Jaarsymposium Circulaire Maakindustrie

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Van circuit board naar zendmast
Impact in supply chain meetbaar en zichtbaar

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What is the essence of circularity for KPN?

Materials flowing-in must be fully recyclable and preferably based on recycled content

INFLOW

Product design:
1. Recyclability
2. Recycled content

Current KPN performance:
Products designed
with recycled content %

Focus on 15 iconic products for KPN to be redesigned by 2022

OUTFLOW

End of Use Reuse &
Recycling rate

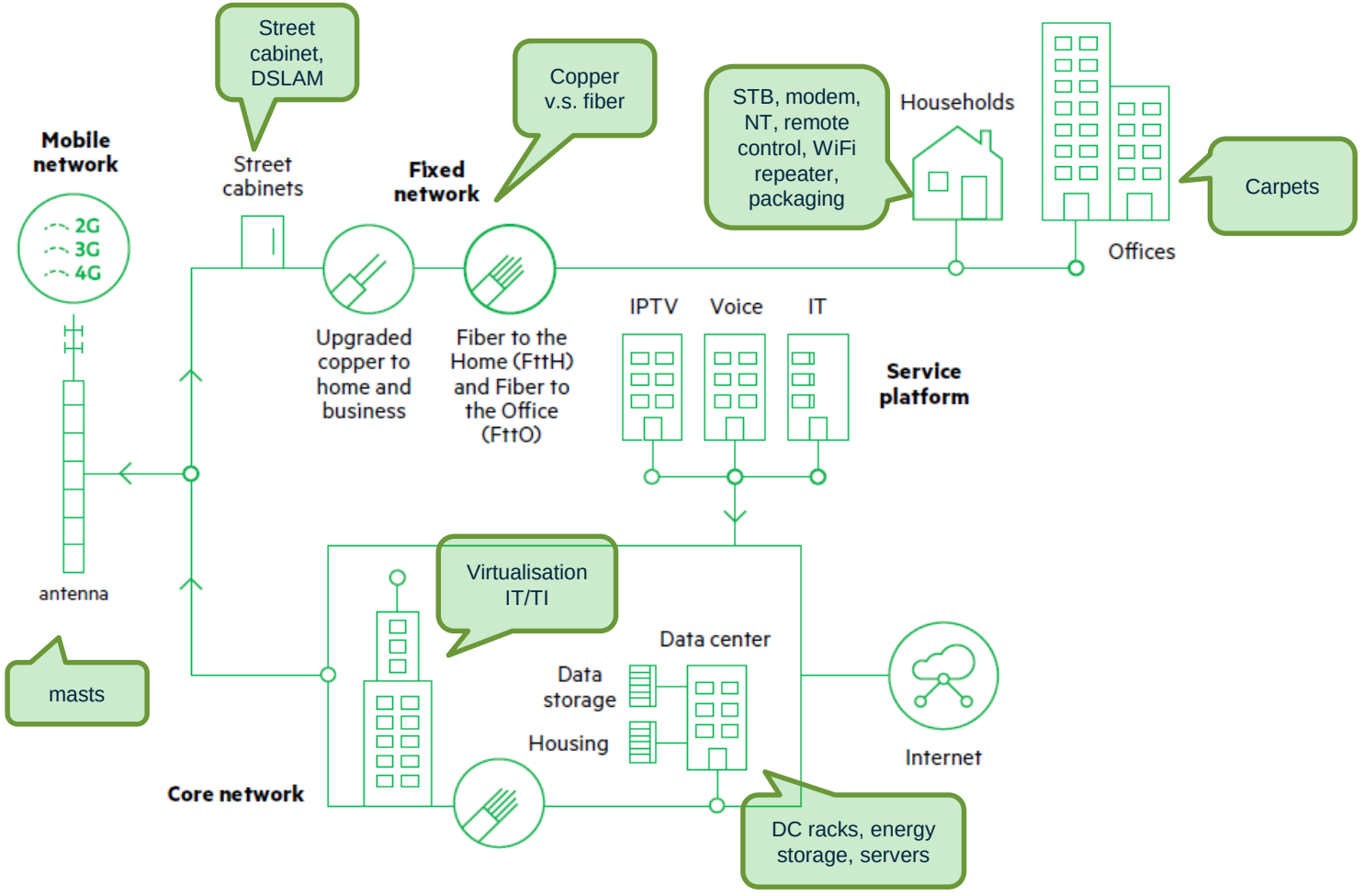
KPN performance 2019:

Reuse% + Re-cycle% 76%
Waste via Incineration 24%
Waste via Landfill 0%

Our ambition: Zero Waste

Product design: measuring circularity of typical KPN products

We focus on 15 product passports for iconic products covering KPN's network and CPE



KPN introduces products with improved circular design

We focus on design, re-use & recycling as part of our 2025 circular ambition
Target 2022: 15 products improved for circular design – 8 realized until now (we focus on key products only)

Entry point internet
25% less plastic

Deep sleep mode:
80% less energy

Smaller design
64% less plastic

900 >> 250 kilo

Modular Design
Recycled plastic cover

Modem

Black covers made of recycled plastic

Digitenne - cover recycled metal

Pilot eco-slim
fibre cable & duct

What are critical raw materials (CRMs)?

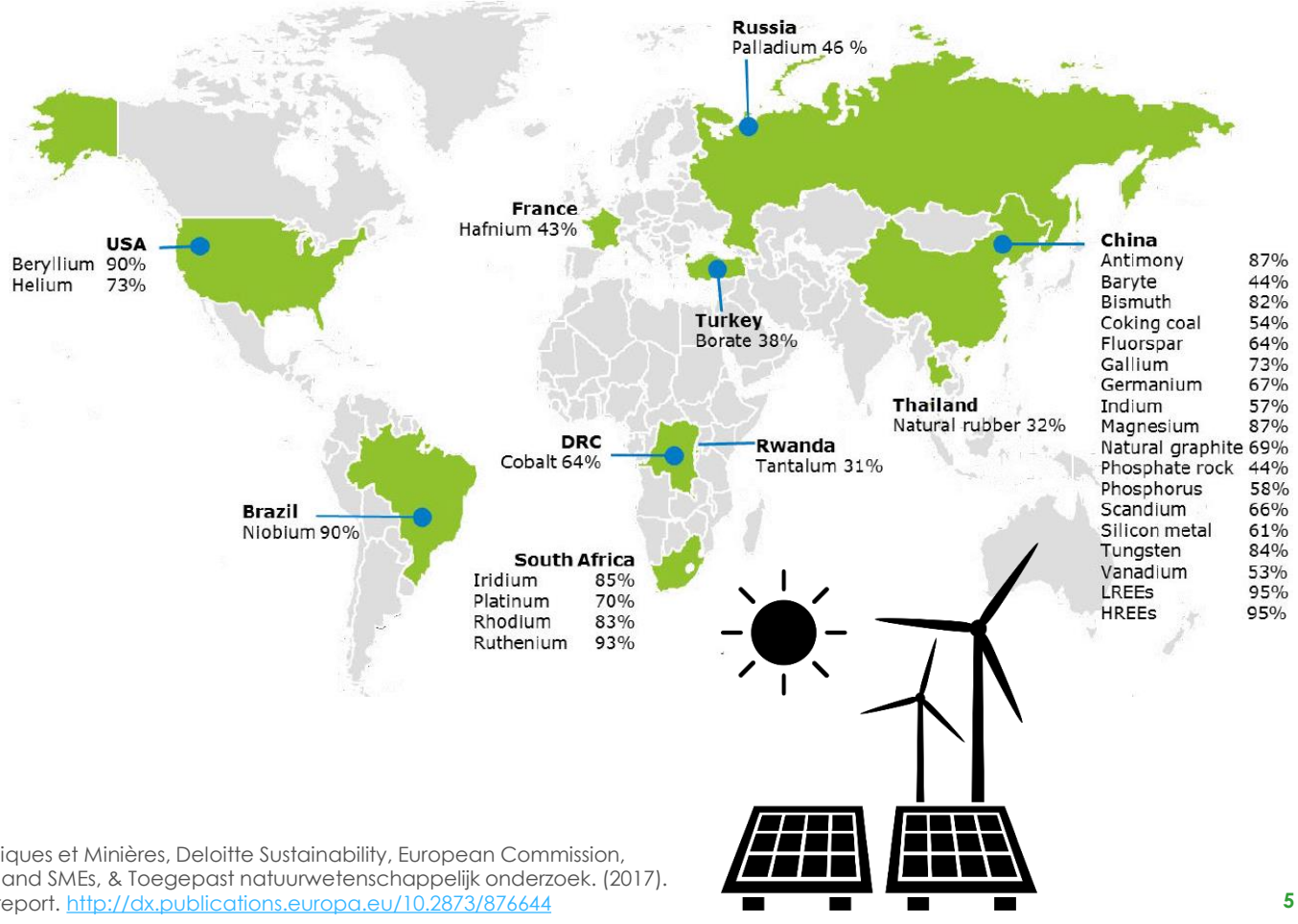
As defined by the European Union [1]

Critical raw materials[3)]

- Form base of important economic activities
- Supply security is at high risk

Reasons for criticality

- Geopolitical risk
- Demand risk
- Scarcity risk
- Environmental risk
- Social risk
- [...]



[1] British Geological Survey, Bureau de Recherches Géologiques et Minières, Deloitte Sustainability, European Commission, Directorate-General for Internal Market, I., Entrepreneurship and SMEs, & Toegepast natuurwetenschappelijk onderzoek. (2017). Study on the review of the list of critical raw materials: Final report. http://dx.publications.europa.eu/10.2873/876644

Criticality assessment

Dimensions

Criticality assessment domains

- Vulnerability to supply restriction
- Supply risk
- Environmental implications
- Social implications

Economic risk

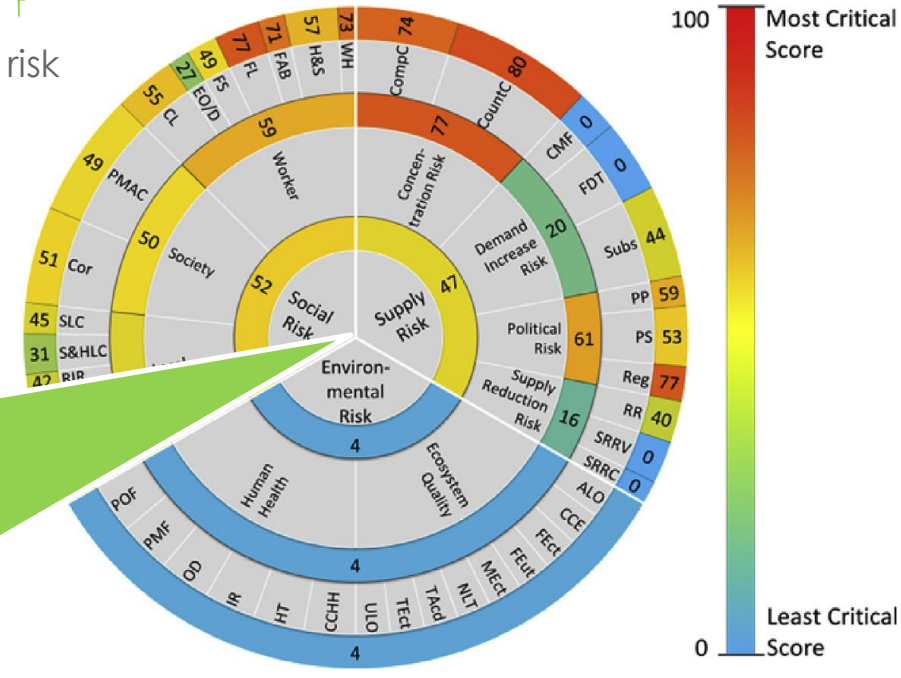
Reputational risk

Which material should be prioritized?

Where may KPN encounter high risks?

?

Example result from [2]



[2] Kolotzek, C., Helbig, C., Thorenz, A., Reller, A., & Tuma, A. (2018). A company-oriented model for the assessment of raw material supply risks, environmental impact and social implications. *Journal of Cleaner Production*, *176*, 566–580. https://doi.org/10.1016/j.jclepro.2017.12.162

Criticality Assessment for telecommunication materials

Methodology

Step 1
Identifying key service area & equipment to investigate

- Remote control [In-home]
- Modem [In-home]
- Core router [Network]
- Blade server [Network]

Step 2
Identifying material composition of equipment with the support of suppliers

- **Provision of material bills with a granularity where constituents are visible on an element level**

Step 3
Conduct criticality assessment

Collect data

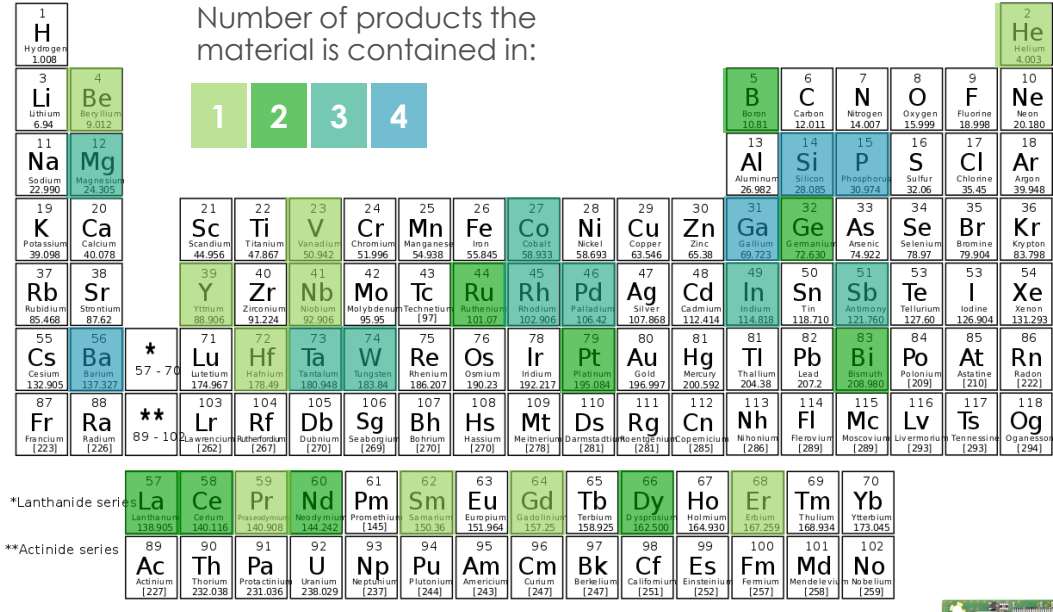
- **company's vulnerability to supply restriction** (impact on revenue and strategy)
- **substitutability** for the specific applications
- **recent data on materials and political, social and environmental practices in production countries**

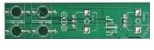
Step 4
Determine company's CRMs and decide on strategies to mitigate

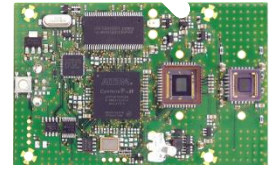
- **Define list of CRMs**
- Determine **roots of criticality**
- **Chose mitigation options** according to your ability to influence and the magnitude of impact

Critical Raw Materials

Occurence







From simple PCBs ...to complex PCBs ?

Remote Control

Modem

Core router

Blade Server

Mitigation strategies

Example: Rhodium

Rhodium (Rh)

Function:
- Plating of electric contacts
- Constituent of capacitors and resistors

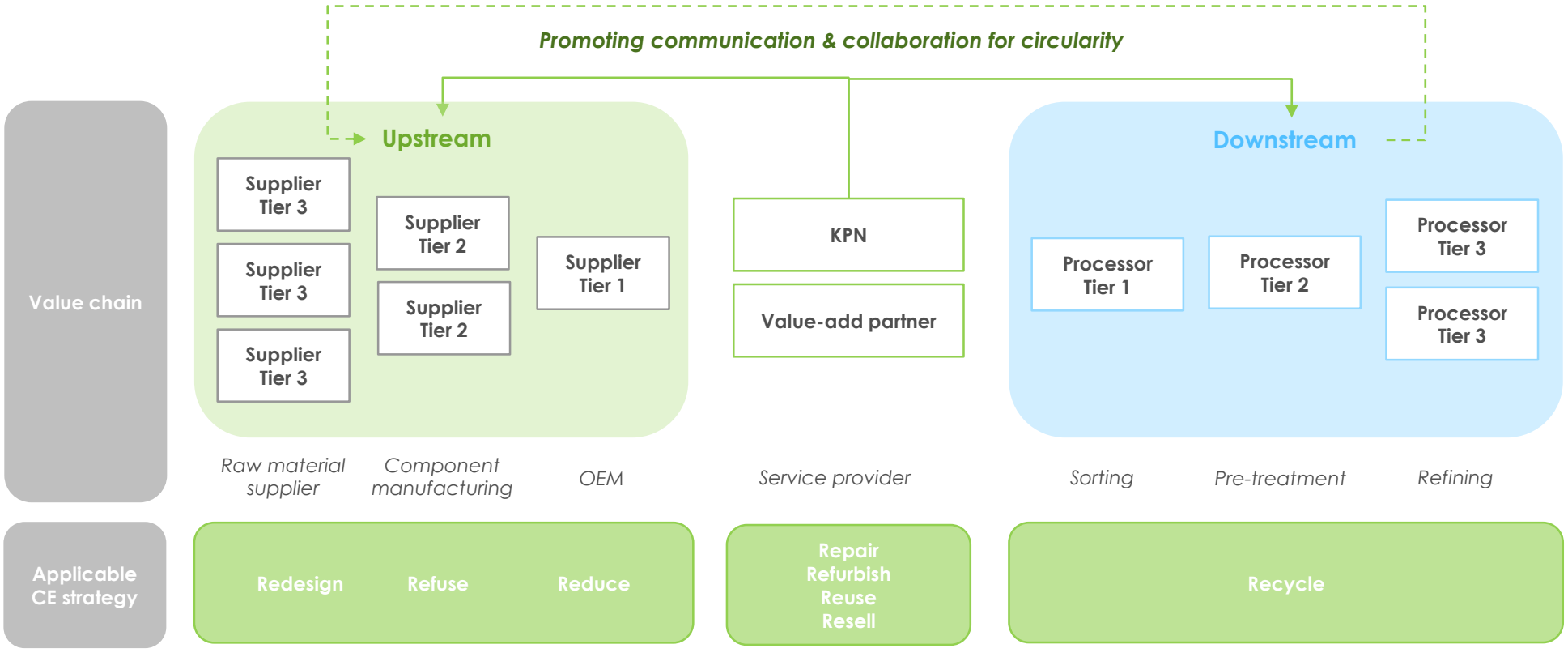
Hotspots

Companion metal, hardly substitutable
Political stability/regulations
80% South Africa

Associated risk	Mitigation strategy: Internal & External	Mitigation strategy: Systemic
Economic risk	• Design for reuse/refurbishment/recyclability • Use secondary material source • Substitution to non-critical materials	• Demand-based recycling targets • Research subsidies and standardization • Trade agreements
Environmental risk Social risk	• Transparency • Due diligence on suppliers • Sourcing CERA (CErtification of RAw Materials) certified components/materials	• Translating externalities into pricing • Trade agreements incl. social and environmental conditions for goods

Follow up research: Circular use of CRMs

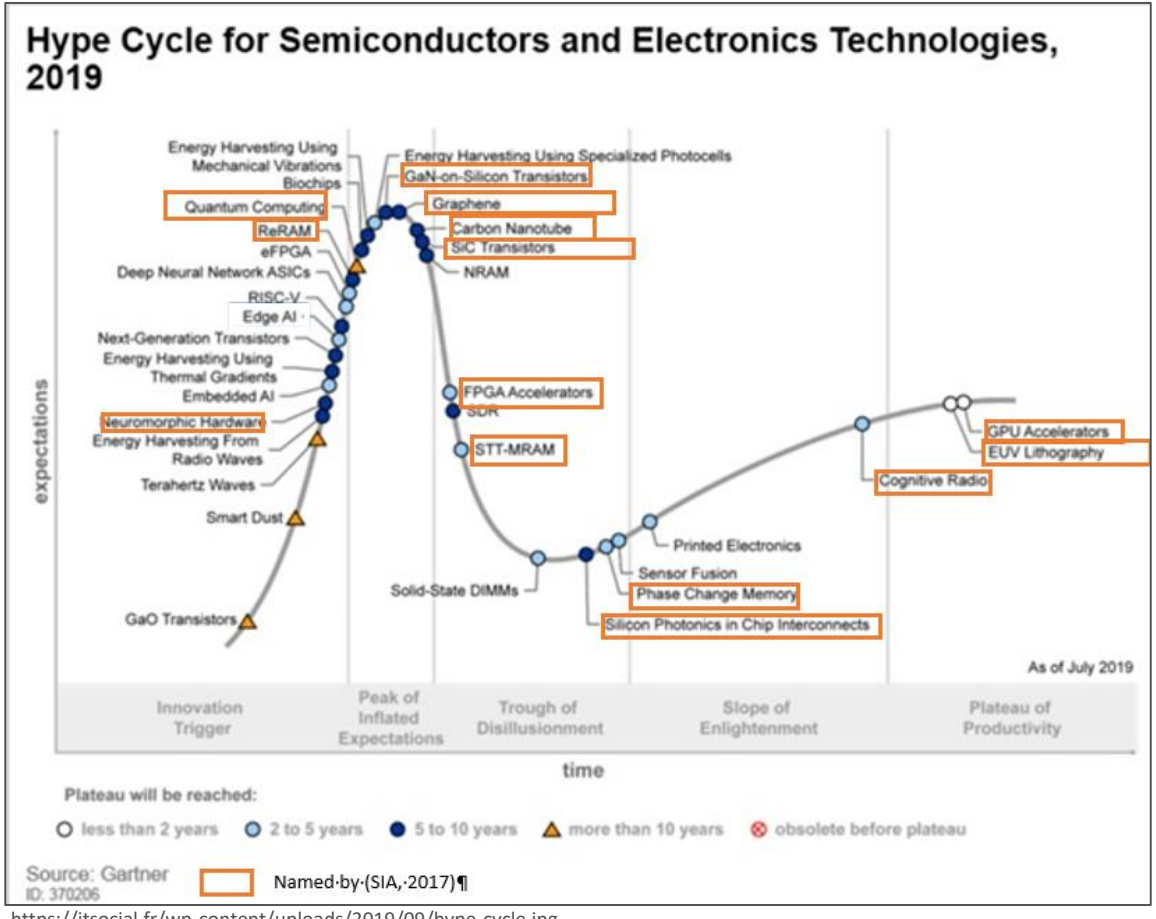
Achieving circularity of CRMs in KPN's value chain



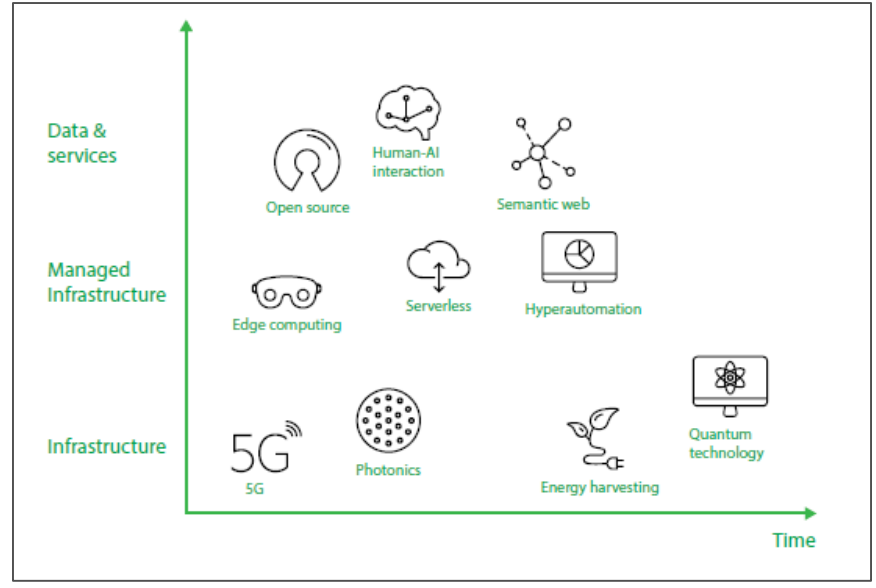
How can circularity of CRMs be achieved via circular strategies suitable for product value chain and collaboration among our partners?

Follow up research: Impact of CRM on future technology

Strategic importance for KPN



https://itsocial.fr/wp-content/uploads/2019/09/hype-cycle.jpg



KPN Technology Book

- What impact do new technologies have on our network architecture and equipment?
- Which CRMs will be required?
- How can we build supply chain resilience?

Thank you