



ACCELERATING THE CIRCULAR ECONOMY
**Integrating Circularity into
Programs, Projects, and Policies**

21-23 February 2024
ADB Headquarters, Manila, Philippines

Digital Technologies for the Circular Economy in Developing Countries

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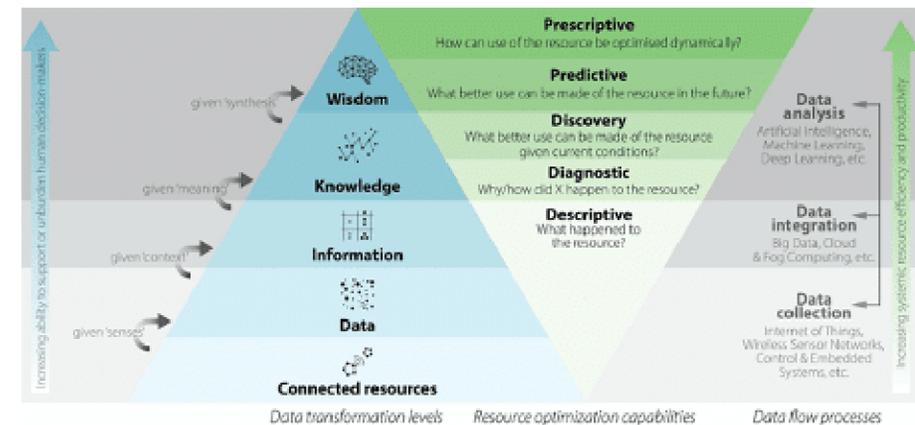
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Opportunities and Challenges
Examples
Conclusion



OVERVIEW

- CE aims to reduce waste, reuse resources, regenerate natural systems
 - Design out waste and pollution
 - Keep products and materials in use
 - Restore natural capital
- Digital technologies can enable and accelerate transition
 - Monitor, optimize, automate circular processes
 - Create new business models, platforms, services
 - Enhance transparency, traceability, accountability



OPPORTUNITIES

- Improving Efficiency and Effectiveness in Resource Management
 - Digital technologies can help to improve the efficiency and effectiveness of resource management, waste reduction, and recycling in developing countries.
- Creation of Circular Platforms and Networks
 - Digital technologies can enable the creation of circular platforms and networks that connect producers, consumers, and intermediaries.
- Innovation and Diversification of Circular Business Models
 - Digital technologies can support the innovation and diversification of circular business models and solutions.
- Enhancing Education, Awareness, and Participation
 - Digital technologies can enhance the education, awareness, and participation of the public and stakeholders in the circular economy.

CHALLENGES

- Negative Environmental and Social Impacts
 - Greenhouse gas emissions, e-waste generation, and resource depletion
- Widening Gap and Inequality
 - Lack of equal access to digital technologies due to infrastructure, affordability, skills, and literacy
- Ethical and Legal Issues
 - Data security and privacy concerns due to collection, processing, and sharing of personal and sensitive data
- Disruption and Displacement of Existing Industries and Livelihoods
 - Social and economic challenges such as unemployment, poverty, and social unrest

DIGITAL PLATFORMS FOR WASTE MANAGEMENT AND RECYCLING

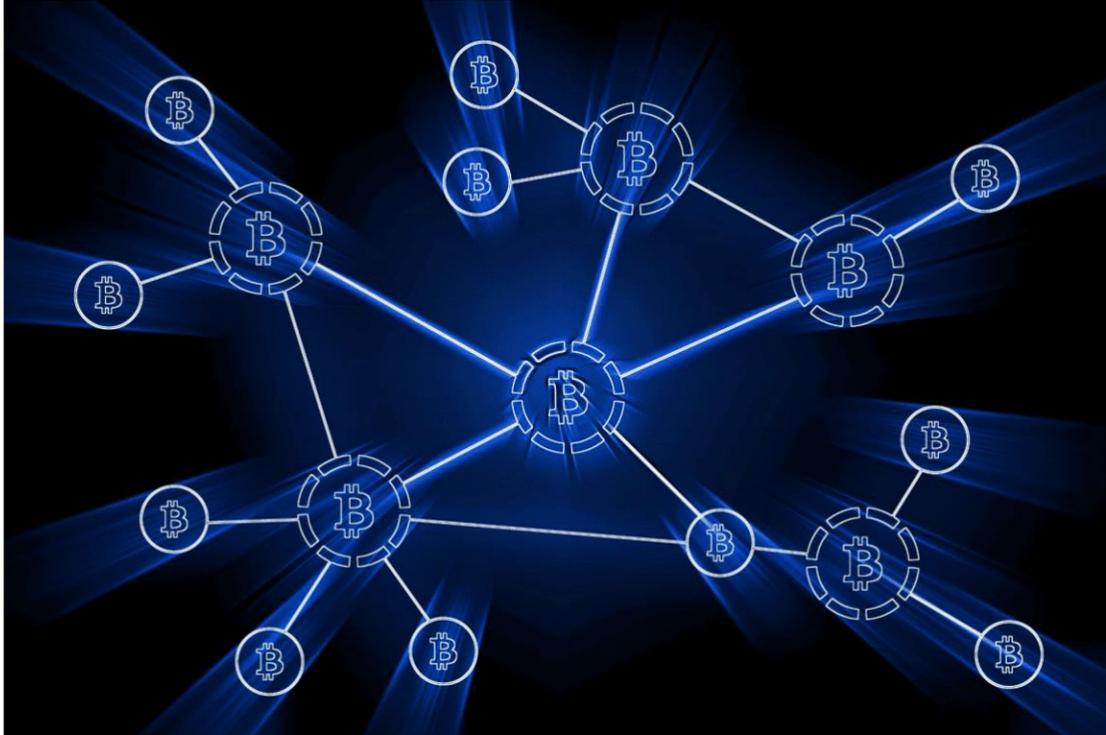


- Connects waste producers with recyclers
 - Facilitates segregation and collection of recyclable materials
- Startups in countries like India and Nigeria
 - Mobile and web applications for waste pick-up services
 - Directs waste to recycling facilities
- Employment opportunities for informal waste workers
 - Stable income while contributing to waste reduction

WASTE MANAGEMENT AND RECYCLING PLATFORMS

- Recykal (India)
 - A digital technology company providing cloud-based waste management and recycling solutions
 - Connects waste generators, processors, recyclers, and brand owners on a single platform
- EcoPost (Kenya)
 - Utilizes waste plastic to manufacture durable and environmentally friendly fencing posts
 - Collects plastic waste and processes it into products that substitute wood
- Wecyclers (Nigeria)
 - Offers household recycling services using a fleet of low-cost cargo bikes
 - Operates a model that incentivizes people in low-income communities to recycle by providing rewards for their recyclable waste

BLOCKCHAIN FOR SUPPLY CHAIN TRANSPARENCY



- Blockchain technology enhances transparency and traceability in supply chains
 - Ensures sustainability and circularity of products by tracking lifecycle of materials and products
- Helps small-scale producers in developing countries verify sustainability of their practices
 - Allows participation in global markets

BLOCKCHAIN FOR SUPPLY CHAIN TRANSPARENCY

- BanQu: A blockchain platform that creates economic passports for people at the bottom of the wealth pyramid
 - Focuses on small-scale farmers and recyclers in developing countries
 - Provides transparency into the supply chain
 - Helps users prove their economic reliability and transaction history
- Provenance: Uses blockchain to enhance supply chain transparency and traceability
 - Allows businesses and consumers to make informed decisions about sustainability and ethical aspects of their purchases

INTERNET OF THINGS (IOT) FOR RESOURCE MANAGEMENT



- IoT devices monitor and optimize natural resource usage
 - Contributes to sustainable consumption patterns
- Smart agriculture technologies reduce waste and improve yields
 - Precise irrigation and fertilization
- IoT sensors monitor product and machinery condition
 - Facilitates maintenance and extends lifespan

IOT AND SMART TECHNOLOGIES



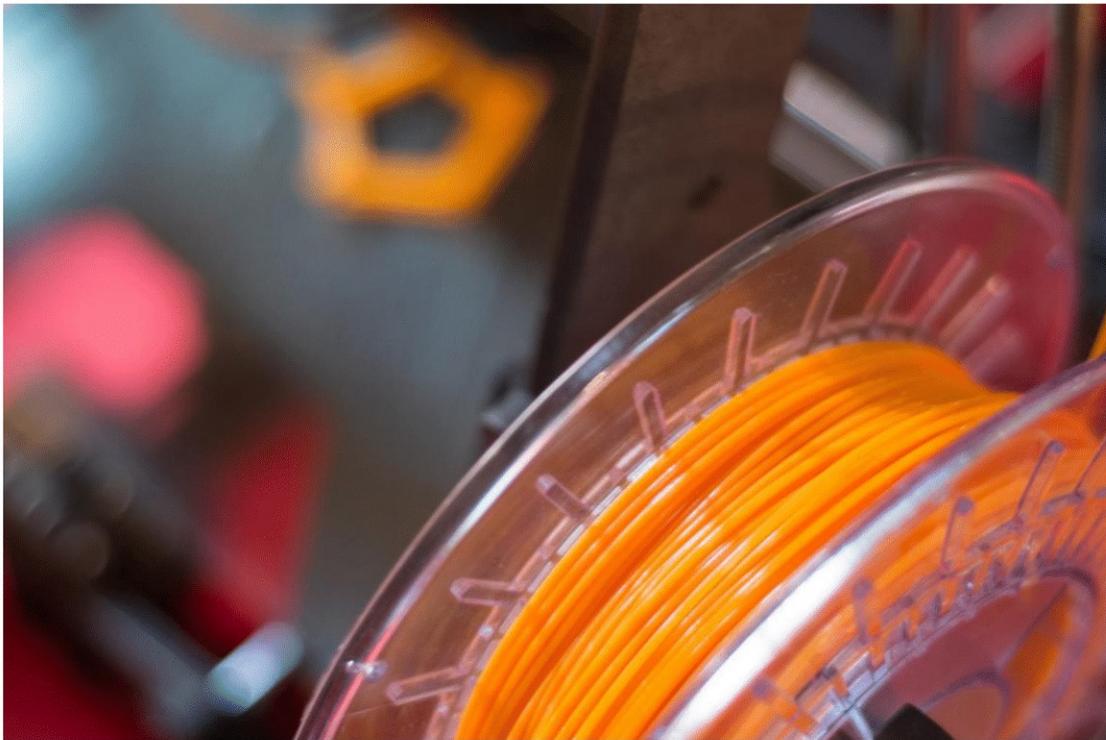
- Hello Tractor: An Agricultural Technology Company
 - Connects tractor owners and smallholder farmers in sub-Saharan Africa
 - Uses a farm equipment sharing app
 - Employs IoT technology for better management of equipment
 - Optimizes usage and maintenance of tractors

3D PRINTING FOR LOCAL PRODUCTION AND REPAIR



- Opportunities for Local Manufacturing and Repair
 - Reduces the need for transportation
 - Promotes the use of sustainable materials
- Supports Decentralized Production Models in Developing Countries
 - Allows for customization of products to meet local needs
 - Enables the reuse of materials

3D PRINTING



- Refilwe, a South African startup
 - Transforms plastic waste into 3D printing filament
 - Provides a sustainable source of material for 3D printing
 - Aims to reduce waste and promote local manufacturing

ARTIFICIAL INTELLIGENCE (AI) FOR CIRCULAR ECONOMY ANALYTICS



- AI can analyze large datasets to identify patterns and opportunities for circular economy practices
 - Optimize material flows through supply chains
 - Predict the lifespan of products
 - Identify the most efficient recycling methods
- Help businesses in developing countries make informed decisions about resource use and waste management

AI FOR CIRCULAR ECONOMY ANALYTICS



- Stuffstr (Global):
 - Uses AI to increase the use and recirculation of stuff people already have
 - Enables retailers and brands to buy back used items from customers
 - Supports a circular model where goods are reused and recycled instead of disposed of

CHALLENGES AND OPPORTUNITIES



- Challenges in Adopting Digital Technologies for Circular Economy Practices
 - Limited digital infrastructure in developing countries
 - Digital divide and need for skills training
- Opportunities for Investment and Collaboration
 - Investment in digital literacy and infrastructure
 - Fostering innovation and collaboration between governments, businesses, and civil society

(HIGH) TECH FOR LOW TECH?

- **Repair Cafes:** community spaces where people can bring their broken items and learn how to fix them with the help of volunteers. This promotes repair and reuse of items, reducing waste and extending the life of products
- **Upcycling:** Upcycling is the process of transforming waste materials into new products of higher value. This can be done through simple DIY projects, such as turning old clothes into rags or creating new furniture from reclaimed wood
- **Sharing Economy:** Sharing economy platforms, such as car-sharing or tool-sharing, allow people to share resources and reduce the need for individual ownership of products. This promotes the efficient use of resources and reduces waste
- **Composting:** Composting is the process of breaking down organic waste into nutrient-rich soil. This can be done at home or through community composting programs, reducing the amount of waste sent to landfills and providing a valuable resource for gardening and agriculture
- **Community Gardens:** Community gardens provide a space for people to grow their own food, reducing the need for transportation and packaging of produce. This promotes local food systems and reduces the environmental impact of food production

CROWDSOURCING

The screenshot displays the challenges.adb.org/en website interface. At the top, there is a banner with three young girls smiling. A dark button with white text says "Press F11 to exit full screen". To the right, a green banner says "Sign up today" and "Participants, sponsors, and partners are all welcome". Below the banner is a navigation link "All programs". The main content area has a search bar and a "Filters" button. The section is titled "Open for registration" and features three challenge cards:

- Asian Development Bank ADB Startup Matchmaking:** "Join the database for the opportunity to work with ADB!". Eligibility tags: Start-up, Student, ADB Employee, General Public, Technology Provider. Countdown: 9810 Days left.
- AI Singapore [Partner Challenge] Online Safety Prize Challenge by AI Singapore:** "The Challenge aims to identify harmful online content, specifically memes, that attack individuals or groups based on characteristics like ethnicity, race, religion, gender identity, and more." Challenge period: 31 JANUARY - 11 APRIL 2024. Prizes: First Place USD 30,000, Second Place USD 15,000, Third Place USD 7,500. Eligibility tags: Start-up, Student, ADB Employee, Corporate Partner, General Public, Technology Provider, Employee. Countdown: 50 Days left.
- Asian Development Bank Innovations for Non-Communicable Diseases and Mental Health Management in Primary Health Care:** "ADB-PATH Innovations Challenge - Taking innovations to primary health care effectively." Eligibility tags: Start-up, Corporate Partner, Technology Provider. Prize: \$20000. Countdown: 4 Days left.

challenges.adb.org/en



SOLUTIONS CATALOG

<https://solutions.adb.org/>

<https://solarimpulse.com/solutions-explorer>

CHALLENGES AND SUPPORT



- Startups integrate digital technologies with circular economy principles
 - Challenges include securing funding, scaling solutions, and navigating regulations
- Support is crucial for growth and impact
 - Support from investors, government policies, and collaborations with established businesses

CONCLUSION

- Integration of digital technologies into circular economy strategies
 - Offers a pathway for developing countries to address environmental challenges
 - Fosters economic growth and social inclusion
- Leveraging digital innovations
 - Enhances resource efficiency
 - Creates sustainable jobs
 - Contributes to global sustainability goals
- Continuous research, policy support, and international cooperation
 - Essential to realize the full potential of digital technologies
 - Advances the circular economy in developing contexts

CONCLUSION

- Digital technologies offer potential for transition to circular economy
 - Especially in developing countries
 - Environmental and social pressures of linear economy are acute
- Challenges and risks need to be addressed and mitigated
 - Adopt holistic and inclusive approach to design and implementation
 - Ensure alignment with local needs, contexts, and capacities
- technology ≠ digital
- Mature technologies ≠ emerging technologies



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Key takeaways

- Digital as an enabler – not driver
- Pick the right digital tech (mature digital technology might work but learn about emerging digital technologies new possibilities)
- Use digital technologies to push the system thinking (crowd sourcing, solutions catalogs..)
- Digital for policy?
Upstream: data / evidence based decision making
Downstream: citizen mobilization



2/21/2024



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References

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[How to make digital technologies for the circular economy work for your business \(AWS\)](#)

[Why digitalization is critical to creating a global circular economy \(WEF\)](#)

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