Sector Needs Assessment (MSNA): Data Protection & Privacy Notice' <<https://data.unhcr.org/en/documents/details/101298>> accessed 19 June 2025 ("The protection of data and the freedom of information in Hungary has been the responsibility of the Parliamentary Commissioner for Data Protection and Freedom of Information (Ombudsman) since 1995... Act LXIII of 1992, which entered into law on 1 May 1993, provides for the protection and dissemination of personal information"); 'EPIC --- Privacy and Human Rights Report 2006 - Republic of Hungary' <<https://worldlii.org/int/journals/EPICPrivHR/2006/PHR2006-Republic-11.html>> accessed 19 June 2025 ("The Parliamentary Commissioner for Data Protection and Freedom of Information oversees the 1992 Act").

<sup>13</sup> DLA Piper, 'Data Protection Laws of the World' <<https://www.dlapiperdataprotection.com/index.html?t=law&c=HU>> accessed 19 June 2025 ("The Hungarian Parliament implemented the GDPR into Hungarian laws by amending Act CXII of 2011 on the Right of Informational Self-Determination and on Freedom of Information").

<sup>14</sup> Dóra Petrányi, 'Data Protection and Cybersecurity Laws in Hungary' <<https://cms.law/en/int/expert-guides/cms-expert-guide-to-data-protection-and-cyber-security-laws/hungary>> accessed 18 June 2025 ("Act CXII/2011 on the Right of Informational Self-Determination and the Freedom of Information... implementing the EU Law Enforcement Directive").

<sup>15</sup> Salim (n 11).

<sup>16</sup> Ruben De Bruin, 'A Comparative Analysis of the EU and U.S. Data Privacy Regimes and the Potential for Convergence' [2022] SSRN Electronic Journal <<https://www.ssrn.com/abstract=4251540>> accessed 19 June 2025 ("With such divergent underlying interests and foundational rationales at play, working towards a harmonized international data transfer framework becomes increasingly difficult to achieve") <https://doi.org/10.2139/ssrn.4251540>.

questions about international interoperability and adequacy determinations for cross-border data flows. Hungary's EU-integrated approach, while providing clear benefits for regional interoperability, represents what some scholars identify as "externally-induced convergence," where normative pressure from supranational entities shapes domestic law more than indigenous policy preferences.<sup>17</sup> This tension between autonomy and harmonization manifests across multiple dimensions, including implementation timelines, enforcement mechanisms, and institutional design choices. Both approaches reveal differing conceptualizations of digital sovereignty—Indonesia emphasizing jurisdictional autonomy while Hungary pursuing integration-based influence within EU policy development processes.<sup>18</sup>

## **2. Implementation Mechanisms and Regulatory Institutions**

Indonesia's implementation framework remains in a formative stage, with the Personal Data Protection Authority still being established and interim oversight responsibilities distributed across multiple agencies.<sup>19</sup> This institutional fragmentation creates coordination challenges and potential enforcement inconsistencies.<sup>20</sup> Implementation mechanisms established under the law include requirements for Data Protection Impact Assessments and breach notification protocols, though detailed implementing regulations remain under development.<sup>21</sup> Hungary's implementation mechanisms demonstrate greater maturity, with the National Authority for Data Protection and Freedom of Information (NAIH) serving as an independent supervisory authority with clearly defined powers and substantial operational experience.<sup>22</sup> NAIH's independence is structurally reinforced through constitutional provisions and specific appointment

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<sup>17</sup> Benjamin Farrand, Helena Carrapico and Aleksei Turobov, 'The New Geopolitics of EU Cybersecurity: Security, Economy and Sovereignty' (2024) 100 *International Affairs* 2379 <https://doi.org/10.1093/ia/iaac231>.

<sup>18</sup> Julia Pohle and Thorsten Thiel, 'Digital Sovereignty' (2020) 9 *Internet Policy Review* <<https://policyreview.info/concepts/digital-sovereignty>> accessed 19 June 2025 <https://doi.org/10.14763/2020.4.1532>.

<sup>19</sup> Adinova Fauri, 'Implementation of Personal Data Privacy Law in Indonesia: Examining Benefits and Key Challenges' (*Tech For Good Institute*, 13 March 2023) <<https://techforgoodinstitute.org/blog/expert-opinion/implementation-of-personal-data-privacy-law-in-indonesia-examining-benefits-and-key-challenges/>> accessed 19 June 2025.

<sup>20</sup> Salim (n 11).

<sup>21</sup> Abadi Abi Tisnadisastra and Prayoga Mokoginta, 'Data Protection Laws and Regulations Indonesia 2024-2025' (*International Comparative Legal Guides International Business Reports*) <<https://iclg.com/practice-areas/data-protection-laws-and-regulations/indonesia>> accessed 19 June 2025.

<sup>22</sup> National Authority for Data Protection and Freedom of Information (NAIH), 'Annual Report of the National Authority for Data Protection and Freedom of Information 2022' <[https://www.naih.hu/files/NAIH\\_annual\\_report\\_2022.pdf](https://www.naih.hu/files/NAIH_annual_report_2022.pdf)> accessed 18 June 2025.

procedures.<sup>23</sup> Hungary has also established specialized judicial expertise in data protection cases, with constitutional jurisprudence recognizing privacy as a fundamental right deserving robust protection.<sup>24</sup>

The contrasting implementation frameworks reveal distinct evolutionary pathways with significant implications for regulatory effectiveness. Indonesia's distributed oversight model, while potentially allowing greater adaptability across sectors, creates risks of regulatory arbitrage and inconsistent enforcement standards that may undermine the law's overall effectiveness.<sup>25</sup> This approach resembles what regulatory theorists term "polycentric governance"—characterized by multiple decision centers with overlapping jurisdictions—which can enhance innovative problem-solving but requires strong coordination mechanisms to prevent fragmentation.<sup>26</sup> Hungary's consolidated authority model aligns with what governance scholars identify as a "regulatory state" paradigm, where independent regulatory agencies exercise substantial discretion within legislatively defined parameters.<sup>27</sup> The structural independence of NAIH represents a critical differentiating factor, as research consistently demonstrates correlations between regulatory independence and enforcement effectiveness in data protection contexts.<sup>28</sup> The different institutional trajectories also reflect varying levels of what regulatory scholars term "administrative capacity"—the organizational resources, expertise, and processes necessary for effective implementation. Indonesia's capacity-building challenges are particularly evident in specialized technical domains like data breach response and cross-border transfer mechanisms, where implementation requires both legal expertise and technical knowledge not yet fully developed within the administrative system.<sup>29</sup>

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<sup>23</sup> Adam Liber and Tamás Bereczki, 'Data Protection & Privacy 2025 - Hungary | Global Practice Guides | Chambers and Partners' <<https://practiceguides.chambers.com/practice-guides/data-protection-privacy-2025/hungary/trends-and-developments>> accessed 19 June 2025.

<sup>24</sup> Dóra Petrányi (n 14).

<sup>25</sup> DLA Piper, 'Data Protection Laws of the World: Indonesia' <<https://www.dlapiperdataprotection.com/?t=law&c=ID>> accessed 19 June 2025.

<sup>26</sup> Carolina Aguerre, Malcolm Campbell-Verduyn and Jan Aart Scholte (eds), *Global Digital Data Governance: Polycentric Perspectives* (Taylor & Francis 2024). <https://doi.org/10.4324/9781003388418>

<sup>27</sup> J Black, 'Decentring Regulation: Understanding the Role of Regulation and Self-Regulation in a "Post-Regulatory" World' (2001) 54 *Current Legal Problems* 103 <https://doi.org/10.1093/clp/54.1.103>.

<sup>28</sup> NAIH (Hungary), 'NAIH (Hungary) - NAIH-85-3/2022' (*GDPRhub*) <[https://gdprhub.eu/index.php?title=NAIH\\_\(Hungary\)\\_-\\_NAIH-85-3/2022](https://gdprhub.eu/index.php?title=NAIH_(Hungary)_-_NAIH-85-3/2022)> accessed 19 June 2025.

<sup>29</sup> Valentina Ancillia Simbolon and Vishnu Juwono, 'Comparative Review of Personal Data Protection Policy in Indonesia and The European Union General Data Protection Regulation' (2022) 11 *Publik (Jurnal Ilmu Administrasi)* 178 <https://doi.org/10.31314/pjia.11.2.178-190.2022>.

### **3. Practical Effectiveness and Social Impact**

Indonesia's recently enacted framework faces significant implementation challenges that affect its practical effectiveness.<sup>30</sup> The transitional status creates uncertainty for organizations, leading to inconsistent implementation practices.<sup>31</sup> Compliance levels vary significantly, with large multinational corporations demonstrating higher adoption rates while small enterprises struggle with awareness and implementation capacities.<sup>32</sup> Despite implementation challenges, the law has catalyzed important conversations about privacy and data protection in Indonesian society.<sup>33</sup>

Hungary's data protection framework demonstrates more established effectiveness after decades of implementation experience.<sup>34</sup> Compliance levels are generally higher, reflecting stronger enforcement mechanisms and greater organizational familiarity with requirements.<sup>35</sup> NAIH actively enforces the legal framework through investigations, administrative fines, and guidance materials.<sup>36,38</sup> Public awareness of data protection rights is more developed, with greater media coverage of privacy issues and more accessible mechanisms for exercising data subject rights.<sup>37</sup>

The effectiveness disparities between these frameworks illustrate the complex relationship between formal legal provisions and practical implementation outcomes. Indonesia's implementation challenges demonstrate what legal sociologists identify as an "implementation gap"—the disconnect between legislative intent and operational reality that often characterizes new regulatory regimes, particularly in rapidly evolving technological domains.<sup>38</sup> This gap manifests in Indonesian contexts through inconsistent organizational compliance practices, limited awareness among smaller entities, and nascent public understanding of

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<sup>30</sup> Rosadi and others (n 10).

<sup>31</sup> Muhammad Deckri Algamar and Noriswadi Ismail, 'Data Subject Access Request: What Indonesia Can Learn And Operationalise In 2024?' (2023) 2 *Journal of Central Banking Law and Institutions* 481 <https://doi.org/10.21098/jcli.v2i3.171>, discussing implementation challenges and noting that "similar failure scenario might occur in Indonesia when PDP Law grace period ended in 2024 – if the causes are not addressed and mitigated."

<sup>32</sup> Adinova Fauri (n 19).

<sup>33</sup> Salim (n 11). ("In shaping the PDP Law, Indonesian lawmakers adapted principles from global standards like the EU GDPR to address both international compliance needs and local challenges")

<sup>34</sup> Dóra Petrányi (n 14). ("Act CXII/2011 on the Right of Informational Self-Determination and the Freedom of Information... implementing the EU Law Enforcement Directive")

<sup>35</sup> National Authority for Data Protection and Freedom of Information (NAIH) (n 22).

<sup>36</sup> Liber and Bereczki (n 23).

<sup>37</sup> Dóra Petrányi (n 14).

<sup>38</sup> Filippo Lancieri, 'Narrowing Data Protection's Enforcement Gap Narrowing Data Protection's Enforcement Gap' (2022) 74 *Maine Law Review* 15. <https://doi.org/10.2139/ssrn.3806880>

newly established rights.<sup>39</sup> The effectiveness differences also highlight the critical role of implementation sequencing in determining regulatory outcomes. Hungary's gradual evolution through multiple legislative iterations allowed for institutional learning and adaptation that Indonesia's more accelerated approach necessarily compresses.<sup>40</sup> The societal impact dimension reveals important distinctions in what privacy scholars term "privacy cultures"—the social norms, expectations, and practices surrounding personal information. Hungary's longer engagement with data protection concepts has facilitated the development of a more robust privacy culture characterized by greater public awareness and more established mechanisms for rights assertion.<sup>41</sup> Indonesia's emerging privacy culture shows promising signs of development, particularly among younger demographics and in urban centers, but remains at an earlier evolutionary stage.<sup>42</sup> These cultural dimensions significantly influence practical effectiveness, as regulatory success depends not only on formal compliance but also on the degree to which data protection principles become integrated into organizational practices and social expectations.<sup>43</sup>

#### **4. Challenges and Ongoing Legislative Developments**

Indonesia faces substantial implementation challenges in operationalizing its framework, including establishing the dedicated authority, developing comprehensive implementing regulations, and addressing resource constraints.<sup>44</sup> Cross-border data transfer provisions require particular attention, as Indonesia navigates tensions between data localization preferences and international data flow needs.<sup>45</sup> Ongoing legislative developments focus on developing implementing regulations and establishing international data transfer mechanisms.<sup>46</sup>

Hungary's challenges reflect its more mature implementation environment, focusing on keeping pace with evolving EU initiatives including the AI Act, Data

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<sup>39</sup> Adinova Fauri, 'Strengthening Indonesia's Personal Data Protection Framework' (*Tech For Good Institute*, 21 March 2025) <<https://techforgoodinstitute.org/blog/expert-opinion/strengthening-indonesias-personal-data-protection-framework/>> accessed 20 June 2025.

<sup>40</sup> James B Rule and Graham Greenleaf (eds), *Global Privacy Protection: The First Generation* (Elgar 2008). <https://doi.org/10.4337/9781848445123>

<sup>41</sup> Sungjin Lim and Junhyoung Oh, 'Navigating Privacy: A Global Comparative Analysis of Data Protection Laws' (2025) 2025 IET Information Security 5536763 <https://doi.org/10.1049/ise2/5536763>.

<sup>42</sup> Fitriah Faisal, Wa Ode Zuliarti, and Law Faculty, Universitas Halu Oleo, Kendari, 'The Awareness Gap in Personal Data Privacy in Indonesia's Cyberspace' (2024) 7 *International Journal of Social Science and Human Research* <<https://ijsshr.in/v7i7/84.php>> accessed 20 June 2025 <https://doi.org/10.47191/ijsshr/v7-i07-84>.

<sup>43</sup> Helen Nissenbaum, 'Privacy as Contextual Integrity' (2004) 79 *Washington Law Review* 119.

<sup>44</sup> Adinova Fauri (n 19).

<sup>45</sup> Abadi Abi Tisnadisastra and Prayoga Mokoginta (n 21).

<sup>46</sup> Rosadi and others (n 10).



Act, and amendments to existing frameworks.<sup>47</sup> Balancing EU compliance with national priorities creates tension in certain areas, while resource constraints still affect comprehensive enforcement.<sup>48</sup> Recent legislative developments include amendments addressing artificial intelligence applications, enhanced enforcement mechanisms, and implementation of evolving EU frameworks.<sup>49</sup>

The divergent challenges facing these frameworks reveal distinctive evolutionary trajectories and implementation priorities that reflect broader governance approaches. Indonesia's implementation challenges embody what public administration scholars term the "implementation deficit"—the gap between policy ambition and administrative capacity that often characterizes comprehensive regulatory initiatives in developing governance contexts.<sup>50</sup> This deficit manifests particularly in specialized technical areas requiring domain expertise not yet fully developed within administrative structures. The cross-border data transfer provisions represent a critical test case for Indonesia's regulatory approach, requiring sophisticated balancing of competing imperatives including digital economy development, national security considerations, and international trade commitments.<sup>51</sup> Indonesia's approach to these provisions reveals an emerging "digital sovereignty" doctrine that emphasizes jurisdictional control while recognizing economic imperatives for certain cross-border data flows.<sup>52</sup> Hungary's challenges demonstrate a different evolutionary stage focused on "regulatory refinement" rather than fundamental implementation. The tensions between EU compliance and national priorities reflect broader political dynamics within European integration processes, where member states navigate complex politics of alignment and differentiation.<sup>53</sup> Hungary's approach to artificial intelligence regulation illustrates these dynamics, with implementation approaches that formally comply with EU frameworks while preserving space for national prioritization in

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<sup>47</sup> Dóra Petrányi (n 14). ("Act CXII/2011 on the Right of Informational Self-Determination and the Freedom of Information... implementing the EU Law Enforcement Directive")

<sup>48</sup> Liber and Bereczki (n 23).

<sup>49</sup> Dóra Petrányi (n 14).

<sup>50</sup> Hernawan and Indra Dharma Wijaya, 'An Analysis of the Challenges and Opportunities for Governance in Indonesia during the Digital Transformation of Public Organisations' (2024) 2 *Proceeding of Research and Civil Society Desemination* 236 <https://doi.org/10.37476/presed.v2i1.45>.

<sup>51</sup> Xirui Li, 'Indonesia Won't Go with the Flow on Data | East Asia Forum' (*East Asia Forum*, 10 August 2022) <<https://eastasiaforum.org/2022/08/10/indonesia-wont-go-with-the-flow-on-data/>> accessed 20 June 2025.

<sup>52</sup> Andreyka Natalegawa and Gregory B Poling, 'The Indo-Pacific Economic Framework and Digital Trade in Southeast Asia' <<https://www.csis.org/analysis/indo-pacific-economic-framework-and-digital-trade-southeast-asia>> accessed 20 June 2025.

<sup>53</sup> Ido Sivan-Sevilla, 'Europeanisation on Demand: The EU Cybersecurity Certification Regime between Market Integration and Core State Powers (1997–2019)' (2021) 41 *Journal of Public Policy* 600 <https://doi.org/10.1017/S0143814X20000173>

application domains considered strategically important.<sup>54</sup> Both countries' resource constraints highlight a persistent challenge in data protection governance—the asymmetry between regulatory mandates and implementation resources that affects even mature regulatory systems.<sup>55</sup> This asymmetry creates what regulatory theorists term "enforcement discretion," requiring sophisticated prioritization strategies to maximize regulatory impact within resource limitations.<sup>56</sup>

## V. E-Government Initiatives and Administrative Digitalization

### 1. *Current Legal Framework and International Standards Relationship*

Indonesia has established a comprehensive legal foundation for e-government through Presidential Regulation No. 95/2018 on Electronic-Based Government Systems, establishing a framework for coordinated electronic government development.<sup>57</sup> This was enhanced by Presidential Regulation No. 39/2023 on National Digital Transformation Acceleration, outlining an integrated approach to digital public service delivery.<sup>58</sup> Indonesia's approach to international e-government standards has been selectively adaptive rather than comprehensively integrative, incorporating elements from UN-DESA, World Bank, and ASEAN frameworks while maintaining significant autonomy in implementation approaches.<sup>59</sup>

Hungary's e-government legal framework has developed through deep integration with European Union digital government initiatives.<sup>60</sup> The foundational legislation is Act CCXXII of 2015 on the General Rules of Electronic Administration and Trust Services, which provides comprehensive provisions while

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<sup>54</sup> Gergely Horváth, 'Understanding the EU AI Act in Practice: 10+1 Questions and Answers for Hungarian Companies' (*schoenherr*) <<https://www.schoenherr.eu/content/understanding-the-eu-ai-act-in-practice-10plus1-questions-and-answers-for-hungarian-companies>> accessed 20 June 2025.

<sup>55</sup> Nuala O'Connor, 'Reforming the U.S. Approach to Data Protection and Privacy | Council on Foreign Relations' <<https://www.cfr.org/report/reforming-us-approach-data-protection>> accessed 20 June 2025.

<sup>56</sup> Aguerre, Campbell-Verduyn and Scholte (n 26).

<sup>57</sup> Betty Purwandari and others, 'Factors Affecting Switching Intention from Cash on Delivery to E-Payment Services in C2C E-Commerce Transactions: COVID-19, Transaction, and Technology Perspectives' (2022) 6 *Emerging Science Journal* 136 <https://doi.org/10.28991/esj-2022-SPER-010>.

<sup>58</sup> Kementerian Komunikasi dan Digital Republik Indonesia, 'Rencana Strategis Kementerian Komunikasi dan Informatika 2020 - 2024' <<https://www.komdigi.go.id/kinerja/rencana-strategis>> accessed 20 June 2025. Kementerian Komunikasi dan Digital, *Rencana Strategis Kementerian Komunikasi dan Informatika 2020 - 2024*, (KOMDIGI 2021-02, 83)

<sup>59</sup> Mireille Hildebrandt, 'Privacy and Data Protection' in Mireille Hildebrandt, *Law for Computer Scientists and Other Folk* (1st edn, Oxford University Press Oxford 2020) <https://doi.org/10.53116/pgafnr.2022.2.3>.

<sup>60</sup> Cabinet Office of the Prime Minister of Hungary, 'National Digitalisation Strategy 2022-2030' <<https://www.digitaliskeszsegek.hu/wp-content/uploads/2024/08/National-Digitalisation-Strategy.docx.pdf>>.

transposing key EU directives including the eIDAS Regulation.<sup>61</sup> This is complemented by the General Administrative Procedure Act (Act CL of 2016), which establishes streamlined procedures for electronic administrative actions.<sup>62</sup> Hungary's approach to international standards is characterized by comprehensive alignment with the EU Digital Single Market framework and European Interoperability Framework.<sup>63</sup>

The contrasting approaches to e-government frameworks reflect fundamental differences in conceptualizing the relationship between technological innovation and administrative law principles. Indonesia's framework embodies what administrative law scholars describe as "framework legislation"—establishing broad principles and coordination mechanisms while preserving substantial implementation discretion for administrative entities.<sup>64</sup> This approach reflects Indonesia's decentralized governance structure and accommodates significant variation in institutional capacities and local contexts. The framework demonstrates what e-government researchers identify as an "adaptive pathway" to digital transformation that accommodates heterogeneous implementation environments rather than imposing standardized solutions.<sup>65</sup> Hungary's approach, by contrast, exemplifies what public administration scholars term "administrative constitutionalism"—the integration of fundamental rights and procedural guarantees directly into administrative processes through explicit legislative provisions.<sup>66</sup> This approach reflects deeper institutionalization of administrative procedure principles in European legal traditions and provides greater predictability for citizens and organizations interacting with public authorities. The integration with EU frameworks demonstrates what governance scholars identify as "networked governance"—where domestic administrative systems become

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<sup>61</sup> Tamás Szádeczky, 'Enhanced Functionality Brings New Privacy and Security Issues – An Analysis of eID' (2018) 12 *Masaryk University Journal of Law and Technology* 3 <https://doi.org/10.5817/MUJLT2018-1-1>.

<sup>62</sup> Attila Badó and Gábor Feleky, 'Public Perception of the Hungarian Local Government Reform: Results of an Empirical Study' (2023) 7 *Public Governance, Administration and Finances Law Review* 59 <https://doi.org/10.53116/pgafnr.2022.2.3>.

<sup>63</sup> 'Interoperability Initiatives - Hungary | Interoperable Europe Portal' <<https://interoperable-europe.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/interoperability-initiatives-hungary>> accessed 20 June 2025.

<sup>64</sup> Seok-Jin Eom and Jooho Lee, 'Digital Government Transformation in Turbulent Times: Responses, Challenges, and Future Direction' (2022) 39 *Government Information Quarterly* 101690 <https://doi.org/10.1016/j.giq.2022.101690>.

<sup>65</sup> Stavros Sindakis and Gazal Showkat, 'The Digital Revolution in India: Bridging the Gap in Rural Technology Adoption' (2024) 13 *Journal of Innovation and Entrepreneurship* 29 <https://doi.org/10.1186/s13731-024-00380-w>.

<sup>66</sup> Giovanni De Gregorio and Roxana Radu, 'Digital Constitutionalism in the New Era of Internet Governance' (2022) 30 *International Journal of Law and Information Technology* 68 <https://doi.org/10.1093/ijlit/eaac004>.

embedded within transnational regulatory networks that share standards and implementation practices.<sup>67</sup> These different approaches reflect not only technical choices but fundamental perspectives on administrative discretion, citizen rights, and the proper relationship between international standards and domestic governance systems.<sup>68</sup>

## 2. *Implementation Mechanisms and Regulatory Institutions*

Indonesia's implementation framework reflects its decentralized governance system, with responsibility distributed across multiple agencies and government levels.<sup>69</sup> The Ministry of Administrative and Bureaucratic Reform serves as policy coordinator, while the Ministry of Communication and Information Technology provides technical implementation guidance.<sup>70</sup> At subnational levels, provincial and municipal governments maintain significant implementation autonomy, with dedicated e-government units varying substantially in capability and resourcing.<sup>71</sup> This multi-level governance approach produces innovative local solutions but creates fragmentation in service quality and technical standards.<sup>72</sup>

Hungary's implementation mechanisms demonstrate greater institutional consolidation within the EU e-government framework.<sup>73</sup> The Ministry of Interior, through the Deputy State Secretariat for E-Government, serves as the primary coordinating body, with specialized agencies including the National Info communications Service Company providing centralized infrastructure.<sup>74</sup> This institutional consolidation facilitates more consistent service deployment and strategic alignment.<sup>75</sup> Hungary's Client Gate (Ugyfelkapu) provides unified access to over 2,500 different e-government services through a single authentication

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<sup>67</sup> Anne-Marie Slaughter and Thomas Hale, 'A Summit Caught Between Past and Future' (*Project Syndicate*, 24 September 2024) <<https://www.project-syndicate.org/commentary/no-breakthroughs-un-summit-of-the-future-but-still-promising-by-thomas-hale-2-and-anne-marie-slaughter-2024-09>> accessed 20 June 2025.

<sup>68</sup> Sandi Lubis and others, 'Electronic Governance in Advancing Sustainable Development Goals through Systematic Literature Review' (2024) 2 *Discover Global Society* 77 <https://doi.org/10.1007/s44282-024-00102-3>.

<sup>69</sup> Mireille Hildebrandt (n 59).

<sup>70</sup> Faisal, Zuliarti, and Law Faculty, Universitas Halu Oleo, Kendari (n 42).

<sup>71</sup> Andi Fitri Rahmadany, 'Literature Study of Electronic Government Implementation in the Perspective of Indonesia's Electronic Government Ranking Dimensions' (2021) 13 *Jurnal Bina Praja* 281 <https://doi.org/10.21787/jbp.13.2021.281-292>.

<sup>72</sup> Hafiez Sofyani, Hosam Alden Riyadh and Heru Fahlevi, 'Improving Service Quality, Accountability and Transparency of Local Government: The Intervening Role of Information Technology Governance' (2020) 7 *Cogent Business & Management* 1735690 <https://doi.org/10.1080/23311975.2020.1735690>.

<sup>73</sup> David Ramiro Troitinho, Viktoria Mazur and Tanel Kerikmäe, 'E-Governance and Integration in the European Union' (2024) 27 *Internet of Things* 101321 <https://doi.org/10.1016/j.iot.2024.101321>.

<sup>74</sup> Cabinet Office of the Prime Minister of Hungary (n 60).

<sup>75</sup> Gergely Cseh-Zelina, 'Digital Economy And Society Index - From The Perspective Of Hungary' (2023) 92 *Curentul Juridic, The Juridical Current, Le Courant Juridique* 21.

mechanism, significantly reducing authentication friction compared to Indonesia's fragmented identity mechanisms.<sup>76</sup>

The implementation architectures demonstrate contrasting approaches to what e-government scholars term "institutional design choices" with significant implications for service delivery outcomes and technological governance. Indonesia's decentralized implementation model represents an example of what administrative theorists describe as "experimentalist governance"—where local implementation units have substantial autonomy to develop context-specific solutions within broadly defined policy frameworks.<sup>77</sup> This approach creates opportunities for innovation through parallel experimentation while creating challenges for interoperability and standardization. The distributed governance model aligns with Indonesia's broader political decentralization reforms that emphasize local autonomy, but creates sustainability challenges as implementation success becomes heavily dependent on local leadership commitment and technical capacity.<sup>78</sup> Hungary's more consolidated approach exemplifies what public administration scholars identify as "whole-of-government" implementation—characterized by centralized coordination mechanisms, shared infrastructure, and standardized interfaces.<sup>79</sup> This approach creates advantages for service consistency and interoperability while potentially reducing adaptability to specialized local contexts. The authentication mechanisms represent a particularly significant point of divergence, with Hungary's unified Client Gate demonstrating what identity management researchers term "federated identity architecture"—where a single trust framework enables access across multiple service domains.<sup>80</sup> This approach significantly reduces friction in citizen-government interactions by eliminating redundant authentication requirements. Indonesia's more fragmented identity ecosystem creates higher transaction costs for citizens who must navigate multiple authentication systems across different government services, though recent

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<sup>76</sup> 'Interoperability Initiatives - Hungary | Interoperable Europe Portal' (n 63).

<sup>77</sup> Dennis Shoesmith, Nathan Franklin and Rachmat Hidayat, 'Decentralised Governance in Indonesia's Disadvantaged Regions: A Critique of the Underperforming Model of Local Governance in Eastern Indonesia' (2020) 39 *Journal of Current Southeast Asian Affairs* 359 <https://doi.org/10.1177/1868103420963140>.

<sup>78</sup> World Bank, 'Beyond Unicorns: Harnessing Digital Technologies for Inclusion in Indonesia' <<https://ideas.repec.org/a/pmu/cjurid/v92y2023p21-34.html>> accessed 20 June 2025.

<sup>79</sup> Tom Christensen and Per Lægreid, 'The Whole-of-Government Approach to Public Sector Reform' (2007) 67 *Public Administration Review* 1059 <https://doi.org/10.1111/j.1540-6210.2007.00797.x>.

<sup>80</sup> Karishini Ramamoorthi and others, 'The Implementation of Federated Digital Identifiers in Health Care: Rapid Review' (2024) 26 *Journal of Medical Internet Research* e45751 <https://doi.org/10.2196/45751>.

initiatives under the One Indonesia Data framework are beginning to address these challenges.<sup>81</sup>

### **3. Practical Effectiveness and Societal Impact**

Indonesia's implementation effectiveness shows significant variation across functional domains and geographic regions.<sup>82</sup> Implementation has achieved notable success in specific domains, particularly tax administration, public procurement, business registration, and trade facilitation.<sup>83</sup> However, effectiveness remains inconsistent across the broader administrative landscape, with many services still limited in functionality and adoption.<sup>84</sup> Geographic disparities are particularly pronounced, with more advanced digital service availability in major urban centers compared to smaller cities and rural areas.<sup>85</sup>

Hungary's e-government implementation demonstrates more consistent effectiveness across administrative domains.<sup>86</sup> The country has achieved above-EU-average scores in the European Commission's Digital Economy and Society Index for digital public services.<sup>87</sup> Particularly successful implementations include tax administration, company registration, property registration, and social security administration.<sup>88</sup> The societal impact extends beyond administrative efficiency to include transparency enhancements, corruption reduction through automated processes, and accessibility improvements for citizens with mobility limitations.<sup>89</sup>

The effectiveness variations between these implementations highlight critical factors that determine digital government outcomes beyond formal legislative frameworks. The sectoral variations in Indonesia's implementation success demonstrate what implementation theorists term "domain-specific factors"—where characteristics particular to specific administrative domains significantly influence digitalization outcomes.<sup>90</sup> Domains with centralized administrative structures, specialized user populations, and financial resources (such

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<sup>81</sup> Mochamad Azhar, 'How Does the Satu Data Indonesia Secretariat Improve Data Governance?' (*GovInsider*, 20 August 2024) <<https://govinsider.asia/intl-en/article/how-does-the-satu-data-indonesia-secretariat-improve-data-governance>> accessed 20 June 2025.

<sup>82</sup> Nurhidayat Nurhidayat, Achmad Nurmandi and Misran Misran, 'Evaluation of the Challenges of E-Government Implementation: Analysis of the E-Government Development Index in Indonesia' (2024) 8 *Jurnal Manajemen Pelayanan Publik* 371 <https://doi.org/10.24198/jmpp.v8i2.52759>.

<sup>83</sup> Braithwaite and Drahos (n 5).

<sup>84</sup> Azhar (n 81).

<sup>85</sup> Sofyani, Riyadh and Fahlevi (n 72).

<sup>86</sup> European Commission, 'The Digital Economy and Society Index (DESI)' <<https://digital-strategy.ec.europa.eu/en/policies/desi>> accessed 20 June 2025.

<sup>87</sup> Cseh-Zelina (n 75).

<sup>88</sup> *ibid*.

<sup>89</sup> Badó and Feleky (n 62).

<sup>90</sup> J Ramón Gil-García and Theresa A Pardo, 'E-Government Success Factors: Mapping Practical Tools to Theoretical Foundations' (2005) 22 *Government Information Quarterly* 187. <https://doi.org/10.1016/j.giq.2005.02.001>

as taxation and procurement) have achieved substantially higher implementation success than domains serving general populations through decentralized structures.<sup>91</sup> This pattern aligns with broader findings in e-government research regarding the relationship between administrative structure and digital transformation outcomes.<sup>92</sup> The geographic disparities in Indonesia highlight what digital inclusion researchers identify as the "digital divide reproduction effect"—where digitalization initiatives without explicit equity mechanisms tend to reproduce or amplify existing socioeconomic and geographic disparities.<sup>93</sup> These disparities create significant challenges for equitable service delivery and potentially undermine citizen trust in governance institutions. Hungary's more consistent implementation effectiveness demonstrates advantages of what administrative scholars term "implementation maturity"—the accumulated organizational learning and capability development that emerges through sustained engagement with transformation processes.<sup>94</sup> The broader societal impacts evident in Hungary's implementation reveal important secondary effects beyond transactional efficiency, including transparency enhancement through standardized and trackable administrative processes, corruption reduction through automated procedures that eliminate discretionary human decision points, and accessibility improvements that expand service access for populations with mobility constraints.<sup>95</sup> These broader impacts highlight how e-government initiatives, when effectively implemented, can advance democratic governance objectives beyond narrow administrative efficiency improvements.<sup>96</sup>

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<sup>91</sup> Nurhidayat, Nurmandi and Misran (n 82).

<sup>92</sup> Balázs Hohmann, 'Integrity Advisors and the Development of Administrative Communication Culture' (2019) 4(1) *European Journal of Multidisciplinary Studies* 29–33 <https://doi.org/10.26417/ejms-2019.v4i1-527>

<sup>93</sup> Polyxeni Vassilakopoulou and Eli Hustad, 'Bridging Digital Divides: A Literature Review and Research Agenda for Information Systems Research' (2023) 25 *Information Systems Frontiers* 955. <https://doi.org/10.1007/s10796-020-10096-3>

<sup>94</sup> Kim Normann Andersen and others, 'The Forgotten Promise of E-Government Maturity: Assessing Responsiveness in the Digital Public Sector' (2011) 28 *Government Information Quarterly* 439. <https://doi.org/10.1016/j.giq.2010.12.006>

<sup>95</sup> Ricardo Matheus and others, 'Digital Transparency and the Usefulness for Open Government' (2023) 73 *International Journal of Information Management* 102690. <https://doi.org/10.1016/j.ijinfomgt.2023.102690>

Balázs Hohmann, 'The Principles and Fundamental Requirements of the Transparency on the Public Administrative Proceedings' in Suresh P (ed), *Proceedings of the IIER International Conference, Dubai, UAE* (International Institute of Engineers and Researchers 2019) 1–4.

<sup>96</sup> Yaser Hasan Al-Mamary and Mohammad Alshallaqi, 'Making Digital Government More Inclusive: An Integrated Perspective' (2023) 12 *Social Sciences* 557 <https://doi.org/10.3390/socsci12100557>.

#### **4. Challenges and Ongoing Legislative Development**

Indonesia confronts substantial infrastructural and institutional challenges affecting implementation consistency.<sup>97</sup> Digital infrastructure disparities represent a primary constraint, with significant variation in connectivity quality between urban centers and rural areas.<sup>98</sup> Institutional capacity limitations compound these challenges, with substantial variation in technical expertise and implementation resources across government levels. Ongoing legislative developments focus on addressing these challenges through expanded infrastructure development, institutional capacity building, and interoperability enhancement through the One Data Indonesia initiative.<sup>99</sup>

Hungary faces different challenges focused on refinement, technological evolution, and balancing EU compliance with national prioritization.<sup>100</sup> Digital skills gaps remain substantial, particularly among older demographics and rural populations.<sup>101</sup> Resource constraints affect implementation capacity despite more developed institutional structures.<sup>102</sup> Ongoing legislative developments focus on addressing these refinement challenges through continuous updates to the Digital Success Programme, enhanced interoperability frameworks, and expanded implementation of automated administrative procedures.<sup>103</sup>

The distinctive challenges facing these implementations reveal different evolutionary stages in digital government development with important implications for future legislative development. Indonesia's challenges exemplify what digital transformation researchers identify as "foundational constraints"—fundamental limitations in infrastructure, human capital, and institutional capacity that must be addressed before advanced digitalization initiatives can succeed at scale.<sup>104</sup> These constraints create implementation sequencing imperatives that necessitate prioritization of foundational elements before proceeding to more sophisticated integration. The One Data Indonesia initiative represents a promising approach to addressing interoperability challenges through what information systems researchers describe as "middleware-enabled integration"—where shared data standards and exchange protocols enable integration across heterogeneous systems

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<sup>97</sup> Nurhidayat, Nurmandi and Misran (n 82).

<sup>98</sup> Purwandari and others (n 57).

<sup>99</sup> Azhar (n 81).

<sup>100</sup> CSEH-ZELINA (n 75).

<sup>101</sup> European Commission (n 86).

<sup>102</sup> Badó and Feleky (n 62).

<sup>103</sup> Caroline Fischer, Moritz Heuberger and Moreen Heine, 'The Impact of Digitalization in the Public Sector: A Systematic Literature Review' (2021) 14 *der moderne staat – Zeitschrift für Public Policy, Recht und Management* 3 14. <https://doi.org/10.3224/dms.v14i1.13>.

<sup>104</sup> Alessandro Cenderello and Arnauld Bertrand, 'How Governments in Developing Countries Can Close the Digital Divide' (*EY*, 4 October 2022) <[https://www.ey.com/en\\_gl/insights/international-development/how-governments-in-developing-countries-can-close-the-digital-gap](https://www.ey.com/en_gl/insights/international-development/how-governments-in-developing-countries-can-close-the-digital-gap)> accessed 20 June 2025.



without requiring comprehensive system replacement.<sup>105</sup> This approach recognizes the practical impossibility of uniform system deployment across Indonesia's diverse administrative landscape and instead focuses on creating integration layers that enable interoperability while preserving local adaptation. Hungary's refinement challenges represent a different evolutionary stage focused on what e-government researchers term "transformational implementation"—moving beyond digitization of existing processes to fundamental redesign of administrative relationships.<sup>106</sup> The digital skills challenges highlight important social dimensions of technological integration that transcend technical system deployment. These challenges manifest particularly in demographic patterns, with significant variations in digital service adoption between younger urban populations and older rural citizens.<sup>107</sup> This pattern creates important equity considerations that influence service design decisions and implementation strategies. The resource constraints affecting even Hungary's more developed implementation highlight a persistent challenge in digital government initiatives—the tension between innovation imperatives and operational sustainability requirements.<sup>108</sup> This tension manifests in difficult prioritization decisions between developing new capabilities and maintaining existing systems, particularly as technology cycles accelerate and create ongoing adaptation pressures.<sup>109</sup>

## **VI. Conclusion and Lessons for Legislative Development**

The comparative analysis of Indonesia and Hungary reveals significant insights for legislative development in the technological era. Both countries demonstrate convergence in recognizing similar fundamental challenges while diverging substantially in implementation approaches.<sup>110</sup> Hungary's EU-integrated approach provides benefits of regional harmonization and established regulatory models but constrains policy autonomy, while Indonesia's more autonomous approach enables

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<sup>105</sup> Hans J (Jochen) Scholl and Ralf Klischewski, 'E-Government Integration and Interoperability: Framing the Research Agenda' (2007) 30 *International Journal of Public Administration* 889 <https://doi.org/10.1080/01900690701402668>.

<sup>106</sup> Shan L Pan and others, 'Digital Sustainability, Climate Change, and Information Systems Solutions: Opportunities for Future Research' (2022) 63 *International Journal of Information Management* 102444 <https://doi.org/10.1016/j.ijinfomgt.2021.102444>.

<sup>107</sup> Koen Salemink, Dirk Strijker and Gary Bosworth, 'Rural Development in the Digital Age: A Systematic Literature Review on Unequal ICT Availability, Adoption, and Use in Rural Areas' (2017) 54 *Journal of Rural Studies* 360 <https://doi.org/10.1016/j.jrurstud.2015.09.001>.

<sup>108</sup> Ilaria Guandalini, 'Sustainability through Digital Transformation: A Systematic Literature Review for Research Guidance' (2022) 148 *Journal of Business Research* 456 <https://doi.org/10.1016/j.jbusres.2022.05.003>.

<sup>109</sup> Sascha Kraus and others, 'Digital Transformation: An Overview of the Current State of the Art of Research' (2021) 11 *Sage Open* 21582440211047576 <https://doi.org/10.1177/21582440211047576>.

<sup>110</sup> Braithwaite and Drahos (n 5).

greater contextual adaptation but creates challenges for international interoperability.<sup>111</sup>

Five key lessons emerge from this comparative analysis:

First, effective technological regulation requires balanced approaches to international harmonization—neither complete regulatory autonomy nor uncritical adoption of international standards represents an optimal approach.<sup>112</sup> Second, institutional capacity development is essential alongside legislative enactment, as the effectiveness of technology-related legislation depends significantly on implementation mechanisms rather than merely formal provisions.<sup>113</sup> Third, policy coherence across related technological domains is crucial given the increasingly interconnected nature of digital technologies and potential for contradictions between regulatory frameworks.<sup>114</sup> Fourth, legislative frameworks must incorporate adaptability mechanisms to accommodate the accelerating pace of technological change while maintaining sufficient certainty for stakeholders.<sup>115</sup> Finally, implementation sequencing and prioritization represent critical considerations, particularly for jurisdictions with resource constraints or limited regulatory experience in technological domains.<sup>116</sup>

Beyond these specific lessons, the comparative analysis reveals deeper patterns in technological regulation with significant implications for legislative theory and practice. The experiences of both countries demonstrate what regulatory theorists identify as "regulatory co-evolution"—where technological innovation and legislative responses develop through interactive processes rather than simple cause-effect relationships.<sup>117</sup> This co-evolutionary perspective highlights the importance of iterative regulatory approaches that maintain sufficient flexibility to adapt to technological trajectories that cannot be fully anticipated at the point of legislative enactment. The comparative experiences also illuminate what legislative scholars term the "implementation gap paradox"—where jurisdictions with more developed implementation capacity often maintain more modest legislative ambitions, while jurisdictions with greater implementation challenges sometimes adopt more expansive legislative frameworks.<sup>118</sup> This pattern suggests important considerations regarding the relationship between legislative ambition and implementation realism

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<sup>111</sup> Algamar and Ismail (n 31).

<sup>112</sup> Rosadi and others (n 10).

<sup>113</sup> Dóra Petrányi (n 14). ("Act CXII/2011 on the Right of Informational Self-Determination and the Freedom of Information... implementing the EU Law Enforcement Directive")

<sup>114</sup> World Bank (n 78).

<sup>115</sup> Szádeczky (n 61) 3–25.

<sup>116</sup> Badó and Feleky (n 62).

<sup>117</sup> Pohle and Thiel (n 18).

<sup>118</sup> Bob Hudson, David Hunter and Stephen Peckham, 'Policy Failure and the Policy-Implementation Gap: Can Policy Support Programs Help?' (2019) 2 Policy Design and Practice 1 <https://doi.org/10.1080/25741292.2018.1540378>.

that should inform technological regulation approaches. The contrasting approaches also demonstrate differing conceptualizations of what governance theorists term "digital sovereignty"—the capacity of jurisdictions to maintain meaningful control over digital activities affecting their citizens and territories.<sup>119</sup> Hungary's approach emphasizes integration-based influence through participation in EU policy development processes, while Indonesia's approach emphasizes jurisdictional autonomy through distinctive national frameworks. These different sovereignty conceptualizations reflect not only technical or legal choices but fundamental perspectives on the proper relationship between national governance systems and transnational digital ecosystems. Finally, the comparative experiences highlight the critical importance of what implementation researchers identify as "adaptive implementation"—the capacity to modify implementation approaches based on operational experience and changing technological contexts.<sup>120</sup> Both countries demonstrate this adaptability in different ways—Hungary through continuous refinement within EU frameworks, and Indonesia through pragmatic implementation sequencing that prioritizes domains where success is most feasible. This adaptability represents perhaps the most essential characteristic for effective technological regulation in an era of accelerating innovation and unpredictable technological trajectories.

These insights highlight how different jurisdictions can navigate the complex terrain of technological regulation while accommodating their unique legal traditions, institutional capacities, and development priorities. The comparison demonstrates that while digital transformation creates certain universal regulatory imperatives, effective implementation requires contextual adaptation that respects distinctive governance systems and societal values.

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<sup>119</sup> Pohle and Thiel (n 18).

<sup>120</sup> Giovanni De Grandis, Irina Brass and Suzanne S Farid, 'Is Regulatory Innovation Fit for Purpose? A Case Study of Adaptive Regulation for Advanced Biotherapeutics' (2023) 17 *Regulation & Governance* 810 <https://doi.org/10.1111/rego.12496>.