Global Gateway

DIGITAL &
GREEN
INNOVATION
ACTION

D4D HUB
EU INTERNATIONAL PARTNERSHIPS
DIGITAL FOR DEVELOPMENT HUB

Accelerating twin transitions in Kenya

by Dr. Milou Derks, Esther Mooiman, Jelle van Balen and Johnni Kjelsgaard

german cooperation DEUTSCHE ZUSAMMENARBEIT
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
AFD GROUPE
EXPERTISE FRANCE GROUPE AFD
Enabel
Republic of Estonia Ministry of Foreign Affairs
estdev From the people of Estonia
Netherlands Enterprise Agency

About

RVO - Netherlands Enterprise Agency

The Netherlands Enterprise Agency (RVO) is a government agency, working closely with the Ministry of Foreign Affairs on international development cooperation. RVO implements a wide range of programmes focused on entrepreneurship and private sector development (PSD) in partner countries, supporting ecosystem strengthening, access to finance, innovation and sustainable business growth. Digitalisation and sustainability are actively integrated by RVO across its entrepreneurship and PSD portfolio.

GrowthAfrica

GrowthAfrica is an African-founded entrepreneurship acceleration and advisory organisation headquartered in Nairobi, with operations across multiple African countries. It supports high-potential entrepreneurs through business acceleration, strategic advisory services and access to investment, contributing to sustainable job creation and economic growth. With a strong local presence and contextualised programme design, GrowthAfrica works closely with entrepreneurs, ecosystem actors and investors to help businesses scale and create lasting impact across the continent.

Digital for Development (D4D) Hub

The Digital for Development (D4D) Hub is a Team Europe platform that strengthens digital cooperation between the European Union, its Member States and partner countries. It promotes human-centric digital transformation, aligned with the Global Gateway strategy by fostering coordination, policy dialogue, multi-stakeholder collaboration and investment in digital ecosystems across Africa and other regions.

DGI Action – Digital and Green Innovation

The Joint Initiative on Digital and Green Innovation (DGI Action) is a Team Europe initiative implemented under the D4D framework by Germany (GIZ), France (Expertise France/AFD), Belgium (Enabel) and Estonia (EstDev). It focuses on strengthening digital, green and circular entrepreneurship through acceleration support, ecosystem development, policy dialogue and finance brokerage across partner regions. The Netherlands contributes to this action through dedicated research into how digital and green transitions unfold in African contexts and how European and African stakeholders can more effectively support systemic transformation.

Acknowledgements

Coalition of the willing

We would like to extend our sincere appreciation to a small group of organisations who thoroughly reviewed the report and provided detailed feedback. Their reflections, technical input and critical questions significantly strengthened the analysis and clarity of this publication.

Name	Organisation
Grace Wachori	Aspen Network of Development Entrepreneurs (ANDE)
Loes van der Velde	Embassy of the Kingdom of the Netherlands in Kenya
Sydney Thiam	The Catalyst Fund

Collaborators

We engaged a wide range of ecosystem actors for in-depth interviews. These organisations represent entrepreneurship support organisations (ESOs), investors, government institutions, research bodies, think tanks and development partners active in Kenya's digital and green innovation landscape (see below). Their insights were instrumental in understanding ecosystem dynamics, financing structures, policy constraints and coordination challenges.

Organisation	Type
African Centre for Research Consortium (ACRC)	Research Consortium
African Centre for Technology Studies (ACTS)	Research Institution
Anza Village	ESO
Aspen Network of Development Entrepreneurs (ANDE)	Global Network of Organisations that support SGBs (intermediaries inclusive of ESOs)
The Agriculture Transformation Office (ATO)	Government Institution
Bopinc	ESO
Catalyst Fund	VC and Venture Builder
CoELIB	ESO
Delta40	Venture Capital
DOB Equity	Impact Investor
Dutch Good Growth Fund (DGGF)	Venture Capital
GIZ	Development Agency
green Digital Innovation Hub (gDIH)	ESO

Organisation	Type
ICFI	Research Institution
iBizAfrica (Strathmore University)	ESO / Academic Institution
Kenya Climate Innovation Center (KCIC)	ESO
KICTANet	Policy Think Tank
Kenya Industrial Research and Development Institute (KIRDI)	Research Institution
National Environment Management Authority (NEMA)	Government Institution
Nakuru Box	ESO
Pyramidia Ventures	Venture Capital
SOMO Africa	ESO
SNV	NGO
Tony Elumelu Foundation	Philanthropic Foundation / ESO
Triple Jump	Venture Capital

Interviewees

We are deeply grateful to the entrepreneurs and businesses who openly shared their journeys, challenges and ambitions in building digital and green solutions in Kenya (see below). Their perspectives ground this report in lived experience and highlight the realities of scaling innovation within complex market and policy environments.

Business name	Sector
AcreInsights	Precision agriculture
Afrisol Energy	Renewable energy
BasiGo	Electric buses
Baus Taka Enterprise	Waste recycling
BioLite	Clean cooking & off-grid energy
Deed Technologies	Electronic appliance refurbishing and recycling
Eco-Print Generation	Plastic waste recycling
Green Pavers	Recycled construction materials
Grekkon	Greenhouse & precision agriculture
Griincom	Organic fertiliser solutions
Jacawa Energy Solutions	Solar energy
Kiri EV	Electric mobility
KOKO	Clean cooking fuel
MarsAgrofarm	Digital agri-platform
M-Taka	Digital waste management
Nasuru Naturals	Precision agriculture
Pixel Engineering	Precision agriculture technology
Savannah Seritech	Silk production
Shamba Pride	Agri-input digital platform
The Source Plus	Honey tracing and tracking
Ujuzi Kilimo	Digital agriculture platform
Warmtech Africa	Clean cooking

Executive summary

Introduction

This white paper examines how digital and green transitions are unfolding in Kenya. As the second in a three-part series (following Senegal and preceding Mozambique), it moves beyond aspirational and success stories to investigate a more complex question: why has Kenya, despite its reputation as Africa's 'Silicon Savannah' and its strong renewable energy profile, not yet achieved sector-wide digital and green transitions? Kenya combines high digital penetration with ambitious green policy. Over 85% of grid electricity is generated from renewable sources. Mobile money penetration is amongst the highest globally. Nairobi hosts more than 200 entrepreneurship support organisations (ESOs) and hundreds of start-ups operate in agriculture, energy, mobility and waste, using digital tools to advance sustainability. On paper, the ingredients for twin transitions are present. Yet despite considerable effort, real systemic transformation has yet to materalise. Diesel pumps still dominate irrigation. Waste dumping persists despite digital recycling platforms. Electric buses are visible but marginal within a fossil-fuel-based transport regime. Digital agriculture tools exist, yet adoption amongst farmers remains limited. Kenya therefore presents a paradox: abundant niche innovations and a great spirit amongst stakeholders, but limited regime change. Guided by the Multi-Level Perspective (MLP) from transition theory, this study explores how niche innovations interact with dominant regimes and broader landscape pressures. Based on 67 qualitative data points, including 22 business interviews and 25 ecosystem actor interviews, we investigate three sectors where digital and green interactions are most visible: agriculture, waste management and small-scale renewable energy (including e-mobility).

The central research question is: **Given Kenya's extensive entrepreneurial support ecosystem, why have digital and green innovations struggled to shift dominant unsustainable practices and trigger broader systemic change?**

From promise to practice: digital and green innovations in transition

Across the three sectors, we identified roughly 380 active digital and green businesses. Many innovations have moved beyond pure experimentation. They are used by multiple customers and supported by ecosystem actors. However, they remain in what transition theory calls the 'take-off' phase: visible and promising, but not yet mainstream. Eight in-transition innovation cases were studied in depth, including electric mobility (motorcycles, buses, battery swapping), digital agriculture platforms and precision agriculture, solar home systems and solar-powered irrigation, clean cooking solutions, smart waste collection and processing, and e-waste recycling and refurbishment. Across these cases, innovators consistently highlighted four structural bottlenecks that prevent scaling beyond niche adoption:

1. **Price competition with unsustainable alternatives:** Digital and green innovations often have higher upfront costs than conventional alternatives. Diesel pumps, charcoal stoves and fossil-fuel vehicles benefit from established infrastructure, informal supply chains, and, in some cases, subsidies or tax advantages. Even where long-term operating costs favour green solutions, short-term affordability often dominates purchasing decisions.
2. **Customer awareness and cultural resistance:** Even when digital and green innovations are affordable, low awareness, limited digital literacy, ingrained habits and lack of trust hold back adoption. Farmers prioritise seeds over soil testing. Households return to charcoal if ethanol is more expensive. In low-income contexts, affordability and convenience outweigh environmental considerations. Awareness-building is costly and innovators lack the resources to systematically shift consumer behaviour.
3. **Unfavourable and inconsistent policy environments:** While Kenya has ambitious digital and green strategies, implementation gaps persist. In practice, regulation often protects incumbents or creates uneven playing fields. Electric vehicles face import duties on components while fossil fuel vehicles benefit from exemptions. Organic fertiliser producers struggle to access subsidies available to conventional farm inputs. Waste regulations exist but remain weakly enforced. Innovation-specific regulatory reform is largely absent.
4. **Capital misalignment:** Kenya has active grant programmes and venture capital, but financing structures poorly match innovator needs. Entrepreneurs face a 'missing middle' between small grants and large equity tickets. Hardware-heavy and R&D-intensive businesses struggle to attract patient capital. Banks remain risk-averse despite guarantee mechanisms. Funding frequently supports early experimentation rather than scaling.

These four bottlenecks are interconnected. Policy distortions reinforce price disadvantages, which limit adoption. Limited adoption undermines revenues, and increases the dependence on external capital that is misaligned. Individual entrepreneurs cannot resolve these systemic constraints alone. As one innovator summarised: "We can build the product, but the system is not ready to absorb it".

Entrepreneurship support: strong at the niche, weak at the regime

Kenya's entrepreneurial ecosystem is large and active. ESOs, development partners, investors, and government actors provide grants, incubation, mentoring and visibility. This has successfully stimulated experimentation and early-stage activity. However, the ecosystem is primarily structured around niche-level support. It helps innovations emerge, but does not sufficiently support scaling, market formation, or regime disruption. Six ecosystem dynamics could be strengthened to accelerate transitions:

- **One-size-fits-all andquantity-driven support:** Standardised entrepreneurship support programmes dominate (e.g. incubators). KPIs focus on number of individuals trained rather than depth or growth outcomes. Grant hopping and over-acceleration are common, while long-term support is rare.

- **A Silicon Valley financing narrative misaligned with Kenyan realities:** The VC-driven 'Silicon Savannah' framing is poorly suited to many green and hardware-intensive businesses requiring longer time horizons, debt financing or blended capital.
- **A financing structure gap:** The ecosystem is polarised between small grants and large equity investments. Flexible, milestone-based, affordable debt or blended instruments are scarce.
- **Limited market-level support:** Most interventions target individual entrepreneurs, not market demand, consumer awareness, standards, infrastructure or sector competitiveness.
- **Policy engagement remains generic rather than innovation-specific:** Policy work often focuses on broad innovation/start-up acts rather than addressing concrete regulatory bottlenecks that inhibit specific innovations.
- **Weak coordination and fragmented learning:** Over 200 ESOs operate in Kenya, but coordination between them is relatively limited. Short-term funding cycles reinforce competition rather than collaboration. Evidence on what works remains anecdotal. Coordination between ministries, between development partners or within the ecosystem at large is even more scarce.

Using the MLP, we see that Kenya demonstrates strong activity at the niche level and ambition at the landscape level (e.g. policy), but insufficient attention to the critical middle layer: the interaction between niches and regimes. Without addressing regime-level incentives, including market demand, pricing structures and sector regulation, innovations remain visible but marginal.

Implications for accelerating twin transitions

Kenya's experience demonstrates that early-stage entrepreneurship support is necessary but insufficient for twin transitions. To further accelerate digital and green transformation:

- Support must shift from generic incubation to sector-specific, technically grounded, long-term assistance.
- Financing structures must address the 'missing middle' and provide flexible, milestone-based instruments aligned with hardware and R&D realities.
- Market creation, including awareness campaigns, green public procurement and coordinated demand-side interventions, must complement entrepreneur-focused programmes.
- Innovation-specific regulatory reform must level the playing field between sustainable solutions and incumbents.
- Ecosystem coordination and evidence generation must be strengthened alongside local actor's organisational capacity to move from activity to effectiveness.

In transition terms, Kenya has already succeeded in nurturing niches. The next step is enabling those niches to destabilise regimes. Without stronger regime-level alignment, through pricing, policy, finance and demand, innovations will remain promising exceptions rather than drivers of structural change. In any case, it is clear that Kenya possesses the ingredients to pioneer an African model for twin transitions. Further success will depend less on generating more innovation, and more on reshaping the system that surrounds it. Given the entrepreneurial spirit amongst the stakeholders in the Kenyan ecosystem, their outspoken ambitions, and the steps many are already taking, there is every reason to be confident that ecosystem actors are willing to move away from unhelpful dynamics and together accelerate real transformation!

Overall conclusions: Kenya compared to Senegal

Compared to Senegal, Kenya's ecosystem is larger, more mature and better financed. Kenya hosts more innovators, more ESOs and more funding options. However, the structural pattern is similar. Both countries show lots of niche innovations but limited systemic transformation. Kenya's scale amplifies the paradox: more support, more activity, but not necessarily more transition impact. The core issue in both contexts is not the absence of innovation, but the absence of mechanisms that help innovations displace unsustainable practices at scale.

1 Introduction

This paper is the second in a three-part series on how digital and green transitions are unfolding across Africa. It focuses on Kenya, following our white paper on Senegal (RVO, 2026) and preceding one on Mozambique. The urgency of digital and green transitions is clear: climate risks are intensifying and development decisions made today will shape Africa's trajectory for decades. While the continent contributes only a small share of global emissions, its exposure to climate and resource shocks is disproportionately high. The case for greening, then, is not about climate guilt, but about future-proofing growth. In this context, the 'twin transition' refers to the simultaneous shift towards digitalisation and environmental sustainability, where digital tools accelerate greener outcomes and green principles inform how digital systems are designed and deployed.

Kenya is a compelling testbed for this dual shift. Often called the 'Silicon Savannah', it combines a lively tech scene with ambitious green policy goals. Nairobi has a high number of tech hubs and incubators, backed by high mobile penetration and a young, digitally active population (Dansk Industri, 2024; DataReportal, 2024). Signature innovations like M-Pesa catalysed a broader fintech wave and enabled new business models across sectors, from agri-marketplaces to pay-as-you-go (PAYGO) energy (Digital for Development Hub, 2024). On the green side, Kenya already generates over 85% of its electricity from renewables, anchored in geothermal, while rapidly scaling solar and advancing wind and bioenergy (Rotich, Chepkirui & Musyimi, 2024). Policy frameworks such as Vision 2030 and the Kenya National Digital Master Plan (2022–2032) articulate national ambition to leverage digital infrastructure, skills and innovation for inclusive growth (Government of Kenya, n.d.; ICT Authority, 2022).

Yet promise and practice have not fully converged. Despite clear policy direction, implementation and enforcement gaps persist, driven by resource constraints, capacity issues, policy misalignment and regulatory volatility (Amugsi, Muindi & Mberu, 2022; Abuya, 2025). In the real economy, most firms operate informally due to the burden of registration and taxation, and market demand remains a serious constraint, particularly for green and digital businesses, and rural-urban divides in connectivity and digital literacy further limit adoption at scale (Dansk Industri, 2024; ANDE, 2023; DataReportal, 2024). This risks a paradox familiar across the continent: abundant starting businesses and lots of support initiatives, but few sector-level transformations where digital solutions have demonstrably helped make sustainable practices the new business-as-usual.

This paper therefore investigates why, even in a frontrunner context like Kenya, completed twin transitions remain rare and what opportunities there are to accelerate them. We focus on three sectors where the opportunities and frictions are most visible: agriculture, waste management and small-scale renewable energy (including e-mobility). In agriculture, Kenya is a regional hub for agri-tech, and policy recognises the multiplier effects of digital tools (e.g., ASTGS) (Kiaka, 2024), yet adoption is held back by: fragmentation of services, affordability barriers, and solutions that are misaligned with day-to-day farmer needs (Mensink & Verberne, 2022; The Conversation, 2025).

In waste, the Sustainable Waste Management Act (2022) sets a strong national framework, but local enforcement and capacity remain weak even as innovators pilot digital tracing, plastic upcycling, e-waste management, smart bins and platform models to formalise value chains (Amugsi et al., 2022; Njeru, 2021). In energy, PAYGO solar and mini-grids have expanded access and livelihoods, and e-mobility is now a policy priority, yet financing, technical capacity, charging infrastructure and coordination gaps hinder scale (GOGLA, 2024; Ministry of Roads and Transport, 2024).

This research is part of the Digital for Development (D4D) Hub's effort to advance digital and green transitions. Our aim is not to sell a vision, but to stress-test it against Kenya's lived realities. We ask:

- → In which areas are promising innovations emerging, and why are they struggling to grow?
- → What systemic barriers (e.g. policy, finance, coordination, or capacity) are preventing Kenya's innovation landscape from scaling into sustainable 'new normal' practice
- → How can policymakers, funders and ecosystem actors recalibrate their strategies to turn innovation existence into sector transformation?

Ultimately, this study seeks to understand why Kenya's innovation scene has not yet translated into broad transformation. By examining sector cases and the realities of implementation, we aim to generate insights that can translate activity into lasting systemic change.

2 Background and research design

It is important to emphasise that this research goes beyond the typical grey literature that often dominates discussions on digital and green innovation in Africa. Rather than presenting a collection of success stories, potential or lessons learned, this study is grounded in a rigorous theoretical framework, a high number of expert interviews and guided by established academic scholarship. The analysis draws on transition theory and is informed by research on entrepreneurial ecosystems and digital transformation. The research has been developed with academic guidance from Associate Professor Dr. Francesca Ciulli of Tilburg University, a leading management scholar specialising in digitalisation and business growth and Professor Dr. Erik Stam of the Utrecht University School of Economics and Visiting Professor at Stellenbosch University, a globally recognised expert on entrepreneurial ecosystems including in African contexts. This academic foundation ensures that the findings presented are analytically robust, theoretically informed and contribute to both policy and practice on accelerating transitions in emerging economies.

2.1 Theoretical background

The field of transition studies has developed several frameworks to analyse large-scale transitions towards sustainability. Central amongst these is the Multi-Level Perspective (MLP), which studies how sustainability transitions unfold over time (Geels, 2002). It conceptualizes transitions as the result of interactions between three analytical levels:

- **Niches** represent protected spaces where innovations can develop outside the pressures of dominant systems, allowing entrepreneurs and organisations to experiment with new technologies, business models and practices without immediately having to compete with established incumbents or conform to existing market rules.
- **Regimes** represent the dominant ways of doing things: the prevailing technologies, infrastructures, policies, user practices and business models that shape how a sector operates, i.e. the business as usual.
- **Landscape** refers to broader structural trends and external pressures, such as climate change, policy environment, urbanisation, development partner agendas or demographic shifts, that influence both niches and regimes but cannot be easily altered by them.

According to MLP, transitions occur when niche innovations grow and scale, often supported by ecosystem actors, and begin to challenge or destabilise the dominant regime. This process is usually accelerated by landscape-level developments that create windows of opportunity for new solutions to break through. See *Figure 1* for a visualisation of this process. In *Box 1*, an example illustrates the transition process.

It also shows that transitions are not ignited by one business alone, but through many businesses and organisations converging around a viable innovation, supported by an enabling ecosystem and shaped by wider societal and structural forces.

Box 1: the transition towards clean cooking

Clean cooking is gaining ground in sub-Saharan Africa. The current unsustainable business-as-usual practice (regime) relies heavily on biomass fuels (wood, charcoal) and inefficient stoves, supported by informal fuel markets, established user habits and underinvestment in alternatives. These practices persist, despite health and environmental concerns. Over the past two decades, numerous actors, such as SMEs, NGOs and public initiatives, have been experimenting in niche spaces with cleaner alternatives, testing different business models, technologies and distribution approaches. Some emerging alternatives are electric cooking solutions powered by solar mini-grids and PAYGO induction stoves, and clean biofuels. Over time, the sector has seen convergence around several viable design constellations. Yet no single organisation has 'caused' the transition. Instead, the momentum comes from a growing number of businesses adopting and adapting these solutions, supported by ecosystem actors like funders, incubators/accelerators, regulators, and technical assistance providers that shield them from full market pressure. At the landscape level, pressures such as global climate policy, deforestation concerns, health advocacy and the expansion of digital and energy infrastructure, create an environment more favourable to clean cooking alternatives. Yet the regime has not been fully displaced. Despite progress, clean cooking solutions remain inaccessible or unaffordable for large segments of the population, and biomass fuel remains the dominant cooking practice. The transition is thus not completed, but ongoing.

There is limited empirical research on how twin transitions emerge and unfold in Africa. Although promising businesses are frequently highlighted in grey literature and news outlets, these examples typically represent individual business success stories rather than evidence of sector-wide change. Meanwhile, academic research largely ignores twin transitions in Africa. Most academic work on digital and green in Africa focus on single innovations or businesses, not on transitions at the sectoral level, and this gap motivates our study.

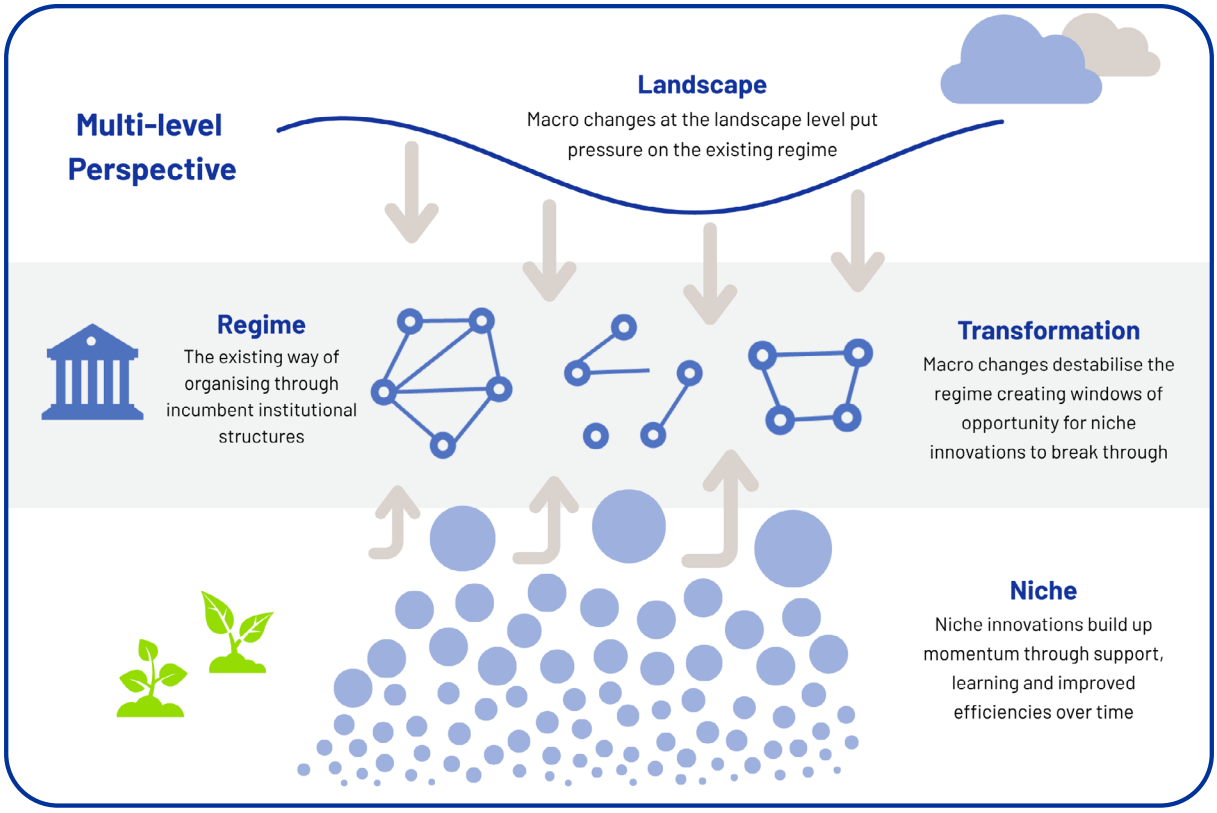

Figure 1: Adapted from the Multi-Level Perspective (MLP) framework by Geels (2002), illustrating transitions through interactions between niche innovations, regimes, and landscape pressures. Adaptation by the authors.

2.2 Research design

This white paper investigates how twin transitions are taking shape in Kenya, with a specific focus on agriculture, waste management and small-scale renewable energy (including e-mobility). These are sectors where sustainability challenges are acute and where digital technologies offer real opportunities for change. The overarching research question guiding this research is: How do digital and green transitions interact in emerging economies, particularly in sectors like agriculture, waste management and small-scale renewable energy?

In this paper, we narrowed the scope based on a preliminary literature review and five exploratory interviews with development partners and investors. These revealed a paradox: Kenya has plenty support for entrepreneurs with a large amount of development partner-funded incubation programmes, early-stage grant schemes, impact investors, a vast tech and start-up landscape and a relatively favourable high-level policy environment. Nonetheless, we found little evidence of completed transitions, and most digital and green innovations were in the early stages of adoption. This led to a more specific research question: Given Kenya's extensive entrepreneurial support ecosystem, why have digital and green innovations struggled to shift dominant unsustainable practices and trigger broader systemic change?

We focus our study mainly on entrepreneurship-focused programmes. We do not provide a comprehensive assessment of sectoral non-entrepreneurship programmes in agriculture, waste, or energy. This scoping is intentional as (i) in Kenya, as in much of Africa, innovation and transformation frequently begin bottom-up with entrepreneurs; and (ii) our objective is to generate concrete recommendations on how to redesign entrepreneurship support to accelerate twin transitions.

To address this, we explore two core themes:

1. Innovation and scaling, i.e. what types of digital innovations are adopted to accelerate green outcomes? How are these innovations scaling? What barriers or tensions limit their adoption?

2. Ecosystem support, i.e. what role do development partners, ESOs, and financers play, and how effective are current interventions? How does the policy environment enable or hinder the emergence of digital and green transitions?

Our research takes a case study approach, focusing on innovations that are 'in transition': solutions that are already beyond the first experimentation stage. They are being offered by multiple businesses, are used by multiple customers or communities and they are supported by ecosystem actors such as ESOs, investors and development partners. However, they have not yet become the mainstream way of doing things: they show promise but have not replaced the unsustainable business-as-usual practices. In Kenya, we found a rich set of innovations that are gaining ground: digital market platforms for farmers, smart waste collection and recycling models, solar irrigation and PAYGO solar energy, electric vehicles from motorbikes to buses and clean cooking solutions with digital payment structures.

Studying these in-transition innovations is crucial. They allow us to see how change begins to take shape in practice, which conditions help or hinder adoption, and how different actors interact along the way. For example, electric buses are now being deployed on several urban routes and supported by multiple ecosystem actors and uptake is growing as operators and commuters recognise their benefits. Yet diesel buses and 'matatus' (minibuses) still dominate because they remain cheaper, more established and backed by existing infrastructure. Looking at such dynamics in real time helps us understand both the opportunities and the barriers. By focusing on these cases, we aim to provide actionable insights for support actors. The key question is not whether transitions will happen, but how they can be accelerated so that promising innovations move from niche adoption to widespread impact.

We studied various digital and green innovations focussing on both climate mitigation (reducing emissions) and adaptation (building resilience to climate shocks). Innovations were selected based on their maturity. We interviewed 22 businesses, and 25 ecosystem actors, including development partners, NGOs, government entities, ESOs, financial institutions and research institutions. This diverse mix of interviewees enabled us to analyse how support systems and institutional frameworks shape transition dynamics.

See ***Table 1*** for an overview of the total amount of data points. This research design allows us to explore how support mechanisms, innovation processes and ecosystem dynamics interact, and where they may fall short-in enabling systemic change.

Table 1: Overview of data collection across actor groups.

Actor groups	Tools used	Data points
Businesses	Interviews and learning visits	22
Entrepreneurial Support Organisations	Interviews	10
Government entities	Interviews	2
Financial institutions	Interviews	6
Development partners	Interviews	2
Research Institutions	Interviews	5
Focus Group Discussion (FGD) with 20 early-stage entrepreneurs	FGD	20
TOTAL		**67**

2.3 Study context: Kenya

Kenya is home to nearly 55 million people, making it one of the most populous countries in East Africa. Population density is unevenly distributed, with Nairobi and other major urban centres such as Mombasa and Kisumu accounting for a significant share of economic activity, while much of the rural population depends on agriculture for livelihoods (Dansk Industri, 2024). Nairobi alone contributes over a third of the country's GDP, yet secondary cities and counties are increasingly recognised as important for growth (Abuya, 2025). The economy is diverse: services contribute more than half of GDP, industry and agriculture around 20% each, though the agriculture sector remains a critical source of rural employment and food security (Abuya, 2025). It is estimated that close to 80% of workers are active in the informal economy (ANDE, 2023). The labour market continues to face challenges, with high levels of youth unemployment and underemployment. Entrepreneurship plays a large role: surveys show that necessity-driven and opportunity-driven entrepreneurship are both common, reflecting both limited formal job creation and a strong entrepreneurial culture (ANDE, 2023).

Kenya's positioning as Africa's 'Silicon Savannah' shows the country's reputation as a digital frontrunner. Over the past two decades, mobile connectivity and fintech have transformed daily life and catalysed new business models. M-Pesa alone shifted financial inclusion from below 30% in 2006 to over 80% today, enabling a wave of pay-as-you-go services, digital marketplaces, and mobile-enabled platforms (Central Bank of Kenya, 2023). Nairobi has become a continental hub for start-ups and innovation, hosting hundreds of incubators, accelerators and hubs. Kenya consistently ranks amongst Africa's top countries in the Global Innovation Index and in e-government development, underpinned by its relatively advanced ICT infrastructure (WIPO, 2025).

At the policy level, Kenya has a strong base of strategies and frameworks that position digitalisation as a driver of inclusive growth. Vision 2030 outlines the ambition to transform Kenya into a newly industrialising, middle-income country, supported by successive five-year plans. The Digital Economy Blueprint (2019), the Kenya National Digital Master Plan (2022-2032) and the AI Strategy (2025-2030) provide strategic guidance for connectivity, digital skills, e-government and frontier technologies (Abuya & Mubaiwa, 2025). The ICT Authority Strategic Plan (2024-2027) adds an additional layer of operationalisation. International partnerships, such as the EU's €28 million Global Gateway Digital Economy Package, are also expanding broadband access and digital literacy. GIZ policy analysis highlights that while the policy base is strong, frameworks often remain incomplete and enforcement lacking (Abuya & Mubaiwa, 2025). Ministries work in parallel rather than through durable coordination mechanisms and financing for large-scale roll-out remains limited. This creates a paradox: Kenya is internationally recognised as a digital leader, yet rural broadband penetration is below 50%, device and data costs remain high and many counties struggle with weak infrastructure and low digital literacy (DataReportal, 2024). In short, Kenya is digitally advanced on paper and in Nairobi's ecosystem, but the benefits are not felt everywhere equally.

Kenya's green development pathway is equally ambitious. Over 85% of electricity comes from renewable sources, making Kenya one of the global leaders in clean energy generation, with geothermal, hydropower, wind and solar forming the backbone of the grid (Kenya Power, 2023). This renewable energy base is supported by the Climate Change Act (2016), the National Climate Change Action Plan (2023-2027), and the Green Economy Strategy and Implementation Plan (2016-2030). Other priorities include climate-smart agriculture, waste management reforms, and the promotion of circular economy models (ANDE, 2023). At COP28, Kenya co-launched the Africa Green Industrialisation Initiative, reflecting its ambition to anchor climate action in industrial and economic transformation (African Union, 2023).

The green and digital agendas in Kenya have so far evolved largely in silos. While digital technologies are increasingly used in agriculture, transport and energy, there is no coherent framework explicitly linking digital transformation with environmental sustainability (Abuya & Mubaiwa, 2025). Despite strong policy ambition, implementation is limited, financing mechanisms are underdeveloped and institutional coordination remains weak. This is why Kenya is an important case. On the one hand, it has one of Africa's most advanced prioritisation of green and a globally recognised ICT sector. On the other hand, systemic change has not yet taken place. Diesel pumps continue to dominate irrigation despite the availability of solar-powered alternatives, waste dumping undermines recycling platforms and electric buses coexist with a fleet still overwhelmingly reliant on diesel. Kenya demonstrates how promising innovations can gain traction but struggle to shift entire sectors without stronger policy coherence, financing and ecosystem support.

Development partners play a significant role in Kenya's digital and green landscapes. International agencies, bilateral donors and multilateral banks channel substantial resources into entrepreneurship programmes, climate finance and infrastructure development. Many programmes have a strong youth and job-creation focus, linking digital entrepreneurship to climate resilience and green growth (ANDE, 2023).

Examples include donor-funded incubation schemes, blended finance facilities and technical assistance for policy development. Nairobi hosts more than 200 incubators, accelerators and hubs, making it one of the most saturated ecosystems on the continent (Abuya & Mubaiwa, 2025). These ESOs provide training, mentoring, small grants and investor readiness programmes, typically financed by donors or international foundations. While Nairobi's entrepreneurs benefit from a wealth of opportunities, support is far scarcer in secondary cities and rural counties (ANDE, 2023).

Taken together, Kenya presents a paradox of high ambition and strong innovation capacity but incomplete systemic transformation. The country has the ingredients to pioneer an African model for the twin transition: a youthful population, a history of digital innovation and a clear ambition on greening. Yet twin transitions have not thrived, making Kenya an ideal case to study 'in-transition' processes, where innovations are gaining traction, ecosystems are active and ambition is high, but systemic change is still just out of reach.

3 Barriers to scaling Kenya's digital and green innovations: the innovator perspective

Often referred to as the 'Silicon Savannah', Kenya is regarded as a frontrunner in digital and green innovation, with many new businesses supported by a large number of incubators, accelerators and grant programmes. Yet despite extensive early-stage support, only a small share of those grow and few bring about broader sector transformation. In this chapter, we investigate why Kenya's promising innovation landscape has not yet translated into completed transitions. Drawing on interviews with 22 innovators across eight different types of innovations, we take the innovator perspective to understand what challenges they face when trying to scale digital and green innovations, focussing specifically on the systemic barriers that prevent even innovations with strong business models from scaling This chapter proceeds in two parts: first, each innovation will be examined in detail, describing the innovation itself, how it leverages digital and green solutions, what works well, and the challenges faced by innovators. Second, we identify the four most critical bottlenecks that consistently prevent innovations from reaching the scale necessary to realise transformation.

3.1 Eight innovation cases: proven solutions, persistent barriers

Before zooming in on the eight innovation cases, we began by compiling a database of digital and green innovations in Kenya across agriculture, waste management and small-scale renewable energy. This inventory was built from online desk research, our professional networks and snowballing through interviewees' input. In total, we identified roughly 380 businesses, ranging from start-ups to SMEs. Most operate in the early stages with between 1-15 employees, while a considerable amount has been active for several years and show some market traction. Figure 2 shows the sectoral distribution of these innovations. It is worth noting that some aspect of agriculture is present in almost every 'combination' innovation, making it the most dominant sector in our research. Although we did not research it specifically, we noted that many businesses relied on financial innovations, such as PAYGO models and carbon credits, to make their digital and green solutions more viable. One ecosystem actor argued that fintech for climate resilience specifically is not just an enabler to make innovations more viable, but a twin transition sector itself. For the scope of this research, we did not add financial services innovations as a separate sector next to agriculture, waste management and small-scale renewable energy, but we do acknowledge and mention its enabling role throughout this chapter.

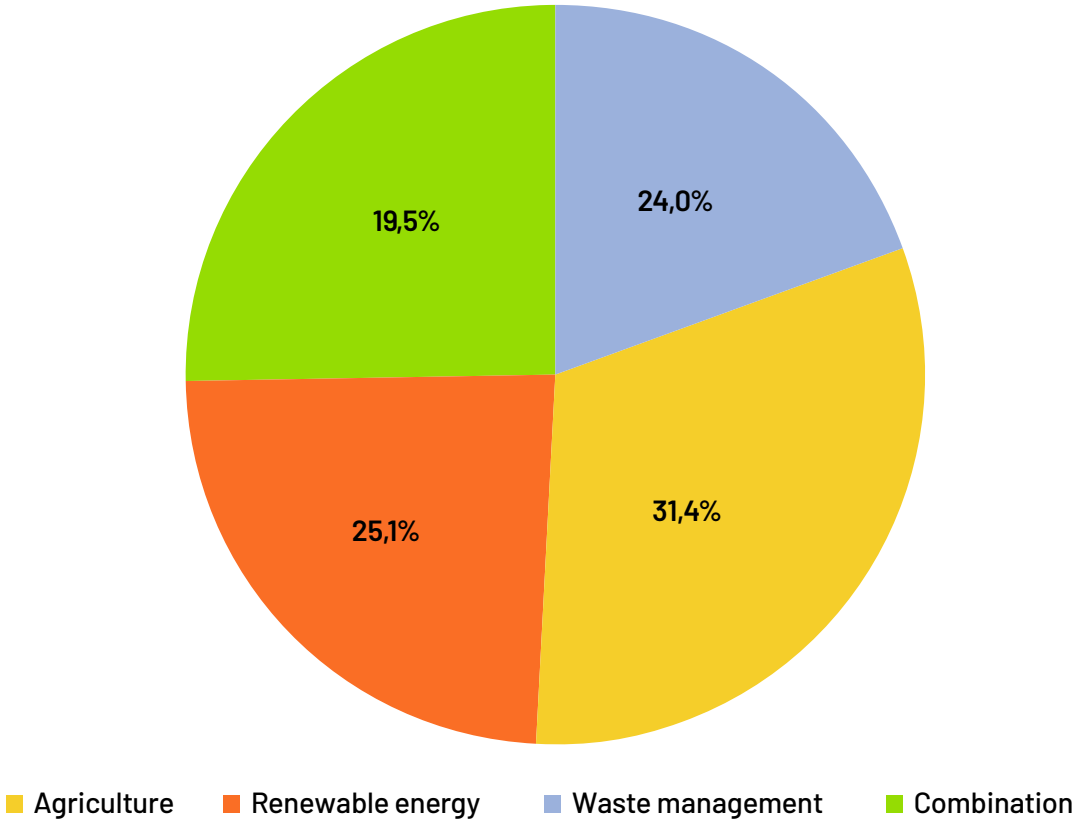

Figure 2: Distribution of digital and green innovations per sector

1. E-mobility

E-mobility in Kenya is advancing rapidly through electric motorcycles, scooters, tuk-tuks and buses that aim to reduce urban emissions and dependence on fossil fuels. Innovation in the sector extends beyond the vehicles themselves. A key example is battery swapping infrastructure, which are distributed networks of stations where riders can quickly exchange depleted batteries for charged ones, eliminating long charging wait times and making electric scooters as convenient as refuelling them with petrol. Digital and green are at the core of these innovations: electric vehicles use IoT technology with GPS and sensors to track location, battery health and usage patterns in real time. Central network software manages battery inventory, monitors swap stations and analyses data to optimise operations and predict maintenance needs. Riders interact through mobile apps to locate nearby charging or swapping stations, pay digitally and access vehicle diagnostics and performance data. Fleet operators, such as bus companies, use digital fleet management tools enabling real-time tracking of vehicle performance, maintenance scheduling and route optimisation, helping to maximise efficiency and minimise downtime. Regarding sustainability, e-mobility replaces polluting diesel and petrol vehicles, cutting carbon emissions and reducing air pollution. The expansion of the Kenyan e-mobility sector is reflected in increasing vehicle numbers. Official figures indicate that the number of electric vehicles rose from 1.378 in 2022 to almost 40.000 in 2025 (Ministry of Roads and Transport, 2026). Yet, these figures still represent a small share of Kenya's overall vehicle fleet because there are significant challenges that constrain further scaling.

Price competition is one of the key barriers. Electric vehicles are often more expensive than the traditional petrol vehicles, largely due to limited domestic manufacturing capacity and the consequent reliance on imported components. This cost disadvantage is worsened by unfavourable tax policies, including high import duties on electric vehicle spare parts, while conventional petrol vehicles and components often benefit from tax exemptions. As a result, innovators in the e-mobility sector struggle to compete with established and unsustainable current practice. As one innovator states: "The challenge is that new technology often costs more than incumbents". Innovators are already trying to mitigate these price barriers by using flexible financing models. For example, for electric buses, there is a 'pay-as-you-drive' model, allowing operators to pay for the buses based on how much they use them, removing high upfront costs that typically prevent transport operators from switching to electric. Nevertheless, price competition remains a challenge. And even when consumers can afford electric vehicles, widespread adoption remains a challenge. Innovators emphasise that consumers primarily seek functional equivalence with petrol vehicles: "Everyone thinks the innovation is around the switch of petrol to electric. But I think the real innovation is what the customer wants. The customer wants an electric bike that does exactly what a petrol bike can". In practice, this equivalence is not yet fully achieved. Poor road conditions, limited availability of trained mechanics and difficulties in sourcing spare parts when a vehicle is broken undermine user confidence in electric vehicles and therefore limit adoption, often regardless of price competition.

Image 1a: Image of electric vehicle from innovator KiriEv.

Image 1b: Image of the purpose and values from innovator BasiGo

Furthermore, appropriate e-mobility infrastructure is often absent, creating a "chicken and egg situation: because there are no electric vehicles there is no charging, and because there is no charging there are no vehicles". Efforts by innovators to develop the necessary infrastructure, such as charging and swapping stations, are often hindered by complex, bureaucratic and slow-moving regulatory procedures, as well as difficulties in accessing capital. Given the uncertainty around e-mobility, banks and investors remain cautious and effective de-risking mechanisms are largely absent. Although actors such as development partners seek to address these constraints, their interventions are not always well aligned with sector needs and funding is often misallocated. An innovator reports that funding is given more to ecosystem

actors instead of to entrepreneurs themselves, "a lot of money is going to e-mobility, but not to e-mobility companies. The money is going to ecosystem actors such as advocacy groups, lawyers, accelerators, but not to the innovators. It is not really working". If funding does flow to entrepreneurs, it sometimes goes to entrepreneurs who are skilled at storytelling rather than to those who have genuinely great innovations. As one innovator states: "I know an entrepreneur who raises lots of money, but he has nothing to show for, he just has a great way of talking (...) so he is kind of scamming the donors. There is a huge gap in the story he is telling and what is reality". Finally, it is noted that funding is targeted on small improvements of the innovation, such as software for a battery health system, instead of scaling the innovation, while the latter is needed to really create a transition. As an innovator mentions, "when a sector starts growing, the funding goes more into niche areas. Now funding is going to health status monitoring of batteries and so on (...) but what they have forgotten is you only help to build the bike, not scale up".

2. Digital agriculture platforms

Digital agriculture platforms in Kenya aim to empower farmers through data-driven tools and improved access to inputs and markets. These platforms address challenges in the agricultural sector: unreliable soil information, limited access to quality inputs, fragmented supply chains and knowledge gaps that leave farmers relying on guesswork. Some platforms use portable soil-testing tools to provide rapid nutrient measurements and simplified fertiliser recommendations, communicated to farmers via SMS. Furthermore, there are platforms offering basic farm management and advisory services that aggregate field-level information to support planning and decision making. Other platforms focus more on supply chain, connecting agro-dealers and farmers through digital networks that facilitate orders, payments and training services for both crop and livestock management. On the greening side, precise soil testing enables targeted fertiliser application, reducing waste and environmental impact, while improved access to quality (organic) inputs supports the transition from conventional to regenerative agriculture.

Despite the promise of these digital agriculture platforms, widespread adoption remains limited. A recent study shows that only around 8% of Kenyan farmers use digital platforms to sell their products (Mbatia, 2025). One of the interviewed innovators, offering data for soil-testing via digital platforms, mentions that around 20.000 farmers make use of their services, meaning that they are "still very, very early on" in terms of market penetration and commercialisation. Low adoption amongst smallholder farmers therefore remains a persistent barrier, either driven by price, limited digital literacy and traditional farming preferences or simply a lack of awareness of the added value. As one innovator explains, "first, it's expensive, and then, it was a new thing for them. Farmers never used it for many generations. So, convincing them to start something new is very difficult". Consequently, innovators in the sector need a lot of finance to raise awareness amongst farmers, making the commercialisation of the platforms even harder. Even when farmers recognise the value, low income creates competing priorities: "you know, farmers are struggling with income (...), do you actually pay 1.000 KSh to test your soil or do you use 1.000 KSh to buy seed? Which one can you do without? You cannot do without buying seeds".

On the policy side, innovators note that government support remains insufficient. Agriculture governance is devolved to the county level, making it difficult for digital platforms to scale with consistent standards. Moreover, there is no policy mandating sustainable practices like soil testing or organic fertiliser, directly influencing the shift to regenerative agriculture that digital platforms promote. As one innovator noted, "policy might be something that could improve market penetration (...), there is still lacking policy around soil testing and adoption of these services for farmers". Furthermore, it is reported that development partners and service providers have not championed digital agricultural solutions in their extension services and farmers training programmes. Meanwhile, the scarcity of local technical talent poses additional operational challenges, as the few skilled engineers available are expensive and in high demand from large corporates offering high salaries: "the engineers that we need to recruit are the same engineers that corporates are looking for. They are very expensive. There are very few in the market".

Image 2a: Image of Kenyan customers accessing a digital agriculture platform via mobile phone.

Image 2b: Image of one of the DigiShops from Shamba Pride.

3. Clean cooking solutions

Clean cooking solutions in Kenya aim to reduce reliance on traditional polluting fuels, such as charcoal and firewood, causing indoor air pollution, deforestation and health problems. Most innovations focus on the provision of cleaner cooking fuels, such as ethanol, combined with more efficient cookstoves, as well as several solar-powered cooking and energy devices designed for household use. Digital technology plays a supporting role in these solutions. There are supply chain platforms that track fuel production, mobile payment systems enable convenient purchasing through flexible payment models and certain clean cooking providers integrate additional services such as basic lighting or phone charging via solar power. Some innovators have linked their distribution with carbon offsetting markets, creating revenue streams through climate finance. On the sustainability side, these technologies significantly reduce indoor air pollution and greenhouse gas emissions, while decreasing pressure on forests and improving overall health.

Of all eight innovation cases, clean cooking solutions can be considered as one of the most mature. The 2023/2024 Kenya Housing Survey shows that 34.4% of Kenyan households are using clean cooking fuels, such as electricity, LPG, biogas or ethanol, which indicates that clean cooking is rapidly moving towards a transition. Nevertheless this also means that 65.6% is still relying on more traditional cooking options, with firewood and charcoal as the predominant cooking fuels (KNBS, 2024). The primary barrier to adopting clean cooking solutions is affordability: clean cooking stoves and fuels have higher upfront costs compared to traditional alternatives. As one innovator mentions about their cook stove: "This one is good. It addresses many challenges, but now the challenge is the upfront cost. It's very expensive. A normal household will not be able to afford this". Competition from cheaper, and sometimes even free, alternatives compounds the problem: "Charcoal is a competitor, and firewood, especially in the rural areas, because it's free". Innovators express that government policy might exacerbate these cost barriers rather than addressing them. High import and domestic taxes on clean cooking solutions drive up prices. "The major obstacle that we faced around affordability is the fiscal environment in Kenya (...) if tax is high, it will be difficult for you to be affordable". Another innovator adds that these taxes "limit the penetration of the product to people who really deserve it, getting into a position whereby people are cutting more trees". Additionally, innovators feel that the government has not been forthcoming in enabling carbon credit markets, while this could provide revenue streams to offset costs and make solutions more affordable. It seems to be a key enabler in this sector, as one innovator stresses: "without the risk of oversimplification, carbon finance as a subsidy has been the single biggest unlock for our business".

However, by the time of writing, one of the interviewed innovators has filed for insolvency as a result of a decision by the Kenyan government to not allocate carbon credits for sale on the international markets at the scale anticipated by the innovator. This rendered their business model infeasible as the subsidies provided to the consumers for the fuel and cookstoves bought from the company would not be sufficient to remain competitive compared to non-green (cheaper) alternatives. One the one hand, this case demonstrates the potential of carbon finance as an enabler for transitions, as it allows solutions at subsidised prices to low-income households. On the other hand, it exposes the vulnerability of business models reliant on carbon finance and external policy factors as well as the importance of policy stability.

4. E-waste recycling

E-waste recycling and refurbishment in Kenya address the growing challenge of electronic waste while providing affordable access to technology. Innovations focus on extending device lifecycles through refurbishment, repair and responsible recycling of electronic devices such as laptops and desktops. Trade-in and buy-back programmes enable upgrades while preventing devices from ending up in landfills, and partnerships with certified recyclers ensure responsible disposal when repair is not possible. Digital systems underpin these operations: e-commerce platforms enable online purchasing, digital warranty systems build customer trust and logistics tracking ensures efficient collection and distribution. This circular model reduces demand for raw materials, while cutting carbon emissions and preventing toxic e-waste from accumulating in (informal) dumpsites.

Scaling, however, proves difficult. Formal collection and recycling systems capture less than 10% of the total e-waste generated, and the country has just a few refurbishers to process and refurbish e-waste (Ministry of Information, Communications and the Digital Economy, 2025). The complexity of refurbishment deters potential new businesses: "Our work is difficult, it's complex. It's easier to just buy and sell. So no one wants to do the work and put themselves in the market". Furthermore, it is reported that there is an absence of specialised training programmes in the ecosystem teaching businesses how to refurbish products and there also seems to be an awareness gap. Amongst entrepreneurs, there is limited understanding of the sector's potential: "I don't think anybody in this country understands this product. Refurbishment with right process, right equipment, people is extremely lucrative". Amongst the broader public, e-waste is not widely recognised as a pressing environmental problem, limiting demand for refurbished devices and policy urgency. Collaboration could help address these challenges by building shared training programmes, establishing industry standards, and shifting mindsets, but remains largely absent: "There is no real collaboration (...) but collaboration could revolve around training, around working on standards for our work. We would be able to change the market, start changing mindsets".

Image 4: Image of employee from innovator Deed Technologies, working on the refurbishment of an electronic device.

5. Precision agriculture

Precision agriculture in Kenya mainly leverages digital technologies such as drones, satellite data and, to some extent, IoT sensors and data analytics to support farming practices and improve productivity. Drones are mainly used for field mapping, acreage measurement and visual crop monitoring, while satellite data is applied to generate basic insights on vegetation health, weather insights and water availability. IoT sensors and real-time data transmission are in some cases used on a small scale to measure soil moisture and nutrients for example, and to provide recommendations to farmers via mobile apps, USSD or SMS. Regarding greening, precision agriculture offers clear potential for more efficient resource use: targeted irrigation can reduce water waste, more precise fertiliser application may help minimize environmental run-off, and improved crop monitoring can contribute to earlier pest detection and reduced pesticide use. While these digital tools and environmental benefits are frequently highlighted, they are not yet consistently realised, as many precision agriculture innovations in Kenya remain in early stages of experimentation.

Image 5a: Image from innovator Pixel Engineering showing a drone that can be used for precision agriculture.

Image 5b: Image from innovator Pixel Engineering showing a robot dog, which is one of their recent high-tech innovations.

Scaling these technologies into mainstream farming practices remains challenging. A recent report mentions that the adoption of precision agriculture in Kenya is very low (KIPPRA, 2024). This low adoption, especially amongst smallholder farmers, is driven by traditional mindsets and lack of awareness about the technology's value. As one innovator explains, "most of the people who really understand IoT products are the big corporates (...) but for a small farmer, they have the ideology like I can walk around my farm within 5 minutes and I'm able to do what I need to do". Even when farmers recognise the benefits, the high upfront costs deter adoption. "Then the biggest challenge is people run away from initial cost because the initial cost will always be higher (...) so that initial cost is what brings in problems". Furthermore, the sector faces critical knowledge and talent gaps when it comes to aspects as IoT and hardware. "There is a big gap on skills", largely due to a " lack of education in technology (...) IoT is never

taught in curriculum, so it is something that you find the number of people who know IoT things is very few. That's the biggest problem we face". Furthermore, raising capital in the sector is particularly challenging. The combination of novel technologies, hardware complexity, long research and development (R&D) timelines, and inability to demonstrate immediate returns makes precision agriculture businesses unattractive to investors who either do not fully understand the sector or prioritise faster return on investment (ROI). More fundamentally, especially hardware solutions receive little support from government and development partners. For example, regarding production spaces where hardware solutions are developed, one innovator reports: "the space where hardware solutions are being developed has never been supported (...) compared to entrepreneurs and start-ups doing software, hardware businesses are rarely supported". To add complexity, there are bureaucratic permit processes for novel products, with fragmented regulatory bodies and no clear legal frameworks for emerging technologies. Support programmes, such as incubation initiatives, tend to be too generic, focusing on business fundamentals rather than the specialised technical assistance that (hardware) businesses in precision agriculture repeatedly report to require.

6. Solar home systems

Solar home systems and microgrids in Kenya provide affordable, decentralised renewable energy access to off-grid households and communities, reducing reliance on kerosene lamps, diesel generators and unreliable grid connections. These solutions range from standalone solar kits that power lighting, phone charging and small appliances, to community-level mini-grids that provide shared electricity access at the neighbourhood level. Some innovators offer integrated solutions that combine solar energy with biogas systems, derived from agricultural waste, and clean cooking technologies, tailoring energy packages to different household and community needs. Digital components include system design and technical planning for solar installations, remote monitoring of system performance, and increasingly, PAYGO financing models that use mobile money integration to enable flexible micropayments. Regarding sustainability, these systems replace polluting energy sources with clean solar power, reducing carbon emissions and household energy costs, while improving health outcomes through reduced indoor air pollution.

Image 6: Image of solar home system solution from innovator Jacawa Energy Solutions.

Like the innovation case around clean cooking solutions, solar home systems can be considered as one of the most mature. Around 20% of Kenyan households use solar-powered mini-grids or standalone systems, making Kenya a regional leader in off-grid solar adoption (Best, 2023; International Energy Agency, 2025). Further scaling of the innovation, however, remains difficult. On the demand side, affordability limits adoption. As one innovator states, "solar energy is relatively more expensive, which most families are unable to meet". Cultural resistance preference for traditional to new technologies further compound adoption challenges. Furthermore, access to capital is constrained, especially for innovators in pilot or early phases with uncertain returns. "Most investors are after ready products and not interested in pilot stages. They also tend to shy away due to the low ROI". Another innovator adds, "business environment, and especially in the energy sector, is not favourable for start-ups. It is very difficult for start-ups to secure contracts without having a minimum of X amount ROI and Y number of years experience". All in all, with a market penetration of 20%, the innovation case around solar home systems seems to progress towards a transition.

7. Smart waste collection and processing

Smart waste collection and processing innovations in Kenya mainly combine digital tools with circular economy principles to improve the coordination of waste collection, sorting and recycling activities. Most innovations focus on mobile applications and digital platforms to connect households, businesses and informal waste collectors, as well as facilitating collection requests, pick-ups and tracking of waste streams. Some innovators focus on converting waste streams into value-added products, such as transforming plastic waste into 3D printing filament or processing organic waste into biogas and fertiliser. Digital payment systems integrated with M-Pesa enable incentive-based participation, rewarding households and (informal) waste workers for proper separation and recycling behaviour. On the greening side, these innovations reduce landfill waste, prevent environmental pollution, create green jobs, generate secondary raw materials for industrial reuse and support ecosystem restoration.

Image 7a: Image of Kenyan customers accessing a mobile app for waste collection.

Image 7b: Image of the founder of innovator Baus Taka Enterprise explaining their digital waste platform to customers.

However, the smart waste management sector struggles to scale. Infrastructural gaps are particularly pervasive, as basic waste management infrastructure is poor or absent. Consequently, innovators mention that to make solutions viable, they must build entire ecosystems, and not just products. "It's hard for waste businesses in Africa. We can't just build tech, we have to build an entire ecosystem". Another innovator adds, "for us, as we grew our business, we feel like we had to grow the entire ecosystem (...) we couldn't build a business out of thin air". Furthermore, entrepreneurs in this sector signal limited government engagement, because of unresponsiveness, lack of enforcement of regulations and unwillingness to engage in public private partnerships (PPP's). As one innovator describes, "we had a meeting with the deputy governor and he was very excited about the idea, but what happens next is that they just go silent". What distinguishes the waste sector from many other sectors is the sector being constrained by entrenched power dynamics. An innovator notes that big players monopolise waste collection and processing operations, actively preventing cooperation with smaller innovators and blocking their market access. This creates barriers making it difficult for small innovators to operate: established actors control waste flows, relationships with buyers and access to disposal sites, effectively shutting out competitors. "The waste management sector is a cartel business (...) the big players are not interested in working with somebody who they feel is going to threaten them".

8. Solar power irrigation systems

Solar-powered irrigation systems in Kenya enable farmers to move away from rain-dependent agriculture and expensive, polluting diesel pumps by using solar energy to power water extraction and distribution. Most systems consist of solar water pumps combined with basic irrigation infrastructure, such as hoses, drip lines or small storage tanks, providing reliable year-round access to water for crop irrigation. Some innovators push more advanced configurations, combining solar panels with batteries, automated irrigation components and IoT sensors to monitor soil moisture or water levels, enabling precision irrigation by activating pumps only when needed. These configurations seem to be applied on a more limited scale, often in pilot projects. Digital payment platforms integrated with mobile money enable PAYGO financing models, allowing smallholder farmers to afford systems through flexible instalments rather than prohibitive upfront payments. On the sustainability side, solar irrigation replaces diesel pumps, thereby cutting carbon emissions, fuel costs and maintenance expenses, while enabling farmers to grow high-value crops year-round, fundamentally transforming agricultural productivity, climate resilience and livelihoods.

Despite proven benefits, solar irrigation struggles to achieve widespread adoption. In 2021, there were approximately 35,000 solar water pumps in use, which is just a fraction given the millions of Kenyan farmers. A case study in Machakos county shows that diesel-powered water pumps (71%) were the most used form of irrigation, while solar water pumps were the least popular at only 1% (Clasp, 2023). A main barrier to adoption is affordability, given that solar systems require significantly higher upfront investment compared to unsustainable alternatives like diesel or petrol pumps, even when PAYGO models spread costs over time. On top of this, small-scale farmers are either not aware of the long-term benefits or do not see the necessity because of the availability of cheap manual labour to perform these tasks.

Image 8a: Image of a drip irrigation system from innovator Grekkon.

Image 8b: Image of solar system which delivers solar power for the irrigation systems from innovator Grekkon.

As one innovator explains, "actually, one of the challenges we have for the uptake of this technology is cheap labour. Because labour is so cheap, you can get someone in your farm for 10.000 KSh every month so they do not see the need for technology". Difficulties in access to finance and hence being unable to spend money on enhancing consumer awareness, further constrains innovators. Banks offer loans at high interest rates and the government is not supporting in capping these rates: "the loans in Kenya are not friendly right now. Bank operating at 19% - 22% depending on how they wake up in the morning. So, it's unsustainable. You'd be working for the bank every day". Moreover, the Kenyan government is not putting much effort in capping the rates anymore. As one innovator explains, "three years ago it was fine because government capped the rates at 12%, but then they came and liberalised the rates". To add complexity, finding alternative financial partners or investors is hard, in part because there is no derisking system.

3.2 Key barriers to scaling digital and green innovations

Despite advances and innovator effort, broad market penetration of these innovations remains obstructed. Most innovations achieve only a small percentage of total market penetration, so business as usual still dominates. The interviews with innovators revealed that various interconnected challenges consistently prevent scaling, even when the business model of the innovation is strong. Some challenges are common to all entrepreneurship, such as talent shortages, weak policy enforcement and high capital costs. For digital and green innovators, these general obstacles are aggravated by transition-specific barriers: policy environments that favour incumbents, markets structured around unsustainable alternatives and customers who lack ability to pay, awareness or trust in new technologies. Of all these, four stand out as particularly critical as they appear across multiple innovation cases and fundamentally block the pathway to sector-wide transitions. These are not isolated problems but systematic constraints no individual innovator overcomes alone, and they reveal where ecosystem-level intervention is needed most. We highlight these four key bottlenecks below.

(1) Price competition

Across almost all innovation cases, innovators face a fundamental price competitiveness challenge: their innovations often require high upfront investment for consumers while unsustainable alternatives remain cheaper. This price disadvantage has multiple causes. Digital and green innovations often require substantial R&D investments to develop, rely on expensive import, and innovators must build supporting infrastructure that conventional alternatives already have in place. In some cases, these conventional alternatives also receive tax exemptions or government subsidies that further reduce their costs. Even when the long-term benefits favour the digital and green solutions, for example through lower operating costs, better performance and less harmful practices, customers either cannot afford it or are unwilling to make the initial investment due to short-term pressures.

The evidence is clear across various sectors. Whether it is electric buses versus diesel buses, clean cooking stoves versus traditional firewood and charcoal stoves, or solar irrigation pumps versus diesel pumps, the unsustainable alternative is cheaper, more convenient and easier to use. When innovators describe their competition, they consistently point not to businesses offering similar solutions, but to the unsustainable alternatives their solutions aim to replace. It is worth noting that innovators are trying to mitigate this price competitiveness themselves, through flexible financing models such as PAYGO systems for solar energy and e-mobility, carbon-credit offsetting to diversify revenue models, and lease contracts or instalment pay plans for agricultural equipment. Another example of mitigation is applying flexibility in business models. An innovator in e-waste set on scaling, for example, started as a Business-2-Customer business but is now venturing into Business-2-Business and Business-2-Business-2-Customer. Still, these workarounds only partially address the affordability gap. Even when customers can technically afford digital and green solutions, they often face short-term pressures preventing large initial investments. Smallholder farmers, for example, may recognise the long-term benefits of soil testing through digital platforms yet choose to spend their money on seeds or other immediate needs. In some cases, practical considerations also are a factor, as smallholder farmers see little reason to invest in solar irrigation when they can hire someone to water crops manually for a few KSh a day. In the waste sector, digital tools are not a priority for especially low-income households. As one innovator summarises: "low-income communities don't want to know anything about technology. People want to look for money to put food on their table". Some sectors face additional complexity through foreign competition. In e-waste recycling, for example, cheap, low-quality imports flood the market at prices that local recycling business cannot match, limiting the scaling possibilities of Kenyan businesses.

(2) Customer awareness and cultural resistance

Price competitiveness is not the only barrier preventing customer adoption. Even when solutions are affordable or when flexible financing addresses upfront cost concerns, many potential customers still do not adopt them. This reflects a different challenge: customers lack awareness of the benefits, prefer longstanding traditional methods, are sceptical of new technologies or do not know how to use and maintain them. This adoption gap represents a demand-side constraint which is distinct from just affordability.

The adoption gap due to lack of awareness and cultural resistance appears across multiple sectors. Many potential customers simply are not aware solutions exist or fail to understand the benefits. In agriculture, smallholder farmers have had little exposure to how digital platforms or precision tools could improve their farming practices. Again, innovators are already working to mitigate the challenge, by using grants to raise awareness via trainings. As one solar irrigation innovator states: "Grants help us a lot in awareness, like the amount of awareness we've been able to do with GIZ funding and KCIC funding, we've been able to train so many farmers we wouldn't have reached out to if we didn't have that kind of funding". Due to these trainings, farmers become more aware of the added value of innovations. Nevertheless, even if smallholder farmers would be aware of the solutions and their benefits, cultural preferences compound the adoption issues. Digital solutions represent entirely new practices for farmers whose knowledge and methods have been passed down through generations. Similar patterns can be seen in other sectors: clean cooking technologies face resistance in communities where long-standing cooking methods are deeply embedded in daily routines and social practices. To address these challenges, innovators invest in community mobilisation, training programmes and awareness campaigns. Yet this seems to create a vicious cycle: creating awareness requires substantial resources, but without widespread adoption, innovators cannot generate sufficient revenue to fund these efforts.

(3) Unfavourable policy environment

Next to the two market-based barriers mentioned above, innovators operate in a policy environment that they experience as unfavourable to digital and green innovations. Innovators report that government actively subsidises or protects the unsustainable business-as-usual. Adding to these challenges, governance systems still must adapt to the pace and needs of digital and green innovations, contexts in which streamlined processes and responsive institutions are critical. The absence of supportive policies or incentives for digital and green innovations is present in various sectors. Regarding mobility, petrol and diesel vehicles have certain advantages that electric vehicles do not have. For example, there are hardly regulations on diesel emissions. Furthermore, tax exemptions exist for locally assembled vehicles. However, many components of electric vehicles, such as batteries, cannot be assembled locally in Kenya, unlike the components for petrol and diesel vehicles. As a result, e-mobility innovators rely on expensive import with full duties while the unsustainable alternatives qualify for exemptions through local assembly, which directly undermines price competitiveness. Looking at other sectors, clean cooking solutions were

faced with tax increases, making them more expensive than alternatives. In agriculture, government subsidies favour conventional chemical fertilisers over organic alternatives, directly undermining the sustainable alternative. Some innovators stress the presence of political connections and governmental preferential treatment of (foreign) players, creating unequal competition. Companies secure low taxes and bypass regulations through presidential or high-level access, while foreign competitors benefit from government deals and cheap export credits, making it hard for local innovators to compete. Beyond unfavourable policies, government bureaucracy and weak enforcement further limit the scaling of digital and green innovations. Innovators need to navigate through time-consuming processes, for example when it comes to getting the right permits for new digital technologies. Notably, innovators try mitigate these policy and regulation challenges through lobbying and advocacy. One innovator reports that they actively call government entities when they need permits. This approach seems to work: "Once you get accustomed to lobbying, I find government entities to be quite responsive". At the local county level, where much agricultural and environmental regulation occurs, governance is fragmented, making it difficult for innovations such as services via digital platforms to scale with consistent standards across Kenya. In the waste sector, regulations exist on paper but remain largely unenforced, allowing informal dumping and unsustainable practices to continue. Moreover, across all sectors, it is reported that the government in general is not very engaging and responsive, when there is no direct access to the right networks or persistence. Innovators without that way in, describe that government is hard to reach and that meetings and conversations are not followed up. Public-private collaboration remains weak, with government showing little willingness to engage through partnerships that could support scaling.

(4) Capital misalignment

Access to capital and finance is frequently cited as a barrier to scaling digital and green innovations. Yet the challenge is not simply a lack of available funding. Kenya has various funding programmes, development partners and investors actively supporting innovation. The problem is more structural, as there seems to be a misalignment between what innovators need and what the funding ecosystem provides. Capital flows to the wrong recipients, targets the wrong stages of development, comes at high costs, is structured inflexibly or remains inaccessible to certain types of businesses.

This misalignment manifests in multiple ways. Funding might flow to ecosystem actors, such as advocacy groups, accelerators and support organisations, rather than to the innovators themselves. When funding does reach innovators, it frequently targets early-stage product development or small innovation improvements rather than the scaling activities needed for real transitions. This creates a missing middle problem: funding, like small grants, support pilots, prototypes and early-stage businesses, but a significant funding gap exists for the money needed to build an organisational foundation, scale operations, purchase equipment and expand to new markets. However, beyond this misalignment, investors and financial institutions demonstrate risk aversion towards new digital and green innovations. They are either still trying to understand the new technologies or still need to get their head around the added value.

This is in particularly present for innovators working on complex technology unfamiliar to investors, and innovators who are still in the R&D phase and not able to demonstrate immediate ROI. As one innovator in precision agriculture summarises: "given the newness of product, a lot of capital is needed for R&D and scaling, but raising capital is hard if you do not have a fully working business model". Derisking mechanisms and alternatively structured financial vehicles that could bridge this gap remain largely ineffective. As an alternative way of funding, debt financing is available, but high interest rates and inflexible repayment terms makes this option unsustainable for many businesses.

(5) Interconnected challenges

Having examined the four key bottlenecks, it is clear that they are interconnected. Unfavourable policies drive price disadvantages through tax structures and subsidies favouring polluting alternatives. Price gaps prevent customer adoption, which in turn blocks revenue generation needed to fund awareness campaigns. Without revenue or scale, innovators must seek external capital, yet the capital ecosystem is often misaligned with innovator needs. Capital constraints then prevent the scaling of activities that could reduce costs and validate business models. Meanwhile, bureaucratic inefficiency and unresponsive governance further complicate every other challenge.

What holds for all four bottlenecks is that they block twin transitions because they are structural, systemic constraints that appear consistently across multiple innovation cases and cannot be overcome by individual innovators alone. No innovator can solve a market where government policy keeps unsustainable alternatives artificially cheap, where creating awareness and changing cultural preferences requires investments exceeding what a single company can afford from revenues, or where capital flows are misaligned with innovator needs. As one innovator perfectly summarises: "we can build the product, but the system is not ready to absorb it". All in all, the problem is not only due to insufficient entrepreneurship or innovation quality, but also because the wider ecosystem is not supporting innovations enough to scale and become the new normal. Addressing the key barriers to transitions therefore requires effort from both innovators and the ecosystem. Digital and green innovators can try to become more efficient and further develop flexible payment methods to increase price competitiveness of their innovations. They could also invest in awareness creation and think more about what products their desired customers really need to mitigate the challenges of customer awareness and cultural resistance. But, as mentioned, they cannot solve these challenges alone. Some innovations will remain more expensive than unsustainable alternatives regardless of innovator efforts. Policy could therefore support to influence price competitiveness through subsidies and regulations that make digital and green innovations cheaper and unsustainable alternatives more expensive, by making debt financing more accessible for digital and green entrepreneurs, or by providing bank guarantees to stimulate financing for R&D. Funders, such as development partners and investors, could fund not only innovations itself but also invest in market development and awareness. The grants of GIZ and KCIC that an innovator used to train farmers and thereby raising awareness on the added value of their solar irrigation innovation is a great example of this. Furthermore, they could become more open to invest in hardware solutions rather than software.

Ultimately, adopting a transition mindset when designing interventions would significantly strengthen their long-term impact. This means encouraging innovators to actively collaborate with other innovators offering similar innovations to achieve sector-wide transformations. For funders, it could mean to spend money on scaling innovations, price competitiveness, policy advocacy and market creation, instead of only on training the individual innovator and expecting the market to do the rest.

(6) Gender-specific challenges

Before this paper dives into the entrepreneurial ecosystem in Kenya, it is important to address the role of gender, as women face additional challenges across the different innovation cases. In the waste sector, for example, it is reported that "women are neglected" because the "male dominant sector feels that women belong in the kitchen". This makes it hard for women innovators in the waste sector to cooperate with, often male dominated, businesses and institutions. Regarding e-mobility, innovators and ecosystem support actors report that scaling (electric) motorbikes to women is limited, partly due to cultural norms that discourage women from riding motorbikes in Kenya. Beyond sector-specific challenges, women also face broader structural barriers within the ecosystem. It is reported that many policies are "gender blind" and that women entrepreneurs "face price sensitivity - meaning less access to collateral, smaller networks and higher borrowing costs". Furthermore, it is noted that women are more likely to be excluded, for example when it comes to "capital allocation" and "training programmes". Female innovators note this motivates them even more to become successful and they show strong resilience. A female innovator in the waste sector, for example, stresses: "People don't want us in the sector (...) but if I'm honest with you, I feel I need to be very successful in this sector. Just to change the social and cultural barrier that is there".

4 Transition support: not yet driving the intended change

Kenya has a large and active entrepreneurial ecosystem. Whether starting a business or running an existing one, be it in agriculture, waste management or small-scale renewable energy, the Kenyan ecosystem offers a wide range of support. From incubation and acceleration programmes to grant, debt and VC funding, to network activities. This has contributed to a growing number of entrepreneurs operating in the digital and green space.

However, the widespread presence of digital and green entrepreneurs has not yet translated into broader sector transformation that make unsustainable practices obsolete. Despite extensive entrepreneurship support, existing practices remain dominant, so why have digital and green innovations not yet resulted in wider system change in Kenya? The ability to scale and move towards mass adoption of sustainable solutions does not depend solely on individual entrepreneurial effort, it is also shaped by how the ecosystem functions as a whole, including coordination between support actors, access to appropriate finance, and the extent to which regulation supports the uptake of new solutions.

This chapter addresses this question by analysing insights from interviews with ecosystem actors, including ESOs, policy actors, NGOs, investors, financial institutions, academic institutions and development partners. The focus is on ecosystem-level dynamics influencing whether digital and green innovations can grow and replace unsustainable practices. The analysis identifies six key dynamics, where some concern current support structures that are not (yet) functioning effectively, others point towards dynamics that are currently missing yet necessary for the ecosystem to function.

4.1 One-size-fits-all support and quantity over quality

Kenya's entrepreneurial ecosystem is characterised by a high density of ESOs. With over 200 ESOs offering incubation, pre-incubation, bootcamps and short accelerators, thousands of entrepreneurs are trained every year. While this density helps lower entry barriers and explains the large number of digital and green innovations emerging, it also has significant downsides. Most programmes rely on standardised, cohort-based formats that do not differentiate by sector, technology or growth stage. Only a limited number of ESOs offer specialised support in areas such as climate, circular economy or digital, and structured, long-term acceleration support is scarce. This one-size-fits-all approach is especially problematic for digital and green businesses, often requiring specialised technical knowledge to advance. Green innovations typically need engineering, conversion, or systems-integration expertise, while digital solutions depend on data infrastructure, interoperability, cybersecurity and continuous iteration. Generic entrepreneurship training, typically focused on ideation, pitching and basic business skills, does little to help entrepreneurs overcome such sector-specific bottlenecks. This leads to many businesses stagnating even after multiple support programmes.

Despite this mismatch in support versus needs, entrepreneurs continue to move from programme to programme. One reason might be that most programmes include a small grant or the promise of investor exposure at the end. As one innovator put it: "Everyone dangles the same carrot: at the end of the programme, you can meet the investors". This dynamic produces what many describe as 'grant hopping': entrepreneurs cycle through multiple programmes without receiving the depth of support needed to improve their business. An ESO reflected on this saying: "Instead of receiving that patience [to grow and improve], they get pushed on the next training they are potentially not ready for". Grant hopping also has a broader systemic effect. By repeatedly providing small grants, the ecosystem is keeping a large number of potentially unviable businesses alive, rather than allowing failure to occur fast. Several ESOs and development partners noted that failure is actively avoided, saying "There is no readiness to fail. The stakes are so high because right now, we're looking at entrepreneurship as a solution". Another interviewee was more explicit: "Those companies will keep running, being dormant, getting another check or grant. But government and development partners want to count large numbers. Somehow, we are collectively not forcing failure fast enough". In practice, this also means that entrepreneurs optimise their innovation for what development partners want to hear rather than for what their customers actually need or are willing to pay for, leading to business models that are designed for grant eligibility rather than market fit.

Additionally, the system supports far more entrepreneurs than markets can realistically absorb. With thousands of digital and green entrepreneurs trained annually, markets quickly become saturated. As one academic noted, "The market cannot keep absorbing farmer connection apps," while an ESO cautioned that "multiple businesses serving the same narrow market becomes very tricky". A development partner explained this pattern stating "We are overfocused on numbers. Somehow, we think that supporting 100 entrepreneurs is better than supporting a few that can really move the needle". This does not imply that competition should be avoided altogether. In some sectors multiple businesses with similar offering can be beneficial, particularly where solutions require intensive customer interaction and localisation. However, the current model often leads to many uncoordinated initiatives, overwhelming markets rather than building viable value chains.

The persistence of such one-size-fits-all, quantity-oriented support models seems closely linked to development partners' incentive structures. Most donor-funded entrepreneurship programmes are designed, contracted and evaluated through short project cycles with predefined outputs. Performance is assessed primarily on indicators that are easy to specify, monitor and report, such as number of entrepreneurs trained, number of programmes delivered, or amount of grants disbursed. These indicators offer clear accountability to taxpayers, parliaments and internal oversight bodies, but they are weak proxies for business growth, market formation, or transition impact, which typically require longer time horizons. Indeed, development partners keep facing strong incentives to design programmes that maximise quantity over quality. Supporting numerous entrepreneurs with standardised interventions reduces delivery risk and makes results predictable, while providing intensive, tailored, expert-driven support to a smaller number of entrepreneurs is riskier, slower, more expensive and harder to justify.

This logic is strengthened by political and institutional pressures: employment creation agendas favour visible scale, and programme success is often equated with large participation numbers. Implementing partners are then contracted against fixed terms of reference that specify target numbers and predefined programmes, leaving limited room for adaptation. ESOs therefore optimise their delivery to meet contractual obligations rather than entrepreneurial needs. As one ESO stated, "It's already decided what intervention we are coming to provide should do," while another noted, "If it's not in the ToR, we won't do it". Over time, this has normalised a model of entrepreneurship support that prioritises quantity over quality, even though many ecosystem actors recognise this dynamic.

4.2 Silicon Savannah does not fit most entrepreneurs

Within Kenya's entrepreneurial ecosystem, particularly in Nairobi, the tech scene is commonly referred to as the 'Silicon Savannah'. This framing is partly rooted in the government's Vision 2030, which positions technology and innovation as engines of growth and aims to establish Kenya as a regional tech hub, drawing inspiration from Silicon Valley. The Silicon Valley model of entrepreneurship, centred on venture capital, rapid scaling and the expectation that a small number of entrepreneurs will grow exponentially and generate high returns, is increasingly applied beyond only software start-ups with high growth potential, to a wide range of businesses across sectors. Several interviewees noted that this creates distorted expectations for entrepreneurs. As the founder of a prominent tech agency put it: "The idea to create a Silicon Savannah might be creating a distorted vision: It's hard to raise [money], and you can't raise at idea stage like in the US", raising the question: "Are we setting up founders for something that we know that they cannot meet?" While the Silicon Valley model may be appropriate for a small subset of digital businesses that can scale quickly with limited marginal costs, it is poorly suited to most Kenyan entrepreneurs, especially in green sectors.

Many entrepreneurs in green sectors design for impact, aiming to solve concrete problems in sectors as agriculture, energy and waste. These entrepreneurs often rely on technology hardware, physical infrastructure, certification and longer R&D cycles, and they serve markets with limited purchasing power. As one investor explained: "Businesses in Africa take time to grow, to establish. And the kind of capital they need is different than what VCs are usually able to provide". Yet they are frequently pushed towards VC-style growth and financing trajectories. While tech alone is not enough, as one venture studio observed: "The market is certainly there, but what is not working is starting with a software-application. You don't unlock [market] potential with only a digital solution".

Overall, the Silicon Savannah narrative promotes a narrow understanding of what a successful tech-driven business should look like. By extending a VC-centric growth model to enterprises for which it is structurally unsuitable, the ecosystem risks steering entrepreneurs towards financing and growth paths that do not match their technological, market or operational realities.

4.3 Lack of fitting financing structures

The Kenyan financing landscape for entrepreneurs is heavily concentrated around two dominant pathways: small grants delivered through entrepreneurship support programmes, typically up to USD 10,000, and equity investment from impact investors or VCs, usually starting from around USD 500,000 and tied to expectations of rapid growth. In practice, however, entrepreneurs' financing needs are far more diverse than these two options allow. Some require multi-year grant funding to support R&D. Others do not need grants at all, but affordable and flexible debt to purchase assets or bridge payment delays between contracts and revenues. And then there are those that should not receive financing at all, but instead should aim for strengthening their business model, marketing or optimising their financial management. Lastly, there are also businesses, particularly those delivering public services such as waste management, that will structurally require some additional financing to cover operational costs.

Despite this diversity, many entrepreneurs are placed on a uniform financing trajectory: first small grants, followed by pressure to pitch to investors. This approach leaves a pronounced 'missing middle' between grants and larger equity tickets. Businesses that do not fit equity investment models, such as many sustainability-oriented SMEs, are left with few alternatives once grant funding ends. Their only remaining option is often commercial finance, characterised by high interest rates, strict collateral requirements and a banking sector that is structurally risk-averse towards smaller and sustainability-oriented businesses. So, businesses become stuck between 'grant' and 'equity' phases, with no appropriate instruments to support the growth phase in between. Additionally, many of these businesses will never need, nor be able to absorb, USD 500,000 investments, and pushing them towards that target is neither realistic nor desirable. As a result, entrepreneurs are "over-accelerated and under-funded" (impact investor). This dynamic is especially visible amongst digital and green innovators, who face high upfront costs and slow payback periods that demand different forms of capital. The current financing logic may work for a narrow subset of software-only start-ups, but it is poorly aligned with the growth paths of most sustainability-oriented businesses. In short, "you cannot pitch your way to patient capital, or follow a six-month programme to a certified product" (impact investor).

In theory, bank loans could bridge the gap between grants and equity. In practice, this has proven extremely difficult. Several initiatives aimed at de-risking bank lending have been introduced, but most have failed to scale, not because the mechanisms are absent, but because banks lack incentives to deploy them. As one investor explained: "A guarantee fund has been tried several times but those banks in the end weren't incentivised to give out these loans. Somehow the incentive system, it's not geared towards any efforts in SMEs. As an account manager of SMEs, it's a lot of extra work versus [investing in] a bigger company. As long as government bonds offer safer and easier returns, lending to SMEs remains unattractive".

Finally, investors and funders often follow the path of least resistance. Tracking what other investors fund is easier than conducting independent due diligence, which results in capital repeatedly flowing to the same 'usual suspects'.

As one research institution noted: "One of the criteria to fund is that you've been funded before. Which is severely limiting the potential of the market to diversify". Similar patterns emerge in founder selection, where talent is often sourced from the diaspora or foreign founders due to perceived ease, familiarity and network access. The result is a system that repeatedly channels capital towards the most visible and connected entrepreneurs, raising questions about whether financing is reaching those who need it most to drive sustainable transformation.

4.4 Absence of innovation-level support: driving market demand and awareness

For digital and green innovations to drive sustainability transitions, they must ultimately scale and outcompete business as usual. This requires widespread user adaptation, meaning that innovations need to become cheaper, easier to use and more convenient than existing alternatives. Affordability is a critical part of this equation, "For any innovation, for it to be uptaked, it has to be affordable" (iNGO). If innovations do not meet customers where they are in terms of price, accessibility and convenience, they are unlikely to replace incumbent practices, regardless of their environmental or social benefits. Yet many innovations are not designed with these realities in mind. As one ESO observed: "[Innovations are, ed.] not pegged on the masses. So, we have very good innovations, but they don't understand how people live their lives and how they spend their money". Commercialisation and demand-side understanding remain weak, while product-market fit receives limited attention. Instead, entrepreneurs are frequently trained in pitching and fundraising. As a result, solutions are developed that do not align with user realities, such as digital tools for farmers who do not own smartphones. As one ESO put it: "Pitch decks create a new reality, not an incentive to solve business problems".

Beyond individual business readiness, adoption is further constrained by structural market barriers. Trust is fragile due to past experiences with failed projects or scams. Digital solutions depend on unevenly distributed digital literacy and data infrastructure. Consumer behaviour is difficult to change, and affordability dominates all other considerations. Despite this reality, ecosystem support remains heavily focused on individual entrepreneurs rather than on the conditions required for innovations to scale. In line with development partner performance metrics, individual founders are celebrated, while competitiveness, demand creation and ease of adoption of innovations in general remain largely unaddressed. Growth of an individual entrepreneur hardly ever translates into transformation of a green sector. Until support shifts towards market readiness, through customer education, distribution infrastructure, standards and coordinated sector development, innovations will continue to struggle to grow and to outcompete business as usual, regardless of how many incubation programmes individual entrepreneurs complete.

A small number of examples illustrate what more market-focused support could look like. One irrigation business, after participating in several incubation programmes, became an implementing partner in a donor-backed programme raising farmer awareness about irrigation. Rather than improving only business-level readiness, this intervention strengthened demand for irrigation systems across the sector.

Similarly, the Electric Mobility Association of Kenya received support to professionalise and jointly lobby for interoperability and charging infrastructure, addressing constraints faced by all EV firms at once. These examples show how support can shift from individual entrepreneurs to sector-level competitiveness. However, such approaches remain the exception. The vast majority of entrepreneurship support continues to focus on training or impact finance, with very limited attention to making innovations cheaper, easier to use and more competitive at scale.

4.5 Policy barriers and unintentional incumbent protection

Kenya has developed policy frameworks to support digital and green innovation, including a green economy strategy and several start-up initiatives. However, these frameworks remain, as one government institute noted, "overly broad and generic". Moreover, it is reported that there is a mismatch between ambitions articulated in policies and actual policy incentives. In practice, general entrepreneurship policies may create a supportive environment on paper, but almost all interviewed digital and green entrepreneurs face highly specific regulatory barriers that directly constrain growth. These include costly or unclear standards, complex certification processes and prohibitive laws around drone usage, for example. In addition, frequent changes in tax policy undermine the stability that entrepreneurs need to plan investments and business models.

Furthermore, existing regulatory frameworks often reinforce incumbent practices rather than enabling new ones. Several innovators highlighted how policies that appear neutral in principle create unequal competition in practice. An entrepreneur producing organic fertiliser from waste, for example, explained that conventional fertiliser is subsidised, while sustainable alternatives require expensive and difficult licences to access similar benefits. Similar challenges emerged across agriculture and waste: innovators repeatedly pointed to one or two highly specific rules, certifications or standards that are expensive and difficult to meet, while existing policies continue to support business-as-usual practices such as fossil fuel use. Although such subsidies are politically difficult to remove given their role in livelihoods, the effect is a non-neutral playing field. Electric or solar alternatives remain more expensive, forcing consumers to pay a 'green premium' that many cannot afford. As the same organisation reflected: "The greatest danger to our industrialisation process? The same government! They killed fantastic innovations: over-controlling and asking for impossible requirements to be met at the beginning".

One policy instrument with the potential to address these barriers is green public procurement. As one government organisation stated: "If government, which is the greatest buyer of goods and services, can choose to buy green then the private sector has no choice but to innovate". Preferential procurement could create demand at scale and crowd in private-sector adoption. However, existing procurement rules do not yet enable this. While Kenya's procurement authority is working on reforms, progress is constrained by limited funding.

Changing policies requires advocacy and coordination. Awareness must be built both within government, innovators and amongst end users. Yet consultation with the innovators remains limited. In response, some innovators have organised themselves collectively through associations such as the Kenya Association of Manufacturers, the Electric Mobility Association of Kenya and the Kenya Association of Waste. These platforms enable joint lobbying but also face resistance from incumbent actors. In electric mobility, for example, diesel-based companies have pushed for local content requirements on public transport that disadvantage e-vehicles reliant on (heavy) imported batteries. Public awareness campaigns could also potentially support adoption. The cookstove sector illustrates how coordinated policy support, donor attention and consumer awareness helped build a market. According to one technology institute, adoption was driven by popularisation efforts combined with pro-poor policy under the National Cooking Transition Strategy. Even so, penetration still remains low highlighting how difficult transition processes are.

A key reason these policy bottlenecks persist is that development partners rarely fund innovation-specific regulatory work. Most development partner-supported policy engagement focuses on broad, highly visible reforms such as start-up acts, innovation strategies or generic entrepreneurship frameworks. While these initiatives are politically attractive and relatively easy to standardise, they do little to address the concrete rules, standards and procurement criteria that shape whether specific digital or green innovations can scale. Targeted regulatory change requires deep sector knowledge, long-term engagement with line ministries and regulators, and long time horizons, but these activities rarely fit funders' project cycles or output-based KPIs. As one ESO summarised: "You cannot lobby without a budget". Building associations is one step; sustained policy engagement requires resources that many innovation-driven entrepreneurs and ESOs simply do not have. As a result, ecosystem support continues to prioritise generic policy reform, while the innovation-specific regulations that matter most for transitions remain largely unexplored.

4.6 Weak coordination between actors undermines collective impact

Kenya's entrepreneurial ecosystem contains a large number of actors: numerous ESOs, dozens of development partners and multiple government agencies with a mandate related to innovation and entrepreneurship. Yet a recurring finding across interviews was that coordination between these actors is weak. ESOs largely operate in isolation, both from one another and from other parts of the ecosystem, such as academia and government. Rather than functioning as a connected system, the ecosystem is more a collection of parallel initiatives, often addressing similar problems in similar ways. Relevant government bodies and institutions will rarely engage directly with the ecosystem or with ESOs, but rather take on a supervisory and policy enforcement role, as one ESO shared: "after inviting the revenue authorities to enlighten and aid entrepreneurs on tax compliance, all participants were audited by the same authority the following week".

This lack of coordination results in programme duplication, limited synergies and the repeated application of approaches that are known to fall short. Several interviewees noted that ESOs frequently run similar curricula, without building on each other's experiences, pipeline or adjusting designs based on past outcomes.

Fragmentation is further reinforced by competitive dynamics between ESOs, which are often competing for the same contracts. As one ESO explained, mistrust runs deep, with 'poaching of staff' cited as a common concern. Building trust and collaboration requires interaction, as one respondent put it: "You need to have monthly meetings to trust each other". However, programme-based funding rarely allows time or resources for this kind of relationship-building, and "If it's not funded, we don't do it" (ESO).

Coordination gaps are also visible in the relationship between ESOs and academia. ESOs reported that researchers frequently approach them to conduct interviews or collect data, but rarely provide feedback or practical insights in return. While academic institutions say that they often have the methodological expertise and, in some cases, budgets to conduct more rigorous research on what works in entrepreneurship support, but struggle to engage ESOs as partners. As one research institute noted on the importance of doing research: "We don't have evidence to know where we should really be drilling in - what kind of models work best, for which kind of start-up?" ESOs, in turn, emphasised that collaboration with researchers is difficult when it is not explicitly funded. The result is a continuing gap between practice and evidence, where lessons remain anecdotal and are rarely translated into programme redesign.

Development partners also play a central role in keeping these dynamics in place. By funding organisations individually through short-term, output-driven contracts, funders inadvertently incentivise competition rather than collaboration, driving down price and thus financial sustainability across the ecosystem. Additionally, limited resources are allocated to ecosystem-level learning, coordination and data infrastructure, as well as long-term data collection. As a result, neither ESOs nor development partners and funders can say with confidence which interventions lead to sustained business growth or survival over time.

These pressures contribute to a pecking order in the entrepreneurial ecosystem that reinforce many of the challenges outlined. The ESOs at the bottom of this pecking order face pressures from development partners, investors, entrepreneurs and competing ESOs. These pressures make it difficult to develop and sustain the internal capacity for most ESOs, which in turn affects the level of service offered to entrepreneurs and the value generated for development partners and investors, which in turn generates a negative spiral that in the end affects the quality of service delivered by the ecosystem as a whole. This is especially felt by entrepreneurs with digital and green innovations as they more than most sub-groups need the support of the whole ecosystem. As one ESO framed it: "I cannot afford to pay my team competitive salaries, so I never know when they will leave; and I cannot afford to develop them because whatever little means I can afford in this regard will only benefit the ecosystem player who eventually will poach them". This lack of sustainability is also witnessed by the relative limited experience (lifespan) of the majority of the 200 active ESOs in Kenya and the fact that most of the ESO founders and operators do this as a secondary or tertiary activity, supplementing their income through unrelated business or employment.

5 Conclusions

This white paper examines how digital and green transitions are emerging in Kenya, focusing on agriculture, waste management and small-scale renewable energy. It is the second in a three-part series exploring how these so-called 'twin transitions' unfold in African countries with active entrepreneurship ecosystems but limited systemic change. The goal is to understand why innovation is growing, yet sector-wide transformation remains limited. The Multi-Level Perspective (MLP) provides a structured way to understand how sustainability transitions fuelled by digital unfold over time.

Using the MLP, we find that digital and green transitions in Kenya are largely limited to niche innovations, with many solutions struggling to achieve widespread market penetration. Despite significant activity in sectors like agriculture, waste management and small-scale renewable energy, innovations such as solar irrigation systems, e-mobility and clean cooking technologies have yet to break through to the mass market. While these innovations have gained initial traction, they face structural barriers that hinder broader adoption (see chapter 3). The entrepreneurial ecosystem in Kenya has played a crucial role in fostering innovation at the niche level, providing essential support like grants, training and networking opportunities. This has allowed entrepreneurs to experiment with new ideas, test solutions and gain early visibility. However, when it comes to scaling innovations and moving from isolated pilots to mainstream, large-scale adoption, the system still faces challenges in enabling innovations to scale. The key challenge is that while innovation is abundant, additional support is needed to drive widespread market adoption. The current ecosystem primarily supports early-stage individual entrepreneurs and businesses but still has limited mechanisms in place that are necessary to help innovations scale. This includes challenges such as access to appropriate financing, misaligned policies, no demand-creation support and ESOs lacking capacity in this regard. As the research has shown, these barriers play out across multiple sectors: solar irrigation systems are available, but their adoption remains limited due to affordability concerns, a lack of consumer awareness and inadequate market development. E-mobility solutions, despite being a policy priority, face barriers like lack of charging infrastructure, high upfront costs and slow regulatory processes. Even clean cooking innovations are hindered by pricing issues and competition from cheaper, often subsidised, traditional fuel sources. While entrepreneurial activity in Kenya is plenty, the insufficient support for scaling these innovations means that they struggle to achieve the widespread impact needed to challenge and replace unsustainable practices. The entrepreneurial ecosystem, despite its early success in fostering innovation to emerge, is currently insufficiently equipped to help innovations go from individual business experiments to sector-wide transformations. This gap between early-stage innovation and market-wide adoption is one of the key barriers to accelerating Kenya's digital and green transitions.

Now, when we look at the support offered by entrepreneurship support funders, including development partners, governments and philanthropic organisations, and how it could help overcome the key barriers to achieving twin transitions, we can distinguish two challenges. First, there are activities that exist but could

be improved to have more impact. Second, there are activities critical to the scaling of niche innovations, regime disruption and landscape influence that are either not being done at all or are insufficiently being done.

The support offered to digital and green entrepreneurs in Kenya, while extensive, is insufficient in addressing the need for innovations to scale to create market adoption. A major issue is the one-size-fits-all approach that dominates both entrepreneurship training and financing. Many ESOs offer standardised programmes that do not account for sector-specific needs as well as needs relating to the growth stage of the business. This leads to a mismatch in support, entrepreneurs working in green and digital sectors require tailored technical expertise and long-term support, but instead, they often receive general business skills training that does not help them overcome bottlenecks. Similarly, the financing landscape is dominated by small grants or large equity investments, leaving many innovators stuck between these two extremes, with no appropriate financing mechanism (e.g. grant, debt, equity or blended instruments) to scale their businesses. Entrepreneurs often find themselves in a loop of grant hopping, cycling through programmes without the depth of support necessary to move forward. Additionally, there is limited coordination across ecosystem actors, such as ESOs, investors and government entities, which results in duplicated support and missed opportunities for collaboration, where multiple programmes offer similar interventions without building on past experiences or learning from previous programmes.

In addition to the support that exists but could be improved, there are also areas of support that are (almost) completely missing, yet are critical to accelerating Kenya's twin transitions. One of the most important support gaps is market-level support, particularly in terms of driving demand for green and digital innovations. For these innovations to scale, they must become affordable, easy to use, and more convenient than existing unsustainable alternatives, but support programmes often focus narrowly on individual entrepreneurs without addressing the broader market conditions needed for solutions to scale. Innovations sometimes fail to align with the real-world needs of customers, as many are struggle with affordability or user realities, limiting adoption, particularly amongst low-income communities. Too little attention goes towards supporting innovators to educate customers, deal with affordability, build trust and ultimately shift consumer behaviour. Policy usually plays a critical role in making innovations become more affordable and convenient than unsustainable practices. Unfortunately, policy barriers persist, with existing policy frameworks aimed to stimulate innovation remaining too generic to tackle specific regulatory issues faced by the wide variety of green and digital innovations. Additionally, policies frequently reinforce incumbent practices, such as subsidies for fossil fuels or conventional fertilisers, while creating obstacles for sustainable alternatives. Clear standards, fast-tracked approvals, tax incentives or green public procurement could create the demand for new solutions, but such initiatives are missing.

If we relate this back to the MLP (see chapter 2), we can see that while significant attention is directed at the lower niche level (where digital and green innovations are emerging) and at the upper landscape level (where there is general policy attention to innovation, sustainability and digitalization), the critical middle levels,

those involving interactions between the niche and the regime, as well as the landscape and the regime, are insufficiently addressed. These levels are where real change needs to occur: scaling niche innovations and helping them transition into broader market acceptance (niche-regime interaction) and influencing the unsustainable practices that dominate current systems (landscape-regime interaction). The current entrepreneurship support system primarily supports niche innovations and individual businesses but fails to provide the necessary support and interventions for these innovations to challenge the status quo or trigger systemic change. Regime disruption and broader landscape shifts, essential for accelerating transitions, are not adequately supported or facilitated. The necessary policies, market incentives, and targeted interventions that could help scale innovations and dismantle unsustainable practices are largely absent. Therefore, while Kenya has strong niche-level activity and some landscape-level pressures, the gap remains in the middle, where innovations must be scaled and where unsustainable practices must be disrupted to enable a broader transition.

Kenya vs. Senegal

This paper on Kenya's digital and green transitions is the second in a three-part series, with the first part focused on Senegal. Where Senegal's entrepreneurial ecosystem is in development, with roughly 10 high-quality ESOs and around 40 businesses actively working on digital and green innovations, Kenya's ecosystem is larger and more mature. The Kenyan ecosystem comprises of over 200 ESOs and around 400 businesses across sectors like agriculture, waste management and small-scale renewable energy, all leveraging digital tools to drive green transitions. Kenya also offers a broader array of financial options and a more mature entrepreneurial ecosystem, which has enabled a larger number of innovations to emerge. The larger volume of innovation in Kenya is a clear indication of more extensive support and resources, but although the volume of support and funding options are higher, the market still struggles to absorb the growing number of innovations, and regulatory policies often fail to encourage the uptake of sustainable solutions. Despite the broader availability of support in Kenya, both countries share a common thread: innovations are not yet driving systemic transformation. While there are many innovations emerging at the niche level, these still struggle to scale or disrupt existing practices across sectors. The same pattern occurs: significant support at the niche level and some landscape-level efforts, but insufficient attention to the critical regime-niche and regime-landscape interactions necessary to scale innovations and disrupt unsustainable practices.

6 Recommendations: an industry perspective

This final chapter presents recommendations from four ecosystem actors: one development partner, one ESO, one network of ESOs and one venture builder. Their recommendations are based on their reflections to the findings of this white paper. The list below shows how support structures must evolve if digital and green innovations are to move beyond isolated businesses and contribute to sector-level transformation.

1. Move from generic support to technically relevant support: Support programmes should go beyond business basics and provide access to sector- and technology-specific expertise. ESOs do not need to become technical experts themselves, but they must be sufficiently familiar with the innovation landscape to involve relevant mentors, engineers, sector specialists and institutional partners in the programme. The design of programmes should ensure that technical depth and entrepreneurial support reinforce each other. This also requires capacity building, as now few ESOs have the skills to systematically assess which interventions a business needs. Building this diagnostic capacity is critical. Without it, entrepreneurs are exposed to full toolboxes rather than targeted support. Stronger assessment would also allow grouping of businesses into focused sub-cohorts where appropriate, without reverting to generic mass training. Venture building models which embed expert operators, such as interim CTO's, product leads and data specialists, directly into companies could be a way to deliver more sector- and technology-specific grounded support.

2. Provide longer-term support beyond early-stage incubation: Short-term, cohort-based incubation is insufficient for digital and green innovators operating in complex sectors. Interventions should enable ESOs to support businesses across early, middle and growth stages, including product refinement, market development and scaling for a longer time period spanning multiple years. This requires funding structures that allow for continuity rather than one-off projects, and support actors capable of supporting businesses beyond ideation. An academy-style intervention could upskill existing ESOs and future ecosystem professionals in growth-stage support, sector analysis, financial readiness and scaling strategy.

3. Integrate capacity building and finance with clear performance thresholds: Programmes should combine leadership development, operational support and financial instruments within one coherent framework. Entry and continuation criteria should be stricter, allowing deliberate funnelling and milestone-based support. Not every business should progress automatically. Stronger selection and elimination mechanisms can increase overall quality and avoid keeping unviable businesses artificially alive. Thresholds should account for sector-specific capital intensity and payback timelines.

4. Co-create interventions with ecosystem actors: Terms of reference should be developed in genuine consultation with local support providers such as ESOs, investors and sector actors. Industry and local knowledge must shape programme design from the start, rather than being incorporated after contracting. This would improve relevance and reduce repetition of ineffective formats.

5. Design financial instruments for early-traction and growth-stage realities: The 'missing middle' must be addressed through flexible financial products aligned with business cash flows, for example blended debt-equity instruments that reduce the dilution burden on founders during early traction and revenue-based financing as an alternative to equity for businesses with predictable recurring revenue. Pricing should reflect performance and milestones, and disbursement structures should be adaptable. Financial support should be integrated with technical and strategic capacity building to align incentives across entrepreneurs, ESOs and funders.

6. Reform risk mitigation to incentivise real demand-side risk-taking: Guarantee facilities and blended finance structures should reward active use rather than penalise it. Risk-sharing mechanisms should encourage financial institutions to expand disbursement to new borrower profiles instead of favouring established clients. The objective should be additionality, not portfolio protection.

7. Shift support funding from activities to institutional strengthening: Current funding models often finance outputs rather than organisations. If support actors are expected to deliver long-term, specialised support, they require sustainable organisational capacity. Funding structures should invest in the 'orchard' not in individual 'apples only'. This includes organisational development, sector knowledge and long-term staffing stability.

8. Support collective demand creation and market-building efforts: Even strong innovations will remain limited to early adopters without broader demand-side interventions. Awareness campaigns, sector-level coordination, targeted subsidies and public procurement can accelerate adoption. These efforts should not be left solely to entrepreneurs. Innovators, ecosystem actors and development partners can play a role - particularly via associational models where companies jointly fund advocacy and standards, with development partners playing a time-limited catalytic role in seeding them. However, coordination and prioritisation are required to avoid fragmentation.

9. Enable carbon finance as a parallel revenue track: Carbon finance can be an important enabler for transitions because it allows innovators to subsidise sustainable solutions for (low-income) users, generate non-dilutive revenue and de-risk businesses for investors, while also driving emission reduction. Innovators could therefore actively act upon carbon finance opportunities. They should however be careful in making their business model dependent on it, given Kenya's underdeveloped market infrastructure for carbon credits and regulatory instability. In turn, the government could build accessible and reliable carbon credit infrastructure and establish stable regulatory frameworks.

10. Embed research and learning within ecosystem support: Research should be integrated into ecosystem actors' operations to systematically identify business needs, sector bottlenecks and effective support models. Partnerships with local research institutions can improve programme design and help clarify ecosystem roles. Evidence-based iteration should replace repetition of standardised programme formats.

7 References

Abuya, R., & Mubaiwa, K. M. (2025). Kenya's twin transition: Leveraging digitalisation and green growth for a sustainable, inclusive economy. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Abuya, R. (2025). Kenya's Green Leadership: Shaping Africa's Climate Future. Retrieved from https://www.csis.org/analysis/kenyas-green-leadership-shaping-africas-climate-future

African Union. (2023). Africa Green Industrialisation Initiative. African Union Commission. https://au.int/en/pressreleases

ANDE. (2023). Ecosystem snapshot: Green entrepreneurship in Kenya. Aspen Network of Development Entrepreneurs (ANDE). Retrieved from https://andeglobal.org/wp-content/uploads/2023/02/ANDE_Ecosystem-Snapshot_Green-Entrepreneurship-in-Kenya.pdf

Amugsi, D. A., Muindi, K., & Mberu, B. U. (2022). Implementation of solid waste management policies in Kenya: challenges and opportunities. Cities & Health, 6(3), 528–535. https://doi.org/10.1080/23748834.2022.2071566

Best, R. (2023). Assets power solar and battery uptake in Kenya. Energy Economics, 123, 106723. https://doi.org/10.1016/j.eneco.2023.106723

Clasp. (2023). Solar-Powered Irrigation Systems Challenges & Opportunities in Kenya. Retrieved from https://www.clasp.ngo/wp-content/uploads/2023/03/SPIS-Workshop-Report_Version-V_15032023.pdf

DataReportal. (2024). Digital 2024: Kenya. Retrieved from https://datareportal.com/reports/digital-2024-kenya

Dansk Industri. (2024). Kenya country profile 2024. DI – Dansk Industri. Retrieved from https://www.danskindustri.dk/globalassets/kurser-arrangementer-og-netvark/arrangementer/2024/5/di-kenya-country-profile-2024_web.pdf

Digital for Development Hub. (2024). Investor's pocket guide: Kenya. Retrieved June 26, 2025, from https://cms.d4dhub.eu/assets/Investor%E2%80%99s-Pocket-Guide-Kenya.pdf

GOGLA. (2024). PURE roadmap report:
Kenya. Global Off-Grid Lighting Association. Retrieved from
https://gogla.org/wp-content/uploads/2024/11/Gogla_PURE-Roadmap-Report-Kenya.pdf

Government of Kenya. (n.d.). Vision 2030. Retrieved from
https://vision2030.go.ke

ICT Authority. (2022). The Kenya National Digital Master Plan 2022—2032. Retrieved from
https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf

International Energy Agency. (2025). Kenya's energy sector is making strides toward universal electricity access, clean cooking solutions and renewable energy development. Retrieved from
https://www.iea.org/news/kenyas-energy-sector-is-making-strides-toward-universal-electricity-access-clean-cooking-solutions-and-renewable-energy-development

Kiaka, R. (2024). Digital Technology in Kenyan Agriculture:
A Scoping Report. Retrieved from
https://plaas.org.za/wp-content/uploads/2024/05/Working-Paper-67-Digital-Technology-in-Kenyan-Agriculture-Kiaka.pdf

KIPPRA. (2024). The Adoption and Application of Drone Technology and Precision Agriculture in Kenya.
Retrieved from https://repository.kippra.or.ke/server/api/core/bitstreams/0536039c-0332-45b4-8408-e5e7abe29282/content

KNBS. (2024). 2023/24 Kenya Housing Survey. Retrieved from:
https://www.knbs.or.ke/wp-content/uploads/2025/01/2023-24-Kenya-Housing-Survey-Basic-Report.pdf

Mbatia, L. (2025). How e-marketplaces are remaking African trade. Retrieved from
https://ethicalbusiness.africa/2025/12/17/from-field-to-phone-how-e-marketplaces-are-transforming-trade/#:~:text=

Mensink, M., & Verberne, F. (2022). Digital Agriculture Landscape in Low- and Middle-Income Countries.
Netherlands Food Partnership to Fair & Sustainable Consulting. (RVO internal documents).

Ministry of Information, Communications and the Digital Economy. (2025).
E-waste National Guidelines & Implementation Framework for Kenya. Retrieved from
https://dtc-kenya.org/wp-content/uploads/2025/10/eWaste-National-Guidelines-and-Implementation-Framework_DRAFT.pdf?utm_source=chatgpt.com

Ministry of Roads and Transport. (2024). Draft national e-mobility policy for circulation. Government of Kenya.

Ministry of Roads and Transport. (2026). Kenya Launches National Electric Mobility Policy to Drive a Cleaner, Efficient and Sustainable Transport System. Retrieved from https://www.transport.go.ke/kenya-launches-national-electric-mobility-policy-drive-cleaner-efficient-and-sustainable-transport#:~:text=CS%20Chirchir%20added%20that%20electric,motorcycles%20and%20lithium%2Dion%20batteries

Njeru, M. K. (2021). Kenya's Growing Plan: Sustainable Solid Waste Management. Retrieved from https://www.theearthandi.org/post/sustainable-solid-waste-management

Rotich, I. K., Chepkirui, H., & Musyimi, P. K. (2024). Renewable energy status and uptake in Kenya. Energy Strategy Reviews, 54, 101453. https://doi.org/10.1016/j.esr.2024.101453

The Conversation. (2025). Kenya's farmers have lots of digital tools to help boost productivity — how they can be made more effective. Retrieved from https://theconversation.com/kenyas-farmers-have-lots-of-digital-tools-to-help-boost-productivity-how-they-can-be-made-more-effective-246690

RVO. (2026). Accelerating Twin Transitions in Senegal. Retrieved from https://cms.d4dhub.eu/assets/Assets-Events/DGI-RVO-research-Senegal-whitepaper.pdf

WIPO. World Intellectual Property Organization. (2025). Global Innovation Index — Kenya. https://www.wipo.int/gii-ranking/en/kenya

Global Gateway

DIGITAL &
GREEN
INNOVATION
ACTION

D4D HUB
EU INTERNATIONAL PARTNERSHIPS
DIGITAL FOR DEVELOPMENT HUB

For questions you can contact:

d4d@rvo.nl