

Twin Transition Framework: Synchronizing Digital Transformation and Sustainability in the Public Sector

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The acceleration of digital transformation in the public sector is becoming increasingly inevitable, especially in response to the challenges of climate change and sustainable development. With more than 124 countries committed to achieving net-zero carbon targets, governments and public sector entities worldwide must not only focus on advancing digital technologies but also ensure that their operations are more sustainable. According to “The Twin Transition: A New Digital and Sustainability Framework for the Public Sector” report by Microsoft and EY, the public sector plays a central role in driving this transition through data-driven strategies, energy efficiency, and technological innovation to minimize ecological impact.¹

Unfortunately, digital transformation and sustainability initiatives often remain fragmented. While technological advancements have contributed to addressing environmental challenges, many stakeholders are still unaware of the full potential of integrating digital transformation to develop more comprehensive and sustainable solutions.

This integration is central to the Twin Transition concept, which represents the convergence of digital transformation and green sustainability within the public sector. The Twin Transition approach highlights that digital transformation not only enhances operational efficiency but is also expected to support green recovery initiatives. Through technological solutions, digital transformation can serve as a catalyst for sustainability in the public sector.

The Microsoft and EY report provides an explanation of how digital transformation can accelerate progress in green sustainability through the following characteristics of the public sector.²

¹ Microsoft & EY. (2021). The twin transition: a new digital and sustainability framework for the public sector. Microsoft. Available at: https://www.ps.microsoft.com/wp-content/uploads/2021/05/MSFT_EY-digital-sustainability-paper_final.pdf.

² Ibid,

The Main Characteristics of Digital- and Sustainability-Based Public Sectors

- Smart and proactive sustainability-driven decision-making.
- Clearly defined, measurable, and visionary goals.
- High transparency in the procurement of goods and services.
- Strong public participation in policy formulation.
- Open data collaboration between public institutions, academic partners, and the private sector to foster innovative solutions.
- Optimal energy efficiency and waste management through technological advancements.
- A comprehensive understanding of climate impacts across sectors.

If these characteristics are effectively implemented, governments and other public sector institutions will have a stronger foundation to optimize digital transformation in a sustainable manner.

Pionir Pemulihan Lingkungan dan Digital

In the post COVID-19 era, governments worldwide have strengthened their commitment to environmental sustainability with more measurable goals. Digital transformation that supports sustainability is now being adopted across various nations through multiple initiatives.

One of the key initiatives in green and digital recovery is NextGenerationEU (NGEU), a €750 billion recovery plan led by the European Commission. The program mandates that at least 37% of the total funding be allocated to supporting the transition toward a green economy, while 20% is dedicated to developing digital initiatives.³ This approach aims to accelerate the shift toward a zero-carbon and zero-waste economy, aligning with the Twin Transition vision outlined in the European Green Deal.

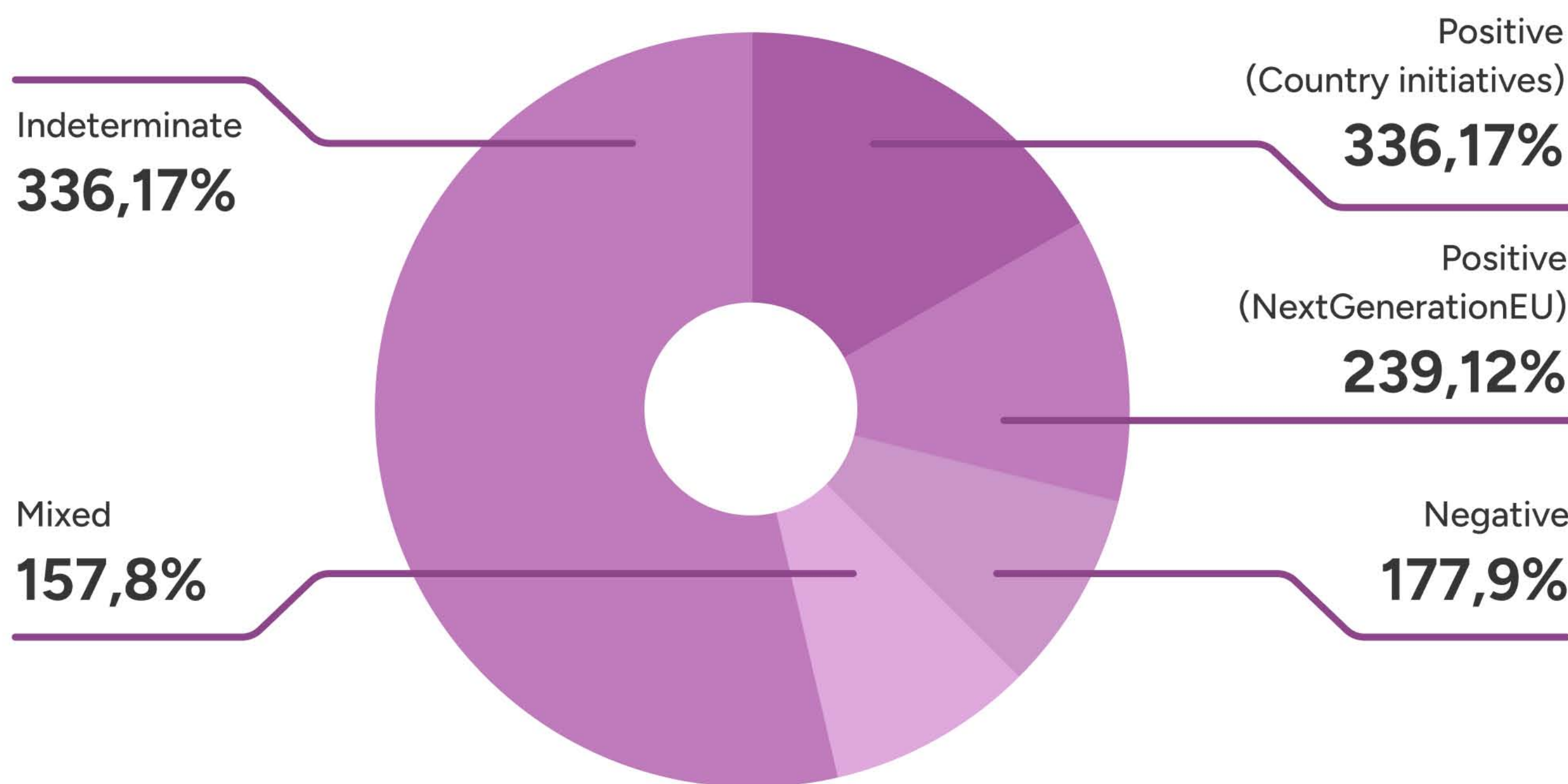
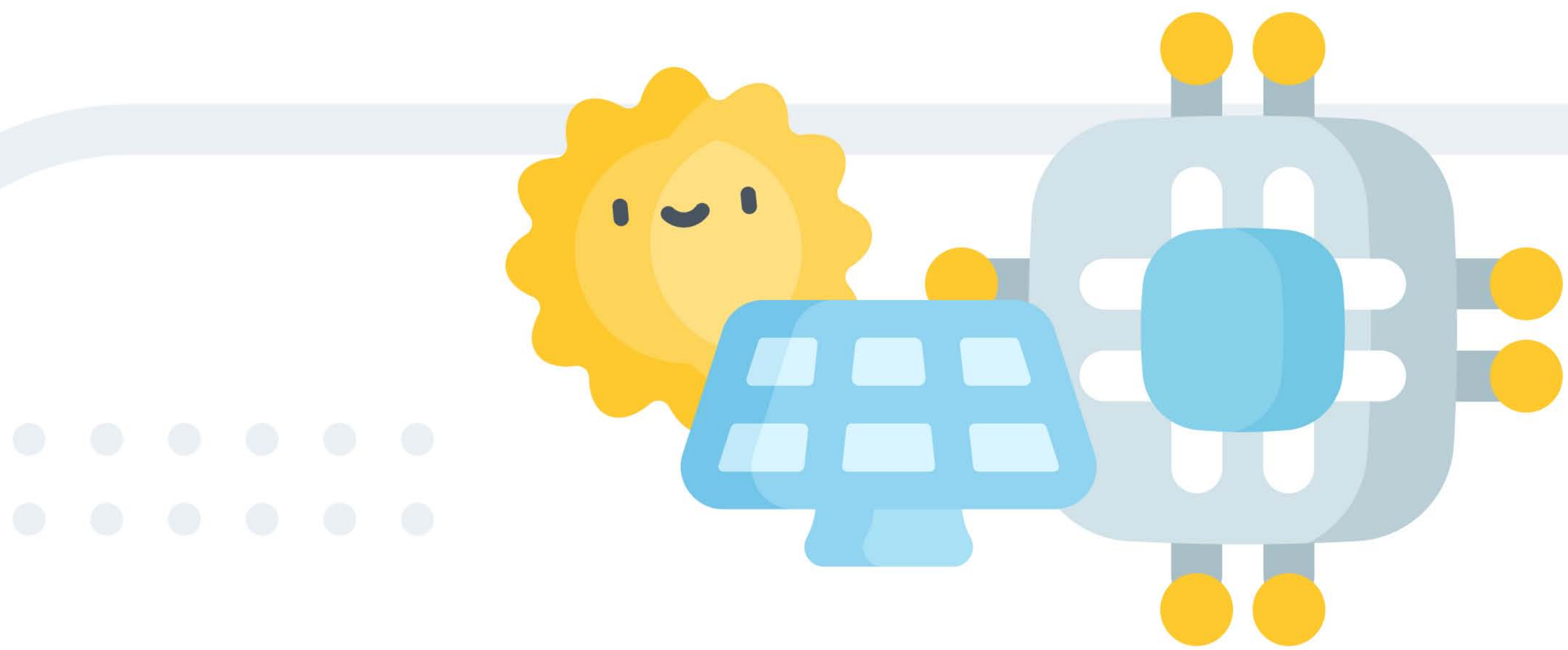


Figure 1. Proportion of Recovery Funding Based on Environmental Impact (Adapted from the Microsoft and EY Report)

³ OECD. (2021). OECD Green Recovery Database.



According to the Environmental Recovery Database maintained by the Organization for Economic Co-operation and Development (OECD), as of February 2021, approximately 29% of nearly US\$2 trillion (aggregated global data) in long-term recovery spending had been allocated to sustainable initiatives.⁴ At the time the data was collected, total expenditures estimated to have a positive environmental impact were nearly equal to those with potentially negative or mixed effects on the environment. However, with the introduction of NGEU into the discussion, this funding balance is likely to shift toward greener spending allocations.

In addition to NGEU, several pioneering recovery programs incorporate environmental initiatives aligned with the Twin Transition vision:

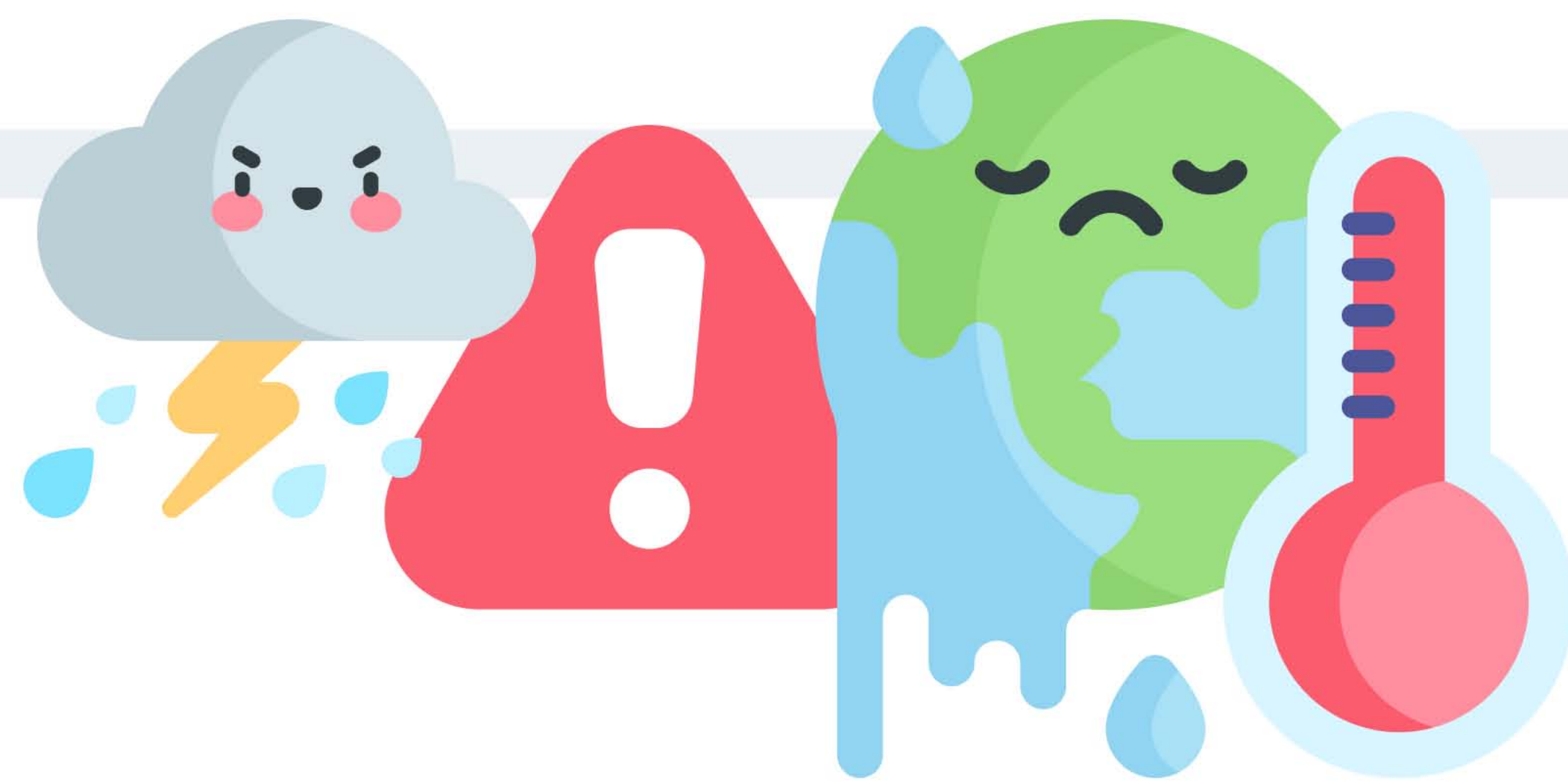
Recovery Programs and Green Initiatives in America, Europe, and the Asia-Pacific

America	Europe	Asia-Pacific
Canada - A Healthy Environment and a Healthy Economy	EU - The EU Green Deal and NextGenerationEU	Japan - Solar & Battery Development dan Afforestation Policies
Brazil - National Energy Plan 2030	France - Ecological Plan	South Korea – New Deal (prioritizes green and digital infrastructure investments.)
Colombia - Compromiso por el Futuro	England - Ten Point Plan for a Green Industrial Revolution	Singapore - Digital Transformation Support
Mexico - Economic Relief and Recovery Spending	Italy - National Plan of Recovery and Resilience	Australia - Hydrogen & Renewables
		New Zealand - Wellbeing Budget

Source: Adapted from the Microsoft and EY Report.

However, digital technology holds significant potential to accelerate environmental targets, yet its implementation presents several challenges that must be addressed.

⁴ Ibid,



The 5 Key Challenges in Achieving the Twin Transition

- 1 **Rising public expectations for climate action** — The 2020 UNDP-Oxford survey revealed that 64% of respondents across 50 countries perceive climate change as an emergency requiring immediate action.⁵ This finding underscores the growing public awareness of climate urgency, along with increasing demands for effective solutions.
- 2 **Skills gap and public distrust in digitalization** — An EY study found that the public across 12 countries supports the digitalization of public services.⁶ However, skill gaps and concerns over data protection remain significant barriers when aligning digital and sustainability agendas.
- 3 **Leadership's role in driving digital and sustainability transformation** — A Microsoft and EY study on AI in the public sector highlights that successful transformation efforts are driven by strong leadership at all levels of an organization.⁷ Many public institutions still operate in fragmented structures, making it difficult to fully integrate sustainability and digital transformation initiatives.
- 4 **Limited capacity in data sharing and environmental expertise** — As of October 2019, only 23% of environmental targets under the Sustainable Development Goals (SDGs) had sufficient data to assess progress, while over 30% of climate change indicators still lacked widely agreed-upon methodologies and data sources.⁸
- 5 **Aligning green and digital ambitions with adequate investment** — If the public sector aims to take progressive steps in combating climate change while continuing to invest in high-emission industries, sustainability transition efforts risk becoming counterproductive. Consistency in funding allocation is crucial to the success of the Twin Transition.

A New Digital and Sustainability Framework

Based on consultations with public sector stakeholders, as well as sustainability and technology experts across 12 countries, the Microsoft and EY report identifies four stages of digital sustainability.⁹

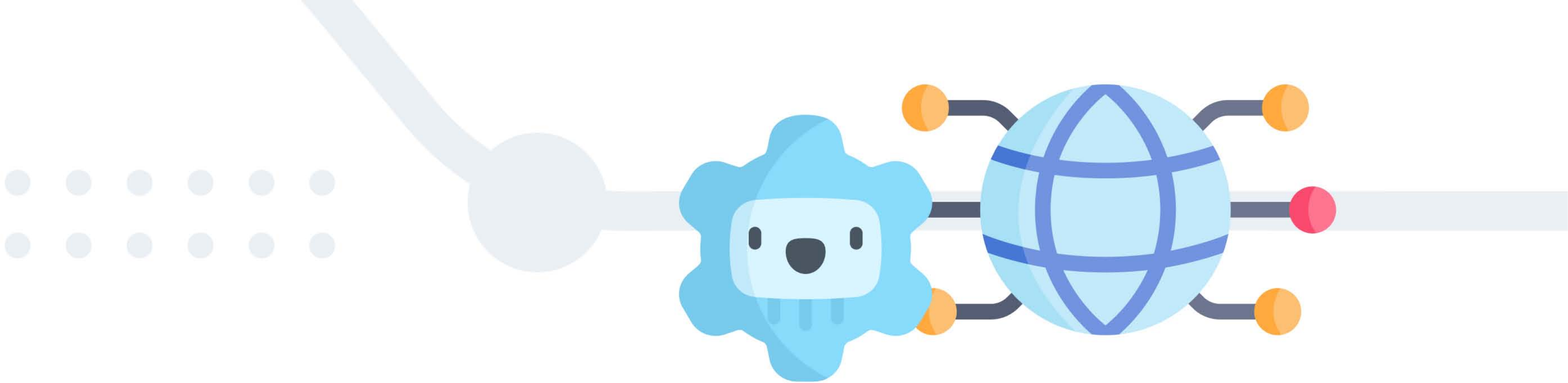
⁵ United Nations Development Programme (2021). The Peoples' Climate Vote. Available at: <https://www.undp.org/publications/peoples-climate-vote>.

⁶ Bertrand, A. (2021). 'How can digital government connect citizens without leaving the disconnected behind', EY.com. Available at: https://www.ey.com/en_id/insights/government-public-sector/how-can-digital-government-connect-citizens-without-leaving-the-disconnected-behind.

⁷ Microsoft. (2021). Artificial Intelligence in the Public Sector. Available at: https://info.microsoft.com/WE-DTGOV-CNTNT-FY21-09Sep-22-ArtificialIntelligenceinthePublicSector-SRGCM3835_01Registration-ForminBody.html.

⁸ United Nations Environment Programme (2019). Measuring Progress: Towards Achieving the Environmental Dimension of the SDGs. Available at: <https://wedocs.unep.org/handle/20.500.11822/27627>.

⁹ Microsoft & EY. (2021). The twin transition: a new digital and sustainability framework for the public sector. Microsoft. Available at: https://www.ps.microsoft.com/wp-content/uploads/2021/05/MSFT_EY-digital-sustainability-paper_final.pdf.



Sustainability Outcomes		Fragmented	Limited	Realized	Transformed
		- Global goals established but few actionable policies - Fragmented organizational approaches prevent the pooling of information - Sustainability strategies are reactive to address regulatory failures	- Climate action plans based on limited data and aimed at improving efficiencies - Limited synchronization across government agencies or jurisdictions - Environmental expertise and skills unevenly distributed - Compliance-driven policies	- Joined-up approach across departments and jurisdictions - Digital technologies seen as essential to the sustainability agenda - Harmonization of local targets with global goals around clear measures and a standardized methodology - Governments start to enact plans to reduce their own environmental footprint	- Sustainability practices become part of the public sector culture, which result in inclusive and climate-first policies and strategies - Sustainability awareness starts with transformed education curriculum - Real-time data inform planning and communication - Green procurement practices embed circular principles into government operations
Enablers	Technology and Data	Analog Government - Lack of data standards and insufficient reporting methods to measure progress - Complex, manual processes fragmented across multiple organization - Paper-based record keeping - information is sliced into data usage restrictes to premises	Transactional Government - Diagnostic and descriptive data inform environmental policies and discussions - Data not shared between and across teams - Technology use limited to answering discrete questions - Policies predicted on limited data set	Service-centered Government - Large dataset, centralized platform and geospatial analysis enable prediction and individualized assessments - Open data frameworks create stronger ecosystem - Citizen-facing employess have access to all data they need - Service can be proactively targeted to groups	Intelligent Government - Cloud-based tech and innovative digital tools can help drive sustainable decision-making - Multiple sources of data used to model impacts and formulate positions, policy, and intervention - Proactive responses to crisis situations - Citizen control their data and trust uses of AI
	Leadership and Governance	Leaders unaware of tech's benefits for sustainability. Departments working on silos, with little or no governance around sustainability	Leaders understand the benefit of a twin digital and sustainable transition, but they have limited capacity to implement or innovate	Leaders champion the integration of digital and sustainability. Governments work across jurisdictions on an ad hoc basis	Digital and sustainability are embedded throughout senior leadership and individual government departments
	Strategy and Policies	Sustainability concepts emerge in strategic planning but little implementation is disjointed	Environmental targets are used in strategic guidelines but not yet standardized across jurisdictions	Use of performance measures to track the progress and outcomes	Policies are co-created and regularly updated to align with current and anticipated citizen expectations
	Stakeholder Cooperations	Stakeholders identified but little understanding of how they are connected and communication is one-way	Basic consultation with the stakeholders on potential sustainability initiatives	Regular communication with stakeholders on the climate activities and environmental progress	Two-way communication flows and iterative learning, stakeholders co-create sustainability policies

Figure 2. Sustainability Outcome Framework in the Digital and Environmental Transition (Adapted from the Microsoft and EY Report).

The emphasis of this framework lies in the critical integration of digital transformation and sustainability within the public sector to foster cross-government synergy. Through this mapping, the Twin Transition framework highlights that while digital technology can accelerate the achievement of sustainability goals, it must be supported by strong leadership commitment and proper resource allocation. Additionally, the active involvement of stakeholders across the public sector ecosystem is a key factor in establishing a comprehensive sustainability culture.

Then, how can a digital approach contribute to realizing the Twin Transition?

The stages within the Twin Transition framework serves as a tool for assessing the public sector's progress in integrating digitalization and sustainability. By doing so, it becomes possible to identify the areas (both in terms of resources and capabilities) that require improvement to achieve optimal synergy between digital transformation and sustainability objectives.

Furthermore, the Microsoft and EY report also identifies key resources and capabilities across four main areas related to the Twin Transition.¹⁰

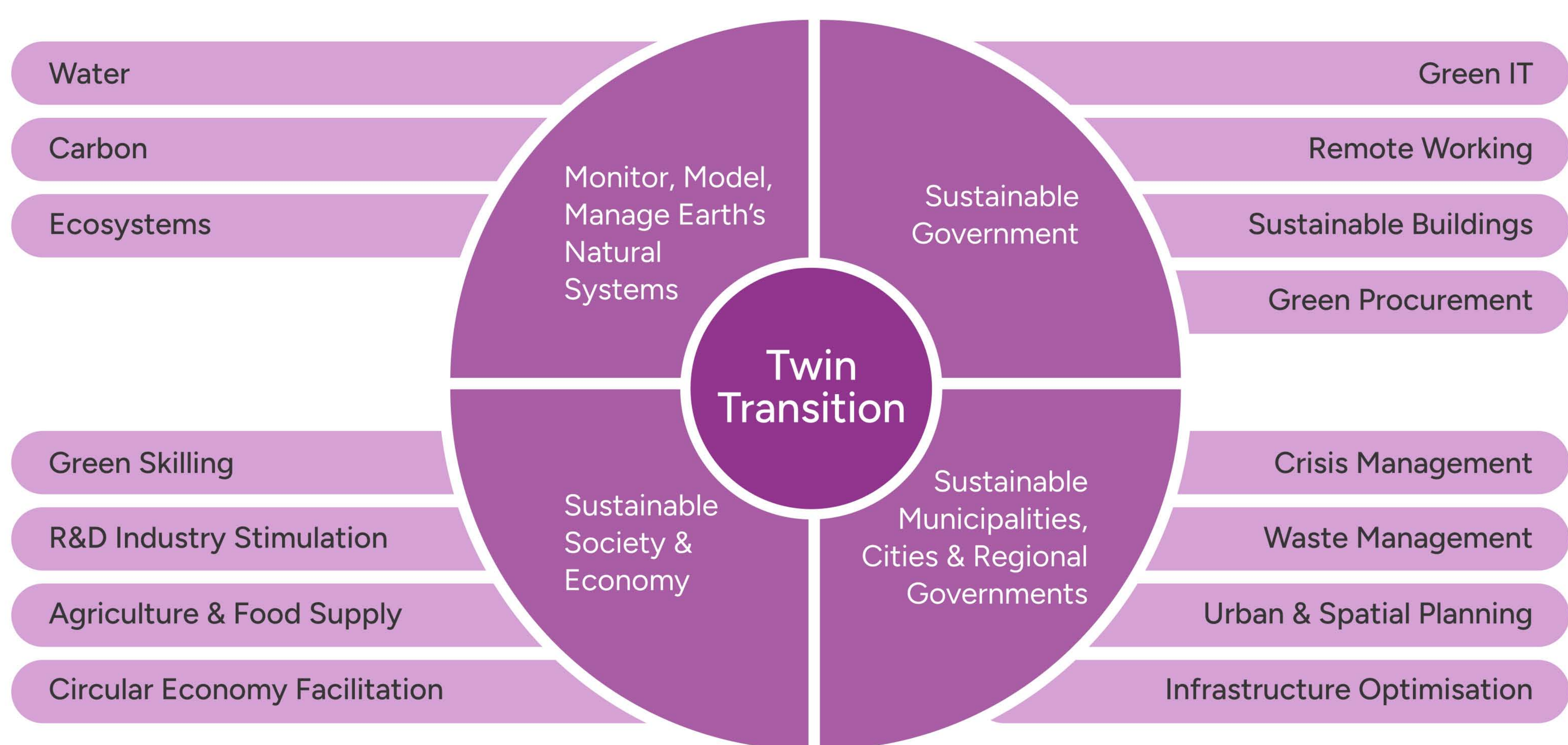


Figure 3. Identification of Key Resources and Capabilities in the Twin Transition
(Adapted from the Microsoft and EY Report).

¹⁰ Ibid,

A digital approach plays a crucial role in realizing the Twin Transition by integrating innovative technologies with sustainability principles across various strategic sectors.

-  **Monitor, Model & Manage Earth's Natural Systems** — Digital technologies such as sensors, the Internet of Things (IoT), and data analytics enable real-time environmental monitoring, supporting policy-making that is responsive to natural dynamics.
-  **Sustainable Government** — The implementation of digital solutions, including Green IT, energy efficiency in buildings, and environmentally friendly procurement policies, helps reduce the government's internal carbon footprint.
-  **Sustainable Society & Economy** — Digital transformation fosters sustainable economic growth through circular economy practices, industrial innovation, and workforce upskilling in environmental fields.
-  **Sustainable Municipalities, Cities & Regional Governments** — The utilization of digital technology optimizes infrastructure, waste management, and efficient spatial planning.

By creating synergy across these four sectors, the Twin Transition comprehensively integrates technological advancements with sustainability efforts.

Initiatives Accelerating the Twin Transition Worldwide

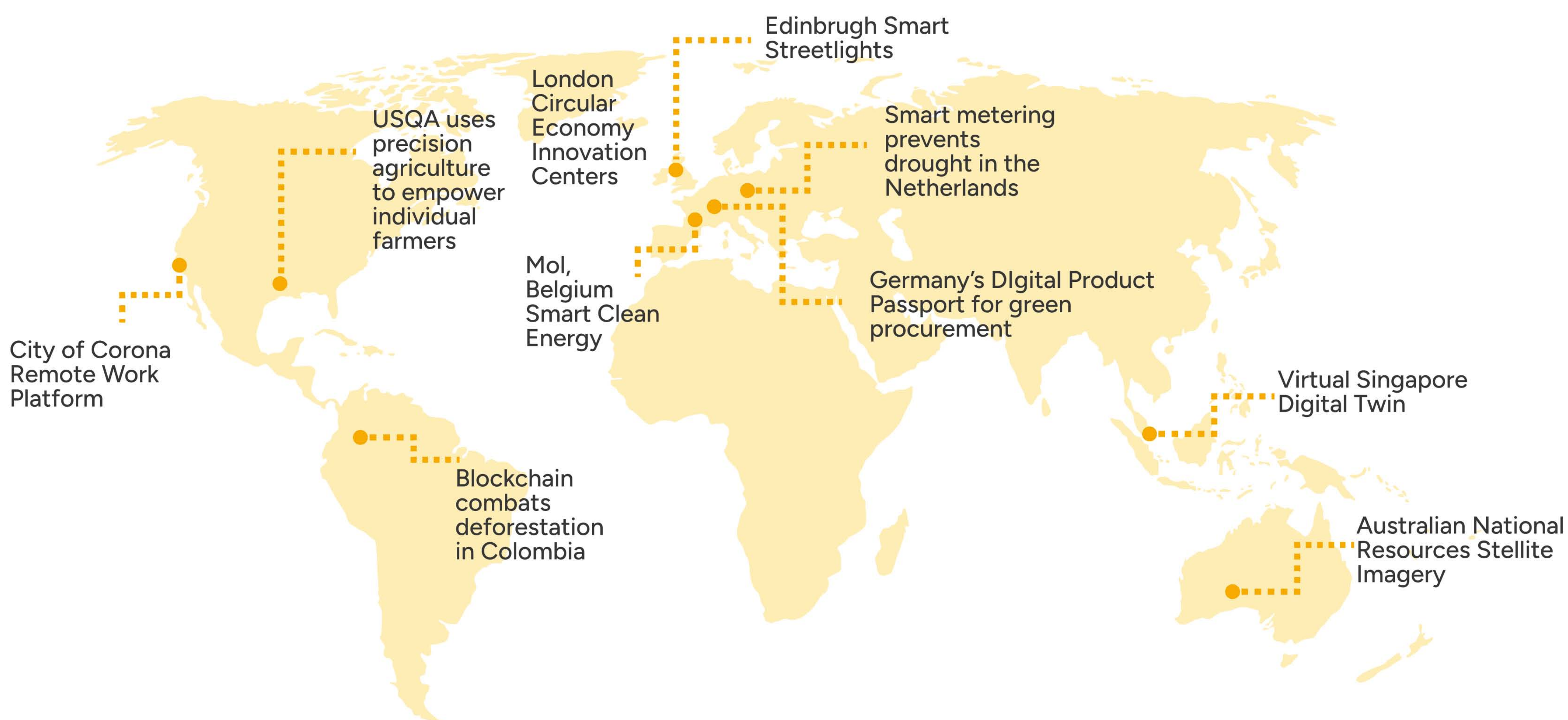


Figure 4. Identification of Key Resources and Capabilities in the Twin Transition
(Adapted from the Microsoft and EY Report).



From this mapping, it is evident that different countries adopt varying approaches based on their regional challenges and opportunities. Following the four key sectors of the Twin Transition, the initiatives can be categorized as follows:

Country Initiatives Based on Twin Transition Categories

Twin Transition Category	Initiative	Location
Monitor, Model, Manage (MMM) Earth's Natural Systems	Smart metering to prevent drought	The Netherlands
	Australian National Resources Satellite Imagery	Australia
	Blockchain to combat deforestation	Colombia
Sustainable Government	Remote Work Platform	City of Corona, USA
	Digital Product Passport for green procurement	Germany
Sustainable Society & Economy	Circular Economy Innovation Centers	London, UK
	USDA Precision Agriculture for farmers	The United States
	Smart Clean Energy	Mol, Belgium
Sustainable Municipalities, Cities & Regional Governments	Edinburgh Smart Streetlights	Scotland
	Digital Twin for urban planning	Singapore

Source: Author's elaboration, based on the Microsoft and EY report.

Aligned with various global initiatives promoting the Twin Transition, the Microsoft and EY report identifies four key factors that can enhance the integration of digitalization and sustainability.¹¹ These factors are deemed crucial for effectively addressing the global environmental crisis.

¹¹ Ibid,

Key Factors for Leveraging Digital Approaches in Public Sector Sustainability

- 1 Standardization of Digitalization and Sustainability** → Uniform standards enable more accurate, transparent, and comparable data.
- 2 Digital Partnerships and Cross-Sector Collaboration** → Many governments lack the financial resources or technological capacity to independently develop green technologies. Therefore, public sector institutions must take proactive steps to collaborate with private sector entities to drive sustainable innovation.
- 3 Linking Socioeconomic Ambitions with Climate Targets** → Public sector institutions must align environmental goals with social and economic factors to ensure an inclusive sustainability transition. Measuring the social and environmental impacts on marginalized communities is crucial to prevent policies from favoring specific groups and exacerbating inequalities.
- 4 Integrating Skills Development with Digital Solutions** → While technology can be implemented rapidly, sustainability goals will remain out of reach if the public sector workforce lacks digital skills. Therefore, investing in upskilling and reskilling employees is essential to ensure that digital transformation and sustainability progress in parallel.

Critical Review: Strengths and Weaknesses of the Report

Aspect	Strengths	Weakness
Analytical Approach	Utilizing a data-driven approach, the report effectively identifies challenges and opportunities for public sector institutions to optimize the benefits of the Twin Transition.	• The linear model (Fragmented → Limited → Realized → Transformed) may appear overly simplistic and may not fully capture the complexity of real-world transitions. • Many success indicators focus primarily on digital aspects, whereas sociopolitical factors play a crucial role in long-term program effectiveness.

Aspect	Strengths	Weakness
Data and References	The report incorporates diverse and extensive data and references, featuring initiatives from various countries and official sources, providing a global perspective and concrete examples for implementing the Twin Transition.	Some references do not sufficiently address local contexts, particularly the potential risks of implementing the Twin Transition in developing countries with limited digital infrastructure.
Implementation Strategy	The proposed implementation strategies are comprehensive and supported by real-world case studies, offering valuable insights into sustainable digital transformation.	• While organizational challenges are acknowledged in the framework, the implementation strategy lacks concrete solutions to address them. • Although real-world initiatives are provided as examples, the implementation strategy remains somewhat abstract, as it primarily emphasizes digital optimization while overlooking in-depth discussions on sociopolitical factors that are equally critical in practice.

With the numerous green initiatives currently being pursued, the Twin Transition has the potential to serve as a universal blueprint for integrating digital transformation and sustainability in the public sector. If implemented with a broader consideration of social, economic, and political factors, this framework could establish a new global sustainability standard that effectively addresses environmental challenges. Thus, digital transformation and sustainability are not opposing goals but rather mutually reinforcing forces.

