

Dr. Holger Berg

Digital Circular Economy

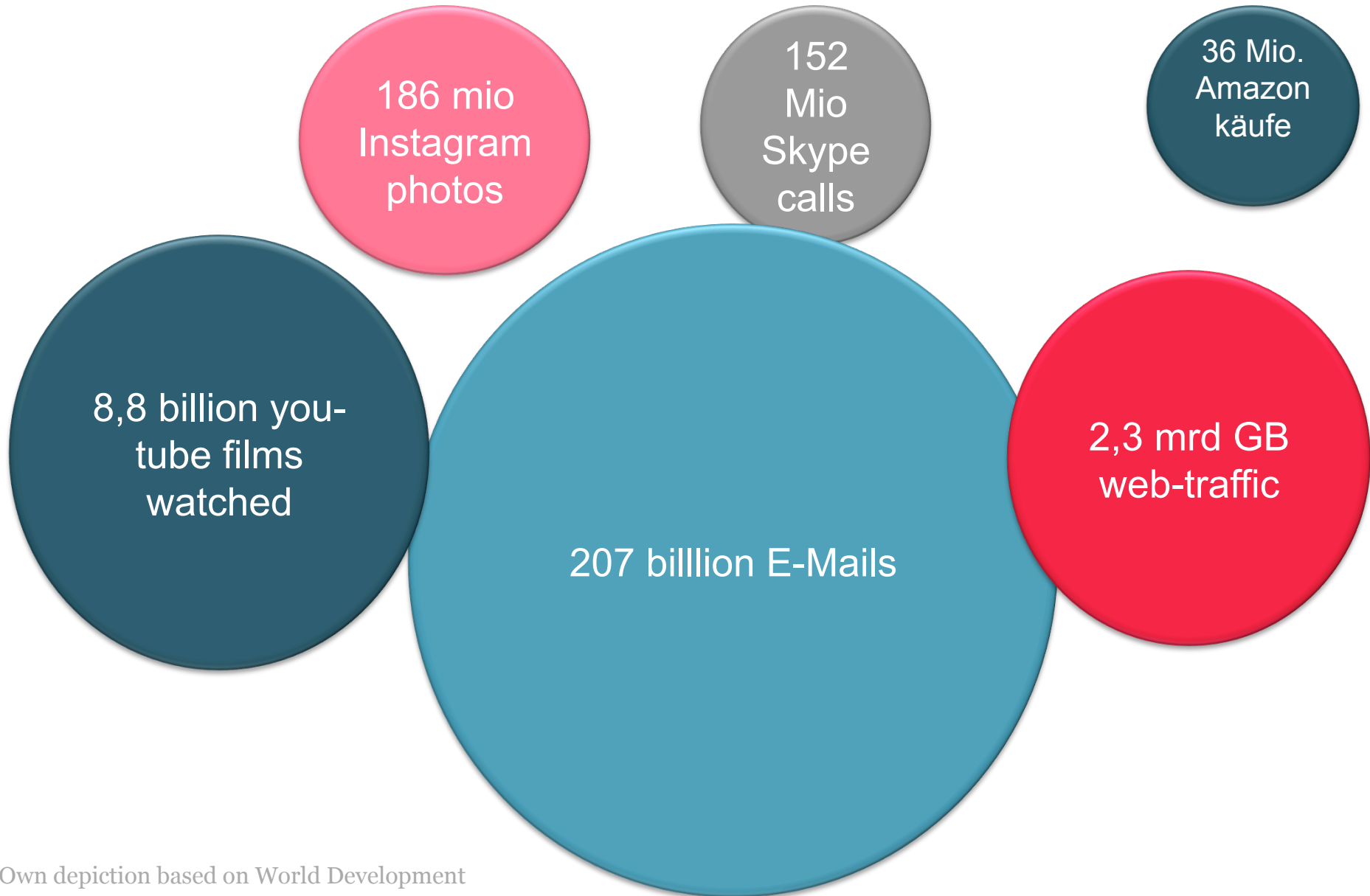
Can the Digital Transformation Pave the Way for Resource Efficient Material Cycles?

What I am (not) talking about...

- Mostly B2B
- Circular is not enough!
- Digital is not sufficient!
- ... it has to be resource efficient!



A day in the life of...



Own depiction based on World Development Report 2016, 6.

Take-Make-Waste Prevails

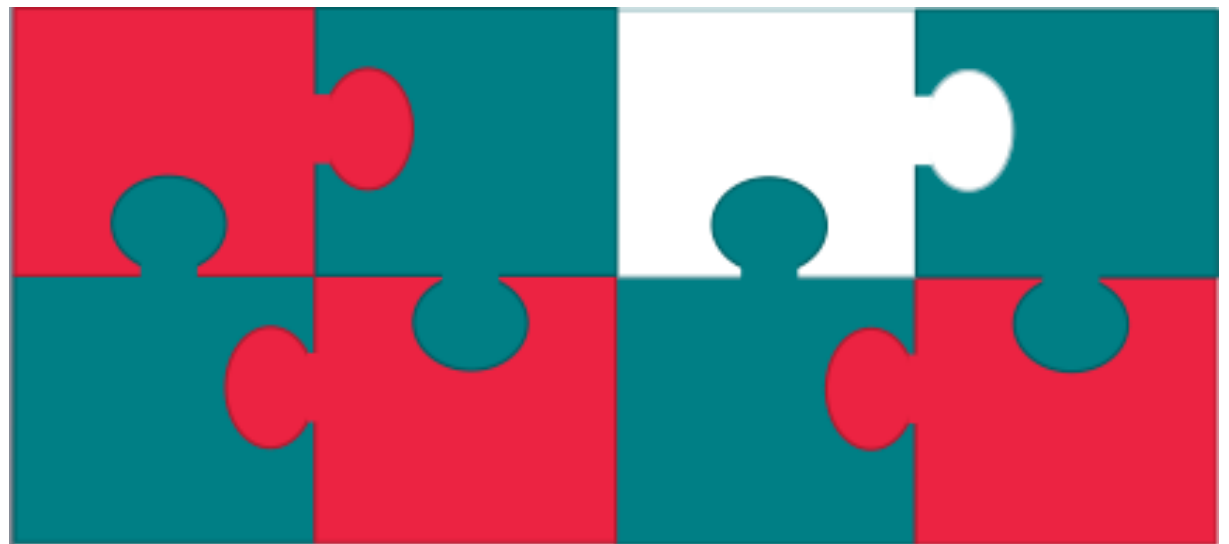
- **Only about 14 per cent of raw materials employed are recyclates (Germany)**
- **Markets and business models for ReUse and ReManufacturing need much more diffusion.**
- **The challenge is (often) not in recycling but in using recyclates.**

Digital Circular Economy

Circular economy

- an information problem

- **Information Failure**
- **Market Failure (transaction and search Costs)**
- **Customer externalities**
- **Technological externalities**



– how to create valuable resources streams

- **Coordination of material- *and* information flows**

→ *Information needs to be processed along with the materials in the cycle*

- **Gathering and storing information about quantity and qualities of products and the raw materials they contain in their lifecycle**

Information e.g. on

- material composition of each individual product
- its use patterns
- its location in the supply chain

should be effectively generated, collected, processed and made available to establish functioning markets and cycles.

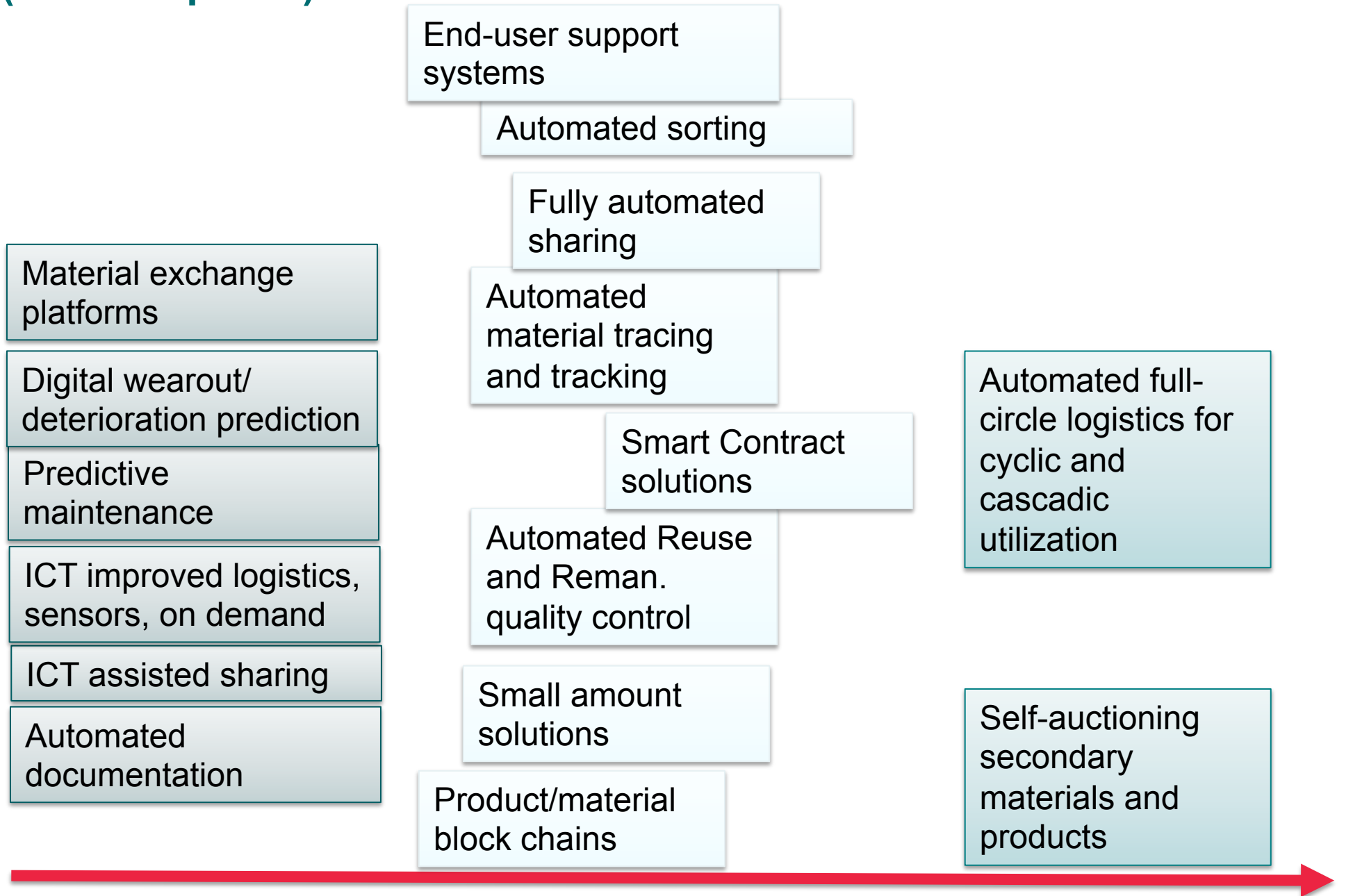
- Collection and generation of data in real-time to create
 - „*Fast Data*“
 - “Big data”
- Lower/eliminate search costs
- Reduce information asymmetry
- Reduce customer externalities

- Information for assembly and disassembly
- information ideally extending across the entire life cycle
- include environment-related information, such as material composition and/or “footprints”

→ Reduce information asymmetry

→ Allow for ReUse, ReManufacturing and Repair

What is there? What is to be expected? (Technosphere)



Case closed

... or is it?

Circular economy	Resource efficiency	Digitalization
Market failures, imbalances and information deficits block the development of a functioning circular economy	The scarcity of many primary resources increases foreseeably	Digital transformation is only timidly commenced
Knowledge about circular approaches is missing: Prevention, Reuse, Remanufacturing, Recycling etc. are not realized,	Prices for primary raw materials are becoming more volatile	Real risks / limitations not regarded: e.g. Speed, Costs of Implementation, Maintenance
Pilot paralysis	Linear processes lead to loss of raw material	Digital Readiness is underdeveloped (especially for SMEs)
The digital transformation is only partially implemented and not “full circle”	Process efficiency is often low with increasing pressure and increasing demands	Benefit-Size-Tradeoff must be solved in many cases
Material not adequately supplied	Knowledge about value chains / networks and alternatives is not present in companies, there are no alliances	Marking/ traceability of products or materials is to be solved

What can we do?

- **Build Bridges**
- **Enable**
- **Big Picture**
- **Provide Guidance**

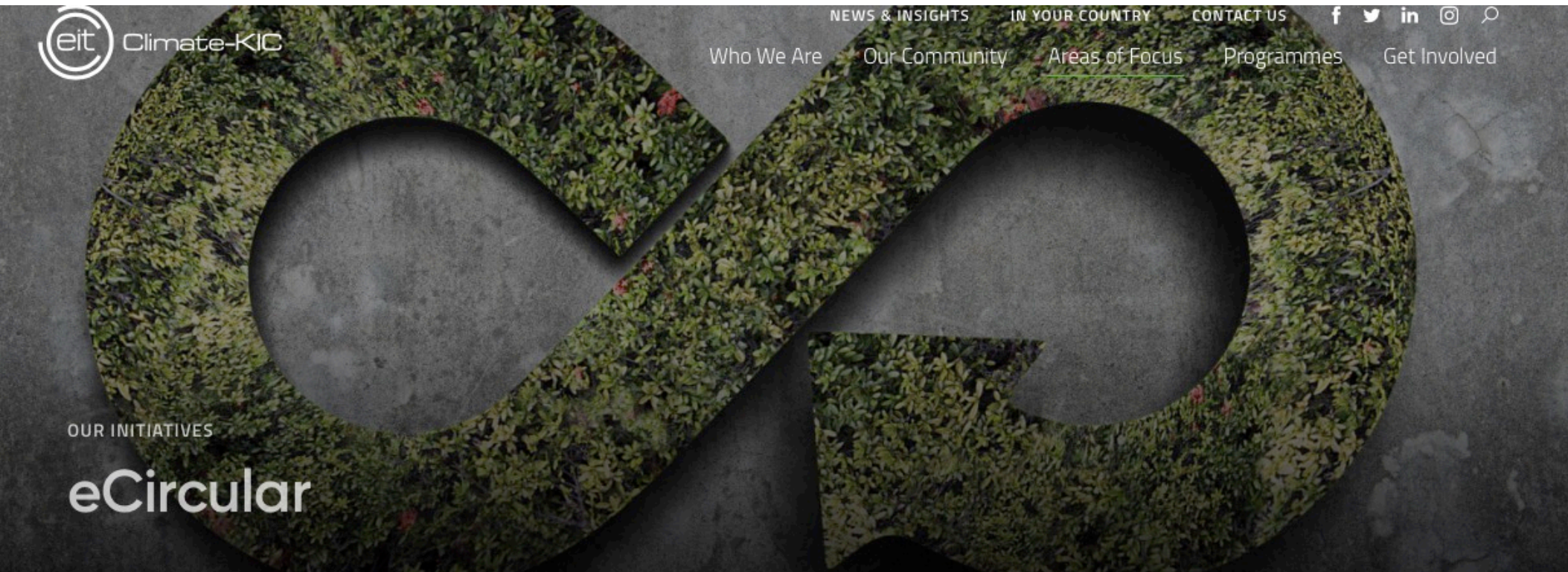
The window of opportunity for this is now!

- **The transition to Industry 4.0, the Internet of Things and data analytics are happening today.**
- **Significant additional costs and expensive system adjustments will be incurred in case of a belated implementation.**

Opportunity for Participation

eCircular – digital Plastic Waste Prevention

<http://www.climate-kic.org/ecircular>



Dr. Holger Berg | holger.berg@wupperinst.org

Thank you for your attention!

CE approaches you do not have to be digital for:

- The best things in life are not things
- Every thing that you possess will sooner or later possess you
- If it works – Keep on using it!
- Do I really need it?
- **THINK!**