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International Best Practices of Digital-Green Integration: Lessons for Developing Countries

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ABSTRACT

Governments are beginning to connect digital transformation and green transition policies, although the two agendas were long managed through separate reform tracks. This article examines that shift through three advanced policy systems: the European Union, South Korea, and China. The analysis uses a comparative design informed by Most Similar Systems logic (MSSD) and draws on official strategies, policy packages, implementation materials, and peer-reviewed literature. Three models are identified: the European Union's regulatory-market model, South Korea's state-coordinated innovation model, and China's infrastructure-planning model. Their institutions, instruments, and financing scales differ substantially. Across the cases, however, three lessons recur: ministries need a working coordination mechanism, shared digital-environmental infrastructure requires patient investment, and complex green conditionalities work better after basic digital capacity has been built. For developing countries, the issue is not how to copy these models wholesale. A more defensible strategy is component matching: selecting institutional and sequencing elements that fit domestic administrative capacity, fiscal space, and digital readiness. The article applies this logic to Uzbekistan, where digital and green reforms are already present but not yet fully joined in implementation. Uzbekistan's relatively high digital readiness combined with fragmented implementation points to coordination, rather than technology, as the binding constraint. The article contributes to policy transfer debates by separating context-bound instruments from design principles that can be adapted under resource constraints.

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1. Introduction

For many years, digital transformation and green transition developed in separate policy spaces. Digitalization usually meant productivity, public service modernization, data infrastructure, and industrial competitiveness. Green transition pointed in another direction: decarbonization, environmental regulation, renewable energy, and climate adaptation. Around 2019–2020, that separation began to weaken. The European Green Deal repeatedly refers to digital tools for climate and resource management; South Korea presented its Digital New Deal and Green New Deal as mutually reinforcing recovery programs; and China's recent planning documents place ecological civilization alongside digital economy development. By 2026 the connection had become more institutionalized but also more contested: the European Union was simplifying parts of its sustainability rulebook (European Parliament & Council, 2025, 2026), South Korea had launched a new climate, energy and environment ministry that took over energy policy from the industry ministry (Asia Business Daily, 2025), and China's 15th Five-Year Plan set low-carbon and "AI+" targets within one planning document (Congressional Research Service, 2026; SESEC, 2026).

The connection is not merely rhetorical. A smart grid cannot operate without digital monitoring and data exchange. Precision agriculture depends on sensors, satellite information, and mobile advisory systems. Circular economy models, meanwhile, often rely on platforms that track materials, match users, and reduce transaction costs. These links are real, but they are not one-sided. Data-center energy demand, electronic waste, and resource-intensive hardware supply chains show that digitalization can also create environmental pressure (Baldé et al., 2024; Freitag et al., 2021; IEA, 2025, 2026). The IEA (2025) estimates that data centers used about 415 TWh of electricity in 2024, roughly 1.5% of the global total, and projects that demand could more than double to around 945 TWh by 2030. For that reason, the digital-green relationship should be treated as conditional, not automatically positive.

For developing countries, this conditionality is not an abstract issue. Uzbekistan, for instance, is trying to expand digital public services, attract renewable energy investment, modernize water management, and meet international climate commitments at the same time. None of these reforms belongs neatly to one ministry or one budget line. Similar pressures arise in other emerging economies, where expanding digitalization raises its own environmental questions (UNCTAD, 2024). The difficulty is that most published experience on digital-green policy integration comes from high-capacity systems with large budgets and mature administrative structures. Copying those models is rarely realistic. What matters more is identifying which components can be adapted under different institutional and fiscal conditions.

To examine that problem, the paper compares the European Union, South Korea, and China. All three have tried to connect digital and environmental policy, but the machinery behind those efforts differs sharply. The EU works mainly through rules and market signals. South Korea relies more heavily on state-led investment missions. China begins from infrastructure and planning capacity. The comparison is not a ranking exercise. It asks a narrower question: which parts of these approaches remain usable when budgets are smaller, ministries are less coordinated, and statistical systems are still developing?

The analysis is organized around three questions. First, how do the three systems organize the connection between digital and environmental policy? Second, which patterns recur across them despite very different governance arrangements? Third, which of those patterns can be adapted by a government with weaker administrative capacity, a narrower fiscal base, and less developed digital systems? The argument developed in the paper is that digital-green integration is best understood as an institutional and sequencing problem rather than a purely technological one, and that lessons travel as components rather than as complete models.

The paper makes three contributions. It develops a typology of integration approaches across three influential policy systems; separates transferable principles from instruments that depend heavily on fiscal capacity, regulatory sophistication, or state structure; and applies the resulting component-matching logic to Uzbekistan as an illustrative developing-country context.

2. Literature Review

The idea of a "twin transition" became prominent in European policy discourse around 2020, although academic and policy debates had already been discussing links between digitalization and environmental policy. European Commission foresight documents frame the two transitions as central to Europe's economic future (European Commission, 2020). Reviewing this literature, Muench et al. (2022) found that much of the work remained close to firms, sectors, and technologies. The institutional question received less attention: how do governments actually coordinate the two agendas?

That institutional gap matters. Technological feasibility alone does not produce policy outcomes. A smart grid, for example, is not simply a technical system; it also requires tariff rules, data standards, investment planning, cybersecurity safeguards, regulatory oversight, and financing. Digital emissions monitoring faces the same problem. The data become meaningful only when regulators have authority and incentives to act on them. In practice, the digital-green nexus is a governance problem as much as a technology problem.

The OECD's Going Digital integrated policy framework (OECD, 2020, 2026) describes digital transformation as a horizontal issue cutting across sectoral ministries.

Environmental policy has a similar character. Once the two agendas are joined, coordination becomes harder rather than easier. Responsibilities are spread across environment ministries, ICT agencies, finance ministries, energy regulators, local governments, and private firms. Without an institutional mechanism linking these actors, integration tends to remain at the level of strategy documents.

Country-specific studies show considerable variation in how this problem is handled. In the European Union, the Green Deal, Digital Europe Programme, Recovery and Resilience Facility, and Fit for 55 package create overlapping digital and green obligations (European Commission, 2019, 2021; European Parliament & Council, 2021a, 2021b). The Recovery and Resilience Facility, for instance, sets separate minimum shares of plan expenditure for climate objectives (37%) and for the digital transition (20%) (European Parliament & Council, 2021a), so the two agendas are tracked through separate thresholds rather than a joint one. Hepburn et al. (2020) assess recovery spending against both economic and climate criteria and show that the design of the conditions attached to public money largely determines its climate effect.

South Korea's Green New Deal and Digital New Deal are often treated as mission-oriented industrial policy. Lee and Woo (2020) emphasize the scale and speed of public investment. Tienhaara et al. (2022), however, show a more mixed picture: the 2020 Green New Deal is socially and environmentally stronger than its 2009 predecessor, but it still supports projects with questionable green outcomes. The lesson is straightforward but important. Announcing the two agendas together does not guarantee that their environmental content is equally robust.

China is usually discussed through strategic industrial policy and state-led planning. Nahm (2021) shows how industrial coordination and manufacturing scale helped reshape global clean energy markets. Chen and Lees (2016) point to a persistent tension between ecological modernization and economic competitiveness. For the present study, the distinctive feature is China's build-first logic: physical and data infrastructure are expanded at scale, and only later are monitoring systems, smart regulation, and environmental conditions layered onto them.

Policy transfer theory provides the analytical basis for the comparison. Dolowitz and Marsh (2000) distinguish between copying, emulation, combination, and inspiration. Rose's (1991) idea of lesson-drawing is especially relevant where direct transfer is unrealistic. Stone (2012) adds another layer by showing how international organizations and expert networks translate policies across contexts, shaping which lessons travel and how they are interpreted.

For developing countries, the transfer problem is particularly acute. Pegels and Altenburg (2020) argue that green industrial policy must be adapted to local factor endowments, market structures, and institutional capabilities. A carbon border adjustment mechanism, an EU-style taxonomy, or a Korean-scale public investment program may be unrealistic in a lower-income setting. The principles behind those instruments may still travel: coordination, credible standards, patient investment, and sequencing can be redesigned for local capacity. Taken together, the literature offers three starting points for this study: the digital-green link is institutional rather than purely technical; integration depends on implementation channels as much as on strategy documents; and transfer to lower-capacity settings requires breaking models into components.

3. Methodology

The study uses a comparative design informed by the Most Similar Systems Design (MSSD) (Anckar, 2008; Przeworski & Teune, 1970) to compare three cases: the European Union, South Korea, and China. All three cases share the background conditions that make digital-green integration feasible: high technological capability, significant state capacity, explicit commitment to both digital and green transformation, and the ability to mobilize public investment at scale. Holding these conditions broadly constant isolates what varies. Political structure, market organization, state-business relations, and international positioning vary sharply across the three cases, allowing the analysis to compare integration strategies across different governance settings. Patterns that recur despite this variation are treated as stronger candidates for transfer than patterns tied to a single governance setting.

The design has limitations. The European Union is a supranational entity, South Korea is a unitary democratic state, and China is a continental one-party state. These are not perfectly similar systems, which is why the design is used here as a comparative logic rather than as a strict test. For this reason, the comparison is not made at the level of regime type or macro-political system. It is made at the level of policy architecture: coordination mechanisms, instruments, financing arrangements, sequencing, and stakeholder engagement. With three cases, the study makes analytical rather than statistical generalizations: the cross-case patterns are propositions to be tested, not causal estimates.

The empirical material is documentary. The analysis draws on official strategies and policy packages from the three cases, including European Green Deal communications, Digital Europe materials, Recovery and Resilience Facility documents, Fit for 55 texts, Korean New Deal materials, Green New Deal and Digital New Deal implementation documents, China's 14th and 15th Five-Year Plan materials, digital economy plans, ecological civilization guidance, and related State Council documents (Congressional Research Service, 2026; European Commission, 2019, 2021; European Parliament & Council, 2021a, 2021b; Ministry of Economy and

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Finance, 2020; State Council of the People's Republic of China, 2021). Peer-reviewed studies and policy analyses were used to interpret implementation patterns and to avoid treating official strategy language as direct evidence of results. The documentary review reflects official sources available through 2026.

Five dimensions guided the comparison: institutional architecture, policy instruments, investment and financing, sequencing, and stakeholder engagement. For each case, the extraction protocol recorded stated objectives, responsible institutions, implementation instruments, financing sources, and evidence of operational integration. The same coding dimensions were then used to compare the three cases and to identify which features were likely to travel to lower-resource policy environments.

Two practical choices shaped the analysis. Official documents were treated as evidence of policy design, not as proof of implementation. Where published evaluations described a gap between stated integration and actual coordination, those findings were used to qualify the interpretation. Transferability was also coded conservatively. A measure counted as transferable only if it could plausibly be adapted by a government with more limited fiscal and administrative capacity than the three cases studied here.

Table 1. Data corpus

Case	Main policy materials	Complementary sources
European Union	European Green Deal, Digital Europe, Recovery and Resilience Facility, Fit for 55	Policy briefs and academic studies on EU twin transition governance
South Korea	Korean New Deal, Green New Deal, Digital New Deal, sector plans, budget papers	Studies on mission-oriented industrial policy and early implementation
China	14th and 15th Five-Year Plan materials, ecological civilization guidance, digital economy plans	Studies on strategic industrial policy, planning, and clean technology deployment
Uzbekistan application	Digital Uzbekistan-2030, Green Economy Strategy 2019–2030, and NDC 3.0 (2025)	Used to test transferability logic, not as a fourth comparative case

Table 2. Coding dimensions

Dimension	Main question used during coding	Example evidence
Institutional architecture	Who is responsible for connecting digital and green agendas?	Cabinet committees, coordinating ministries, inter-service groups
Policy instruments	Which tools are used to make integration operational?	Standards, taxonomies, subsidies, procurement rules, pilots
Investment and financing	How are shared digital-green assets funded?	Recovery funds, policy banks, public-private partnerships
Sequencing	Which capacities are built first?	Digital infrastructure before emissions monitoring or smart regulation
Stakeholder engagement	Which non-state actors participate in implementation?	Firms, utilities, civil society, expert bodies, local governments

This section moves in four steps. It first classifies the three cases into models (4.1), then extracts the patterns that recur across them (4.2), assesses which elements could be adapted under weaker capacity (4.3), and converts the result into a component-matching framework (4.4) that is applied to Uzbekistan (4.5).

4.1 Three Models of Digital-Green Integration

The comparison points to three integration approaches.

The European Union relies on a regulatory-market approach. Its core logic is to establish standards, taxonomies, disclosure rules, and market signals, then allow firms and member states to respond within a shared framework. Green taxonomy rules, digital product passports, the Carbon Border Adjustment

Mechanism, right-to-repair legislation, and sustainability disclosure obligations illustrate this approach (European Parliament & Council, 2020, 2022, 2023, 2024a, 2024b). Rule-setting and long-term market signaling are its strengths. The costs are slower implementation and a heavy compliance burden for smaller firms or lower-capacity member states. The EU has itself acted on this cost. A 2026 amendment narrowed the Corporate Sustainability Reporting Directive to companies with more than 1,000 employees and EUR 450 million in net turnover (European Parliament & Council, 2026), and a 2025 amendment exempted importers of less than 50 tonnes of goods covered by the Carbon Border Adjustment Mechanism, whose definitive period began in January 2026 (European Parliament & Council, 2025).

South Korea takes a state-coordinated innovation route. The policy logic is more direct: identify strategic areas where digital and environmental objectives overlap, concentrate public investment, and bring private firms into mission-oriented programs. Smart grids, green buildings, hydrogen, digital infrastructure, and mobility technologies are treated as investment priorities. Speed, concentrated resources, and a compact administrative structure give the approach practical force. Its weakness appears when green language is attached to projects whose environmental impact is still uncertain (Tienhaara et al., 2022). Recent changes underline the coordination question. In October 2025 the government launched a ministry for climate, energy and environment that took over core energy policy functions from the industry ministry (Asia Business Daily, 2025), and at COP30 it announced a phase-out of unabated coal power by 2040 (Climate Action Tracker, 2025).

China represents an infrastructure-planning route. Large-scale physical and data infrastructure is built first; environmental objectives are then attached through planning targets, state-owned enterprises, and regulatory guidance. Smart city infrastructure, new-energy vehicle charging networks, ultra-high-voltage transmission, real-time emissions monitoring, and industrial platforms fit this pattern. The approach achieves scale quickly. Direct transfer is difficult, however, because it depends on strong planning authority, policy bank finance, state influence over land and enterprise, and limited procedural constraints. The 15th Five-Year Plan (2026–2030), approved in March 2026, sets numerical targets for both agendas within one plan: a 17% cut in carbon dioxide emissions per unit of GDP and a 25% non-fossil share of energy consumption, alongside a rise in the core digital economy to 12.5% of GDP and an "AI+" action (Congressional Research Service, 2026; SESEC, 2026).

Table 3. Comparative models of digital-green integration

Dimension	European Union	South Korea	China
Model type	Regulatory-market	State-coordinated innovation	Infrastructure-planning
Main coordination logic	Shared rules and cross-cutting frameworks	Presidential and ministry-level mission coordination	Planning system and joint multi-agency guidance
Dominant instruments	Taxonomies, disclosure, standards, market rules	Public investment, R&D missions, public-private partnerships	Infrastructure investment, state targets, SOE direction
Main strength	Credible rules and long-term market signaling	Speed and policy focus	Scale and implementation capacity
Main weakness	Slow and administratively complex	Risk of uneven integration	Low transferability to pluralistic or low-capacity systems
Developing-country lesson	Simplify standards and sequencing	Adapt mission logic at smaller scale	Learn sequencing, not the full governance model

4.2 Cross-Case Patterns

Despite these differences, three patterns recur. They are stated as propositions because three cases support analytical, not statistical, generalization.

Proposition 1 (coordination). Each system created or relied on a mechanism that links digital and environmental portfolios. In the European Union, this happens through Commission structures and cross-program conditionalities, such as the climate and digital spending thresholds of the Recovery and Resilience Facility (European Parliament & Council, 2021a). In South Korea, high-level national strategy bodies perform the bridging role. In China, the five-year planning system sets targets for both agendas, and in 2024 the Office of the Central Cyberspace Affairs Commission and nine central departments issued joint guidelines for coordinated digital and green transformation (State Council of the People's Republic of China, 2024). The institutional forms differ, but the function is similar: preventing the two policy

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communities from working in isolation. The comparison suggests that the exact form of the coordinating body is less important than its mandate, authority, and connection to budget decisions. South Korea's 2025 move to place energy policy together with climate and environment policy in one ministry points in the same direction (Asia Business Daily, 2025).

Proposition 2 (shared infrastructure). Shared infrastructure receives sustained public attention. Data platforms, smart grids, monitoring systems, testing facilities, and digital public services support environmental regulation while also serving wider economic goals. Private actors often underinvest in these assets because the benefits are spread across sectors and agencies. Public funding remains important, even where market actors later use the infrastructure. Data centers show the other side of this proposition: the IEA (2025) projects that their electricity demand could more than double by 2030, so shared digital infrastructure has to be planned together with energy supply.

Proposition 3 (sequencing). Sequencing matters. Complex green conditionalities work better when basic connectivity, data systems, and administrative capacity already exist. The case evidence indicates that monitoring tools, staff skills, and data standards are prerequisites for many forms of environmental regulation. This does not mean waiting for full digital transformation. It means choosing instruments that match the country's readiness level. A government can begin with open environmental data and digital permitting before moving to real-time emissions monitoring or automated compliance systems. The evidence for this proposition is the weakest of the three, because it rests on the documented design of programs more than on measured outcomes. It is therefore the proposition most in need of testing.

Taken together, the three propositions describe what integration requires (a mandate, shared assets, and an order of operations) rather than which instruments governments use. This is why they travel better than the models themselves: they can be restated in terms of any country's administrative capacity, digital readiness, and fiscal space, which are the three conditions used in Section 4.4.

4.3 Transferability for Developing Countries

Transferability falls into three levels, depending on how far each element relies on the fiscal, regulatory, or political conditions found in the three cases.

Some elements are directly transferable because they do not require large budgets or advanced markets. Inter-ministerial coordination groups, digital-green strategy alignment, open environmental data standards, and sequencing logic fall into this category. For a developing country, even a modest coordination body with a clear mandate can improve policy coherence if it links environment, digital, finance, and economic planning institutions.

Other elements are conditionally transferable. Mission-oriented investment programs can be useful, but fiscal capacity determines their scale. Regulatory sandboxes linking digital innovation and green finance may be feasible where regulators have enough technical competence and legal authority. Green disclosure requirements can support market development, although starting with larger firms or banks is more realistic than immediately extending obligations to small enterprises.

The least transferable elements are those embedded in political and fiscal systems that cannot be reproduced easily: the scale of EU recovery funding, South Korea's high-volume public investment, and China's full state-directed infrastructure model. Copying these elements may produce ambitious strategies on paper but weak implementation in practice.

Table 4. Transferability assessment

Transferability level	Examples	Implication for developing countries
Directly transferable	Coordination bodies, sequencing logic, open data standards, joint strategy drafting	Low-cost institutional reforms can begin early
Conditionally transferable	Mission-oriented programs, regulatory sandboxes, disclosure rules, green-digital procurement	Adapt scale, legal complexity, and implementation timetable
Largely non-transferable	EU funding scale, Korean New Deal budget, Chinese state-directed infrastructure model	Use as reference points, not policy templates

4.4 Component-Matching Framework

The comparison supports a component-matching framework rather than a blueprint-transfer approach. Before choosing instruments, developing countries need to assess three conditions: state capacity, digital readiness, and fiscal space. Each condition corresponds to one proposition in Section 4.2: state capacity to coordination, digital readiness to sequencing, and fiscal space to shared infrastructure.

Low state capacity points toward coordination and basic data governance rather than complex regulation. Weak digital readiness calls for connectivity, digital public services, and administrative data systems before advanced monitoring or automated compliance. Narrow fiscal space makes shared infrastructure and targeted pilots more realistic than broad subsidy programs.

The framework can be summarized as follows:

- If administrative capacity is limited, start with simple coordination structures and clear division of institutional responsibilities.
- If digital infrastructure is weak, prioritize digital foundations that enable later green applications.
- If fiscal space is narrow, fund shared infrastructure and demonstration projects rather than broad national programs.
- If private-sector capacity is uneven, begin with large firms, banks, and public agencies before extending obligations to SMEs.
- If external finance is used, design domestic ownership and maintenance arrangements from the beginning.

Rules 1 to 3 follow directly from the three conditions and from Propositions 1 to 3. Rules 4 and 5 add two contextual conditions, private-sector capacity and the source of external finance, which the comparison treats as secondary: they shape implementation but are less central to the integration problem itself.

International experience is more useful when treated as a menu of components rather than a set of ready-made models. The EU offers lessons on standards and regulatory credibility. South Korea offers lessons on mission-oriented investment. China offers lessons on infrastructure sequencing. For a country such as Uzbekistan, the immediate lesson is probably not to build a full EU-style taxonomy or a Korean-scale mission program. A more plausible starting point would be a small coordination mechanism, a limited set of green-digital procurement criteria, and a public data standard for priority sectors such as energy, water, and agriculture. The relevant question is not "Which model should be copied?" but "Which component fits the country's current constraints?"

4.5 Uzbekistan as an Application Context

Uzbekistan offers an illustrative application of this framework. Digital reform and green transition already appear in national policy, but they are usually organized through different programs, ministries, indicators, and implementation routines. The "Digital Uzbekistan-2030" strategy, approved in 2020, emphasizes digital infrastructure, e-government, digital services, and the development of a national digital economy (President of the Republic of Uzbekistan, 2020). The 2019–2030 green economy strategy, approved one year earlier, focuses on energy efficiency, renewable energy, natural resource conservation, greenhouse gas reduction, green jobs, and climate resilience (President of the Republic of Uzbekistan, 2019). The two strategies are compatible on paper. The harder question is whether their overlapping tasks can be managed through common data systems, budgets, and institutional responsibilities.

The overlap is visible in specific sectors rather than only in national strategy language. In energy, renewable generation and grid modernization require digital metering, forecasting, dispatch, and demand-side management. In water and agriculture, which are especially important for Uzbekistan (FAO, 2022; World Bank, 2023), digital monitoring can support more efficient irrigation, land-use planning, and climate adaptation. In public administration, digital permitting and open environmental data can reduce the cost of compliance while improving regulatory transparency. These examples suggest that Uzbekistan does not need to choose between digitalization and environmental reform. The more immediate problem is sequence: which digital foundations must be in place before stricter environmental reporting or performance rules are introduced?

Uzbekistan's updated nationally determined contribution (NDC 3.0, 2025) shows where the two agendas already meet. It sets a target of a 50% reduction in the emissions intensity of GDP by 2035 from 2010 levels and commits to an integrated measurement, reporting and verification system supported by an online platform (Republic of Uzbekistan, 2025). Because such a system depends on shared data across energy, water, and agriculture agencies, it is a natural anchor for the first-stage data standard proposed below. Table 5 reads Uzbekistan against the three conditions of the framework.

Table 5. Illustrative assessment of Uzbekistan against the three conditions

Condition	Evidence used	Reading for the framework
State capacity	Separate digital (2020) and green (2019) strategies, run through different programs; NDC 3.0 (2025) plans an integrated measurement, reporting and verification (MRV) system with an online platform (Republic of Uzbekistan, 2025).	Strategy design capacity exists; cross-agency coordination is the gap. Start with a coordination mechanism and use MRV data as a shared base.

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Condition	Evidence used	Reading for the framework
Digital readiness	UN E-Government Development Index 2024: 0.7999, rank 63 of 193, in the "very high" group; rank 69 in 2022 (United Nations Department of Economic and Social Affairs, 2024).	Digital foundations are comparatively strong for a lower-middle-income economy, so building basic digital capacity is less binding than coordination.
Fiscal space	Public debt of about one-third of GDP in 2025 (International Monetary Fund, 2025); adaptation investment needs alone of USD 15.7 billion by 2030 and USD 30.1 billion by 2035 (Republic of Uzbekistan, 2025).	Debt is moderate but needs are large, so shared infrastructure and targeted pilots remain more realistic than broad subsidy programs.

Read against the framework, Uzbekistan's binding constraint is coordination rather than digital capability: digital readiness is relatively high and public debt is moderate, but the two agendas are still run separately. Rule 2 (building digital foundations) is therefore less binding than Rules 1 and 3. This suggests keeping the coordination mechanism first while moving earlier than in a weaker-readiness country to shared data standards and pilot projects. The assessment is illustrative: it uses a small set of indicators and does not measure administrative capacity directly.

The comparison above points to a cautious Uzbek pathway. From the European Union, Uzbekistan can borrow the idea of credible standards, but those standards should begin with a limited number of sectors rather than a complex economy-wide taxonomy. From South Korea, Uzbekistan can borrow mission-oriented coordination, but at a smaller fiscal scale and with clearer links to measurable environmental outcomes. From China, Uzbekistan can learn the value of infrastructure sequencing, especially the need to build data systems before imposing advanced reporting or monitoring requirements.

An appropriate first stage would include three practical steps. The first is a permanent coordination mechanism linking the digital, economy, energy, water, agriculture, and environment portfolios. The second is a shared data standard for priority environmental sectors, beginning with energy, water, and agriculture. The third is a small set of green-digital pilot projects, such as digital water accounting in selected regions, smart metering for public buildings, or digital procurement criteria for energy-efficient equipment. These steps would not transform the policy system immediately. Their value is more basic: they would create the institutional and data foundations needed before later regulation becomes credible.

This application also shows the limits of policy transfer. Uzbekistan cannot simply import the EU's regulatory density, South Korea's investment scale, or China's planning model. Its stronger option is selective adaptation: start with coordination, data, and pilots; test instruments in priority sectors; and expand only after administrative capacity and digital readiness improve. In that sense, Uzbekistan illustrates the paper's main argument. International models become useful only after they are broken into components and matched to local constraints.

5. Conclusion

Digital-green integration has moved from a specialist topic to a central question in development strategy. The European Union, South Korea, and China show three possible routes: regulatory-market coordination, state-led innovation missions, and infrastructure-centered planning. Uzbekistan shows why the transfer question matters for developing countries. It has separate digital and green reform agendas, but the practical value lies in connecting them through institutions, data systems, and carefully sequenced sectoral projects. None of the three international models travels easily as a complete package. The institutional foundations, fiscal resources, and administrative capacities behind these approaches differ too sharply from those of most lower- and middle-income economies.

The more useful lesson lies in transferable principles. Effective digital-green integration requires coordination across ministries, patient investment in shared infrastructure, and careful sequencing between digital capacity and environmental conditionality. Even where budgets are limited, those principles can be adapted.

For developing countries, the central task is not reproduction but selection. A country with weak digital infrastructure should not begin with highly complex green data requirements. A country with limited fiscal space should not announce large mission programs without financing credibility. A country with fragmented ministries should not expect digital-green integration to happen without an explicit coordination mechanism. The practical work is to build a locally appropriate combination of components.

Several limitations remain. The comparison includes only three cases, and official documents tend to understate implementation gaps. Published evaluations help identify some of those gaps but cannot substitute for longitudinal implementation data. The cases also represent relatively high-capacity systems, so the transferability claims should be read as hypotheses for adaptation rather than final prescriptions. The cases are also moving targets: the EU's 2025–2026 simplification of its sustainability rules, South Korea's 2025 merger of

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climate and energy responsibilities, and China's 15th Five-Year Plan show that the models described here continue to change. Future research should test the component-matching framework in developing countries that are already experimenting with digital-green integration, including Uzbekistan, Rwanda, Costa Rica, Vietnam, and Morocco. Such research would show whether the principles identified here hold when transferred from high-capacity systems to more constrained policy environments.

The main conclusion is practical: developing countries should learn selectively. For Uzbekistan and similar economies, international best practices are useful only when broken down into components, matched to local capacity, and sequenced realistically.

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