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SUSTAINABLE DIGITAL TRANSFORMATION STRATEGIES FOR INTERNATIONAL TRADE

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Abstract: Advanced analytical frameworks have enabled the formulation of multiple digital transformation strategies with considerable economic, technological, and sustainability benefits. Recent studies on international trade are challenging traditional conceptions of competitiveness and value creation, and in the process, opening up windows of opportunity for reconfiguring the mechanisms associated with cross-border digitalization. As little is known about where sustainable digital transformation is gaining momentum beyond developed economies and high-income markets, the purpose of this investigation is to map in what dimensions of international trade it is perceived to gain traction. Drawing on data from regression modeling and Analytical Hierarchy Process (AHP) evaluation in Asia–Europe trade corridors, we identify a long tail of institutional and industrial domains in which a total of 47 unique transformation models operate, including categories such as logistics automation, digital trade finance, and data-driven market forecasting. Our findings reveal a strong, positive correlation coefficient ($r = 0.842$) between digital readiness and trade performance. However, firms do not passively comply. Rather, their adaptive capabilities and sustainability orientations are integrated into the architecture of strategic innovation. The paper concludes by identifying policy implications, reflecting on the application of multi-criteria decision-making in the field of sustainable trade governance, and proposing suggestions for scalable implementation. The empirical insights enrich understandings of the workings of digital transformation in experiences of international competitiveness and sustainable growth.

Key words: Sustainable Digital Transformation, International Trade Competitiveness, Analytical Hierarchy Process (AHP), Digital Readiness and Governance, Data-Driven Market Forecasting, Smart Logistics and Automation, Asia–Europe Trade Corridors.

Annotatsiya: Ilg'or tahliliy asoslar sezilarli iqtisodiy, texnologik va barqarorlik foydalari bilan bir nechta raqamli transformatsiya strategiyalarini shakllantirish imkonini berdi. Xalqaro savdo bo'yicha olib borilgan so'nggi tadqiqotlar raqobatbardoshlik va qiymat yaratishning an'anaviy kontseptsiyalarini shubha ostiga qo'yadi va bu jarayonda transchegaraviy raqamlashtirish bilan bog'liq mexanizmlarni qayta sozlash uchun imkoniyatlar oynalarini ochadi. Barqaror raqamli transformatsiya rivojlangan iqtisodiyotlar va yuqori daromadli bozorlardan tashqari qayerda jadal rivojlanayotgani haqida kam ma'lum bo'lgani uchun, ushbu tadqiqotning maqsadi xalqaro savdoning qaysi o'lchovlarida qiziqish uyg'otayotganini xaritalashdir. Osiyo-Yevropa savdo koridorlarida regression modellashtirish va Analitik ierarxiya jarayonini (AHP) baholash ma'lumotlariga asoslanib, biz logistika avtomatlashtirish, raqamli savdoni moliyalashtirish va ma'lumotlarga asoslangan bozorni prognozlash kabi toifalarni o'z ichiga olgan jami 47 ta noyob transformatsiya modellari faoliyat yuritadigan institutsional va sanoat sohalarining uzoq qismini aniqlaymiz. Bizning topilmalarimiz raqamli tayyorlik va savdo ko'rsatkichlari o'rtasida kuchli, ijobiy korrelyatsiya koeffitsientini ($r = 0,842$) ochib beradi. Biroq, firmalar passiv ravishda rioya qilmaydi. Aksincha, ularning moslashuvchan qobiliyatlari va barqarorlik yo'nalishlari strategik innovatsiyalar arxitekturasiga kiritilgan. Hujjat siyosatning oqibatlarini aniqlash, barqaror savdoni boshqarish sohasida ko'p mezonli qarorlar qabul qilishni qo'llash haqida fikr yuritish va keng ko'lami amalga oshirish bo'yicha takliflarni taklif qilish bilan yakunlanadi. Empirik tushunchalar xalqaro raqobatbardoshlik va barqaror o'sish tajribasida raqamli transformatsiyaning ishlashi haqidagi tushunchalarni boyitadi.

Kalit so'zlar: Barqaror raqamli transformatsiya, xalqaro savdo raqobatbardoshligi, analitik ierarxiya jarayoni (AHP), raqamli tayyorlik va boshqaruv, ma'lumotlarga asoslangan bozorni prognozlash, aqli logistika va avtomatlashtirish, Osiyo-Yevropa savdo koridorlari.

Аннотация: Передовые аналитические подходы позволили разработать множество стратегий цифровой трансформации, обеспечивающих значительные экономические, технологические и устойчивые преимущества. Недавние исследования международной торговли бросают вызов традиционным концепциям конкурентоспособности и создания стоимости, открывая при этом возможности для перестройки механизмов, связанных с трансграничной цифровизацией. Поскольку мало что известно о том, где устойчивая цифровая трансформация набирает обороты за пределами развитых экономик и рынков с высоким уровнем дохода, цель данного исследования — определить, в каких аспектах международной торговли она, по всей видимости, набирает силу. Опираясь на данные регрессионного моделирования и анализа аналитического иерархического процесса (АИП) в торговых коридорах Азия–Европа, мы выделяем обширный набор институциональных и отраслевых областей, в которых действуют в общей сложности 47 уникальных моделей трансформации, включая такие категории, как автоматизация логистики, цифровое торговое финансирование и прогнозирование рынка на основе данных. Наши результаты показывают сильный положительный коэффициент корреляции ($r = 0,842$) между цифровой готовностью и эффективностью торговли. Однако компании не пассивно следуют этим требованиям. Вместо этого их адаптивные возможности и ориентация на устойчивое развитие интегрированы в архитектуру стратегических инноваций. В заключение статьи определяются политические последствия, анализируется применение многокритериального принятия решений в области устойчивого управления торговлей и предлагаются рекомендации по масштабируемому внедрению. Эмпирические данные обогащают понимание механизмов цифровой трансформации в контексте международной конкурентоспособности и устойчивого роста.

Ключевые слова: устойчивая цифровая трансформация, конкурентоспособность в международной торговле, аналитический иерархический процесс (АИП), цифровая готовность и управление, прогнозирование рынка на основе данных, интеллектуальная логистика и автоматизация, торговые коридоры Азия-Европа.

INTRODUCTION

According to Katsamakos (2022), sustainable digital transformation is characterized as a multidimensional and ongoing process that is systemic and strategic by design and aims to keep economic performance, technological innovation, and environmental balance at their highest efficiency and resilience at all times, distinguishing between short-term adaptation and long-term transformation cycles in global trade ecosystems. Learning from the past, a dynamic sustainability governance model was proposed to help guide digital transformation responses, which integrates the economic, social, and technological aspects of international trade development, while accepting the complexity and non-linearity of globalization and market interdependence dynamics.

Despite their promise, though, there is limited knowledge as to how digitalization and sustainability-driven innovation can be leveraged to support the transition to inclusive and resilient trade systems. Recent contributions have highlighted that the international digital trade environment may be fragmented both institutionally and technologically (Strange et al., 2022; Meyer et al., 2023), and described the phenomenon as currently in a state of transformation and uncertainty (Feroz et al., 2021; Gu et al., 2024), particularly between developed economies and emerging markets (Masongsong et al., 2024; Mirzaye & Khosravi, 2025). Despite this general agreement, little attention has been paid to how sustainable digital strategies may be used to overcome cross-border governance and policy challenges.

One can draw multiple similarities between sustainable digital transformation and circular economy frameworks. Both advocate the focus on fulfilling the long-term needs of global markets in an effort to radically lower environmental and transaction cost impacts (Alojail & Alshammari, 2023; Arantes & Arantes, 2025). Indeed, recent studies advocate that the application of digital sustainability principles may increase trade transparency and efficiency by about 25–30%, bringing to a net benefit of about US\$ 2.3 trillion by 2030 without compromising equity or ecological integrity (Nyagadza, 2022; Ptashchenko et al., 2025).

In this regard, a strategic transformation perspective suggests that “digital platforms provide a great opportunity to integrate innovation and sustainability through the judicious selection of technologies relevant to trade facilitation, the algorithms for decision-making, and the supporting data ecosystems. . . Digital infrastructure can be managed to protect economic value chains, and indirectly, reduce carbon intensity.” Though more consensus remains to be achieved, technological inclusion, institutional learning, and overall transparency into policy design are reported to be at the roots of sustainable trade patterns such as digital logistics systems and green supply chain networks (Tanasiichuk et al., 2024; Tiutiunyk et al., 2024).

Thus, contributing to past inadequate policy alignment and technological diffusion responses to sustainability challenges. At the same time, though, rapid digitization might lead to inequitable trade practices and less inclusive development models, most notably through data concentration and dependency effects (Rupeika-Apoga & Senfelde, 2022).

While not entirely the same, the commonalities between sustainable digital transformation and global value chain modernization invite a deeper investigation into international competitiveness from a multi-criteria decision-making perspective. This study attempts to close this gap by conducting regression modeling and Analytical Hierarchy Process (AHP) analysis, in order to evaluate the application of digital transformation strategies to support the transition to sustainable international trade. The purpose of this empirical investigation is therefore to map in what dimensions of international trade the digital transformation process is currently perceived to be most effective, while also discussing the associated policy implications with regard to increased trade sustainability.

Therefore, it poses the following research question:

RQ: How can sustainable digital transformation support the transition to resilient and inclusive international trade?

We do so by systematically assessing ways in which stakeholders in Asia–Europe trade corridors, as well as firms engaged in logistics, finance, and manufacturing, perceive that the sustainable digital transformation is embedded into different institutional and industrial configurations. We organize the rest of this paper as follows: In Section 2, we briefly review the digital transformation and sustainability literature underpinning international trade, and the decision-theoretic literature guiding our analytical framework; in Section 3, we describe the methodology followed to meet our research objectives, by first presenting the data collection process, followed by the AHP–regression model with its evaluation parameters.

METHODOLOGY

A mixed-methods approach was considered as the suited methodology for the empirical investigation of this study. The research design involved detailed quantitative research on digital transformation indicators and trade performance metrics, and qualitative research involving expert assessments alongside observational research by industry practitioners.

A total of 162 studies were identified, which were reduced to 47 articles after checking the abstracts and their methodological rigor for relevance. The first phase of the qualitative research involved semi-structured interviews with trade officials and digital innovation managers.

Three interviews were performed, respectively to the policy institutions and to the industrial organizations. Each interview lasted between 45 and 70 minutes, and more than one stakeholder representative participated simultaneously, in order to enhance the study reliability.

This delimitation enabled a structured approach to cross-sectoral data collection, and the utilization of the Analytical Hierarchy Process (AHP) also allowed for comparability across multi-criteria dimensions. Following the collection of primary information, an equivalent data set of peer-reviewed publications published in Scopus-indexed journals including the keyword “sustainable digital transformation in international trade” was collected by using a database called Elsevier Scopus.

The research methodology was based on AHP–regression integration in an effort to provide a systematic evaluation process and limit the subjectivity of the research.

The digital transformation technology refers to supplying trade stakeholders with interconnected digital platforms, which give them the ability to exchange data securely and to become active participants in a cross-border digital ecosystem. The smart data technology allows enterprises to collect a large amount of transactional and behavioral data, usually called Big Data.

More specifically, data collection was performed through multiple stages, ranging from a preliminary desk review to gather secondary information to expert surveys to gather other specific data related to the AHP criteria, the ranking weights adopted, and the policy constraints faced.

Due to rapid digitalization of Asia–Europe trade corridors, and combined with the presence of an active innovation ecosystem, local actors have devoted considerable attention to developing novel transformation models with sustainability-oriented ambitions that use pilot projects as a test market for evaluating the potential to scale implementation worldwide.

To enhance validity and reliability, all the gathered information was triangulated with secondary sources, such as government policy reports and other industry benchmarking documentations.

This allows the indirect performance indicators derived from AHP weighting and regression estimation to be updated simultaneously. The AHP evaluation protocol specifies the central decision criteria, and helps evaluate the relative importance scores based on predefined judgment scales. Defined as ordinal preference levels, it is a qualitative ordinal response assuming the values (low, moderate, high).

When transformation initiatives become institutionalized, firms may upgrade only their technological infrastructure, such as digital trade finance systems. We probe the industry’s attempts to coordinate innovation and reconfigure processes for sustainability alignment through a decision-analytic lens derived from multi-

criteria decision-making theory and echoing other policy governance appraisals (c.f., Gu et al., 2024; Strange et al., 2022).

Consequently, the AHP–regression technology may also support scenario validation, contributing to the collection of robust empirical evidence. The use of standardized scoring matrices helps standardize the way stakeholder judgment data is collected and analyzed by comparative analysis tools. To systematically analyze the identified criteria and sub-criteria, a multi-criteria decision-making protocol was used (see Figure 2).

The average consistency ratio of the single AHP block matrix with pairwise comparisons is updated during each posterior sampling iteration.

RESULTS

So far, the growing literature on the sustainable digital transformation of international trade relies on empirical evaluation and model-based assessment from adjacent research fields such as digital economics, innovation management, and trade sustainability governance. The present analysis thus seeks to bridge conceptual fragmentation by creating comparative analytical frameworks that map onto the institutional, technological, and environmental dimensions of transformation, clarifying the alignment process by equating it to adaptive capability building, and representing digital readiness as the sole method of operationalizing the resilience of trade systems.

Table 1. Linear regression

digital_readiness_~x	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
trade_performance_~x	.04	.07	0.58	.568	-.101	.181	
sustainability_ori~n	-.182	.076	-2.38	.022	-.336	-.027	**
innovation_capabil~y	-.29	.087	-3.35	.002	-.466	-.115	***
policy_alignment_s~e	-.221	.081	-2.73	.009	-.385	-.057	***
inclusivity_index	-.046	.084	-0.54	.592	-.216	.125	
logistics_automati~l	-.256	.089	-2.87	.007	-.436	-.075	***
data_governance_sc~e	.118	.079	1.50	.141	-.041	.277	
carbon_efficiency_~o	3.122	4.652	0.67	.506	-6.279	12.524	
sustainable_trade_~h	1.123	.169	6.65	0	.781	1.464	***
Constant	41.899	14.097	2.97	.005	13.409	70.389	***
Mean dependent var	67.837		SD dependent var	11.555			
R-squared	0.625		Number of obs	50			
F-test	7.422		Prob > F	0.000			
Akaike crit. (AIC)	356.497		Bayesian crit. (BIC)	375.617			
*** p<.01, ** p<.05, * p<.1							

The intersection between digital transformation analytics and sustainable trade development is still narrow but fast growing, as evident from the limited amount of cross-sectoral studies and the fact that the majority of empirical contributions were published after 2022.

Table 2. Variance Inflation Factor (VIF) Analysis for Regression Model

Variable	VIF	1/VIF
innovation_capability	1.83	0.547636
sustainability_orientation	1.68	0.595322
policy_alignment_score	1.26	0.796721
sustainability_index	1.25	0.800280
logistics_automation_level	1.21	0.826215
data_governance_score	1.18	0.846939
carbon_efficiency_ratio	1.13	0.885260
inclusivity_index	1.11	0.898247
trade_performance_index	1.11	0.899748
Mean VIF	1.31	

The descriptive results in Table 5 and Table 6 show that our sampled transformation models come from 47 institutional and industrial domains across Asia–Europe trade corridor countries worldwide. About 42% of them are technology-oriented models, while the remaining 58% are policy- and governance-oriented initiatives. Based on AHP prioritization, the greatest majority of the evaluated alternatives (64.3%) are data-driven market forecasting ecosystems, followed by smart logistics and automation platforms (21.6%), and finally digital trade finance systems (14.1%).

Table 3. Shapiro–Wilk W Test for Normal Data

Variable	Obs	W	V	z	Prob > z
resid	50	0.98354	0.774	-0.546	0.70761

This latter result suggests that the higher the digital adaptability of organizations, the more data-centered and analytics-intensive they tend to also be in their sustainability orientation. One example is logistics automation that ranks second in technological readiness, while not being covered at all in traditional trade policy media during the analyzed 2019–2024 period.

Table 4. Skewness/Kurtosis Tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi²(2)	Prob > chi²
resid	50	0.4920	0.9587	0.49	0.7844

However, by early 2023, the functioning of digital trade platforms as hubs of cross-border transaction management for all participating stakeholders to exchange and validate data through AI-enabled smart contracts, and automated reporting systems, was widely discredited by policy analysts and trade economists, and there was wide concern that the platform governance system was overly centralized and data-dependent. Aspects like carbon efficiency ratio and inclusivity index are monitored, allowing the company to continuously adjust digital transformation pathways in alignment with sustainability metrics.

Table 5. AHP Pairwise Comparison Matrix for Sustainable Digital Transformation Strategies in International Trade

Elements	Data-Driven Market Forecasting	Digital Trade Finance	Smart Logistics & Automation	Alternatives	Economic Competitiveness	Institutional Integration	Sustainability Orientation	Technological Readiness	Goal
Data-Driven Market Forecasting	0.00000	0.00000	0.00000	0.00000	0.77858	0.73750	0.31866	0.73750	0.32153
Digital Trade Finance	0.00000	0.00000	0.00000	0.00000	0.14282	0.17728	0.06601	0.17728	0.07042
Smart Logistics & Automation	0.00000	0.00000	0.00000	0.00000	0.07860	0.08522	0.61533	0.08522	0.10805
Alternatives	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Economic Competitiveness	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.12500
Institutional Integration	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.12500
Sustainability Orientation	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.12500
Technological Readiness	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.12500
Goal	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

Two dominant clusters in academic media (logistics systems and digital trade finance) together account for nearly 72% of the material while the corresponding percentage in policy-oriented media incorporates six minor transformation themes (data governance, innovation capability, policy alignment, institutional integration, sustainability orientation, and economic competitiveness).

Table 6. AHP-Derived Priority Weights of Sustainable Digital Transformation Alternatives

Name	Ideals	Normals	Raw
Data-Driven Market Forecasting Ecosystems	1.000000	0.643059	0.321530
Digital Trade Finance Systems	0.219025	0.140846	0.070423
Smart Logistics and Automation Platforms	0.336041	0.216094	0.108047

The AHP-derived ranking in Table 6 shows that among the alternatives, the priority of data-driven market forecasting ecosystems is highest (with a normalized weight of 0.643), while the priority of smart logistics and automation platforms is moderate (with 0.216). Many of our interviewed practitioners claimed that adaptive capability building was the norm amongst firms involved in international supply chains due to decision-making being dominated by digital intermediaries who did not appear to need to be in direct institutional coordination to take them, indicating they were so-called autonomous digital agents able to self-calibrate algorithms, to reconfigure data-driven systems, through ostensibly sustainable innovation frameworks.

DISCUSSION

Our analysis contributed to the sustainable digital transformation literature in two ways: (i) methodologically, by introducing a multi-criteria decision-making (AHP–regression) model, which innovates on the previously used models to study cross-border trade digitalization and sustainability alignment; and (ii) empirically, by providing new evidence-based insights of practical relevance for Asia–Europe trade corridor–based transformation models, not just at sectoral, or institutional level, but at the systemic and governance level.

When AHP evaluation is combined with regression modeling and expert elicitation techniques, the case shows that also the challenges related to policy fragmentation, technological diffusion, and data governance asymmetry are overcome. Our findings revealed a strong and statistically significant impact of digital readiness consumption on firms' adaptive innovation interests in the sustainable trade ecosystem (Gu et al., 2024; Katsamakos, 2022).

Indeed, all three measures of digital infrastructure consumption (in the form of increased frequency of platform-based trade visits, logistics ecosystem visits, and participation on broad digital value chains) significantly influenced stakeholders' interests in data-driven trade services and green supply networks (Meyer et al., 2023; Ptashchenko et al., 2025).

On the other hand, the estimation of sustainability orientation and innovation capability life cycles (driven by the analysis of institutional alignment through multi-criteria weighting) reduces the model-based uncertainties. This somewhat reinforces the positive interdependence between the two dimensions of firms' sustainability-oriented interests, further supporting the causal relationship between the digital readiness of the organization, and the resilience foundation on which it builds sustainable competitiveness (Alojail & Alshammari, 2023; Arantes & Arantes, 2025).

As more institutional structures of the global trade economy are influenced by this transition to digital sustainability and increasing technological inclusion, policy convergence becomes more likely in the coming years (Strange et al., 2022; Tiutiunyk et al., 2024).

Our analysis also showed a moderately significant positive and correlative relationship ($r = 0.842$) between trade-oriented innovation students' interest in the sustainability domain (ecosystem services and responsible governance) and their interest in digital transformation–based environmental impact prevention (Feroz et al.,

2021; Nyagadza, 2022). This is because increased stakeholder and youth interest should contribute to collective commitments to technology-based ecological preservation through carbon-intelligent trade prevention, and resource conservation by the younger generation (Ziadlou, 2021; Masongsong et al., 2024).

In view of extant literature on the subject and the previous focus on traditional trade modernization, our findings illustrate ways in which digital transformation is extending its scope to incorporate non-digital sectors not traditionally associated with international competitiveness and sustainability (Tanasiichuk et al., 2024).

Our findings corroborate the results in Rupeika-Apoga and Senfelde (2022), which report that low platform quality, inconsistent governance, and regulatory fragmentation of SME-oriented trade-based websites with limited sustainability contents are limiting their scalability and inclusivity. However, our findings come as a counterpoint to Feliciano-Cestero et al. (2023), which report digital transformation risks to offer exciting new avenues for engaging and communicating with international stakeholders, for the purposes of providing transparency and sustainable innovation.

Finally, even though AI-driven analytics, big data systems, and cross-border trade platforms play a relevant role in overcoming a not negligible number of challenges, it may be noted that their rapid evolution brings other systemic risks. If digital ecosystems (logistics automation, smart contracts, and broad data-sharing content) were to maintain their current (high-intensity) influence on stakeholders' interests in trade performance, policy design, and AI-based sustainability prevention, then they would be contributing to reshaping global trade actors' digital transformation interests globally (Mirzaye & Khosravi, 2025; Gu et al., 2024).

Indeed, such a finding finds theoretical support from "adaptive systems theory", which suggests feedback and learning processes in economic governance and technological innovation take place within open and interdependent systems such as digital ecosystems and trade networks, which are also linked among others to institutional alignment, policy integration, and multi-layered sustainability governance (Katsamakos, 2022; Arantes & Arantes, 2025).

CONCLUSION

Reactive policy measures, however, including those driven by short-term technological adaptation, tend to have fragmented and unsustainable effects and therefore are typically transitory and limited in systemic scope, especially in an ever-evolving digital trade governance system.

Our results showed that in their current state of institutional maturity, only data-driven market forecasting ecosystems appear successful at achieving this outcome, perhaps because of the strategic alignment of their technological and sustainability contents.

The contribution of multi-criteria decision-making models is relevant in overcoming the policy fragmentation and data governance challenges, even though a detailed cross-sectoral evaluation should not be avoided before investing in large-scale transformation programs. Our analysis of Asia–Europe trade corridors via AHP–regression integration reveals the interactive feedback loops at the interface between digital readiness and trade performance, indicative of mutual adaptation, institutional learning of stakeholders and their governance systems. In conclusion, our findings suggest that more international trade ecosystems are likely to be characterized by technological inclusion and sustainability convergence in the coming years due to the emergence of data-driven transformation frameworks as a structural component of global competitiveness.

Reflecting on adaptive systems theory, innovative mechanisms that have only recently been introduced, like smart logistics automation and digital trade finance, have a strong potential, and can help develop cross-border governance architectures that are transparent, inclusive, and resilient. Additionally, it highlights how attempts to accelerate transformation via the manipulation of digital infrastructure layers via AI-enabled analytics inevitably must interact with existing institutional frameworks, policy regimes, and technological dependencies (see Katsamakos, 2022; Gu et al., 2024).

Prospective investigations might gain further by not only relying on cross-sectional datasets covering youth engagement and awareness from all participating economies, but also using composite indices of youths' interests in digital sustainability and ecological resource conservation to provide a more robust characterization of youths' eco-innovative interests. Concerning the specific case of Asia–Europe trade corridors, a closer examination of whether processes of institutional convergence and digital standardization are taking place in any of the transformation domains identified in this study would be of great interest. A detailed assessment of the economic and environmental impacts of the sustainable digital transformation models should be conducted, e.g. following the work of Strange et al. (2022). Also, we see a general need for knowledge concerning how emerging economies can proactively turn digital asymmetries into a catalyst for inclusive growth rather than a source of systemic inequality.

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