

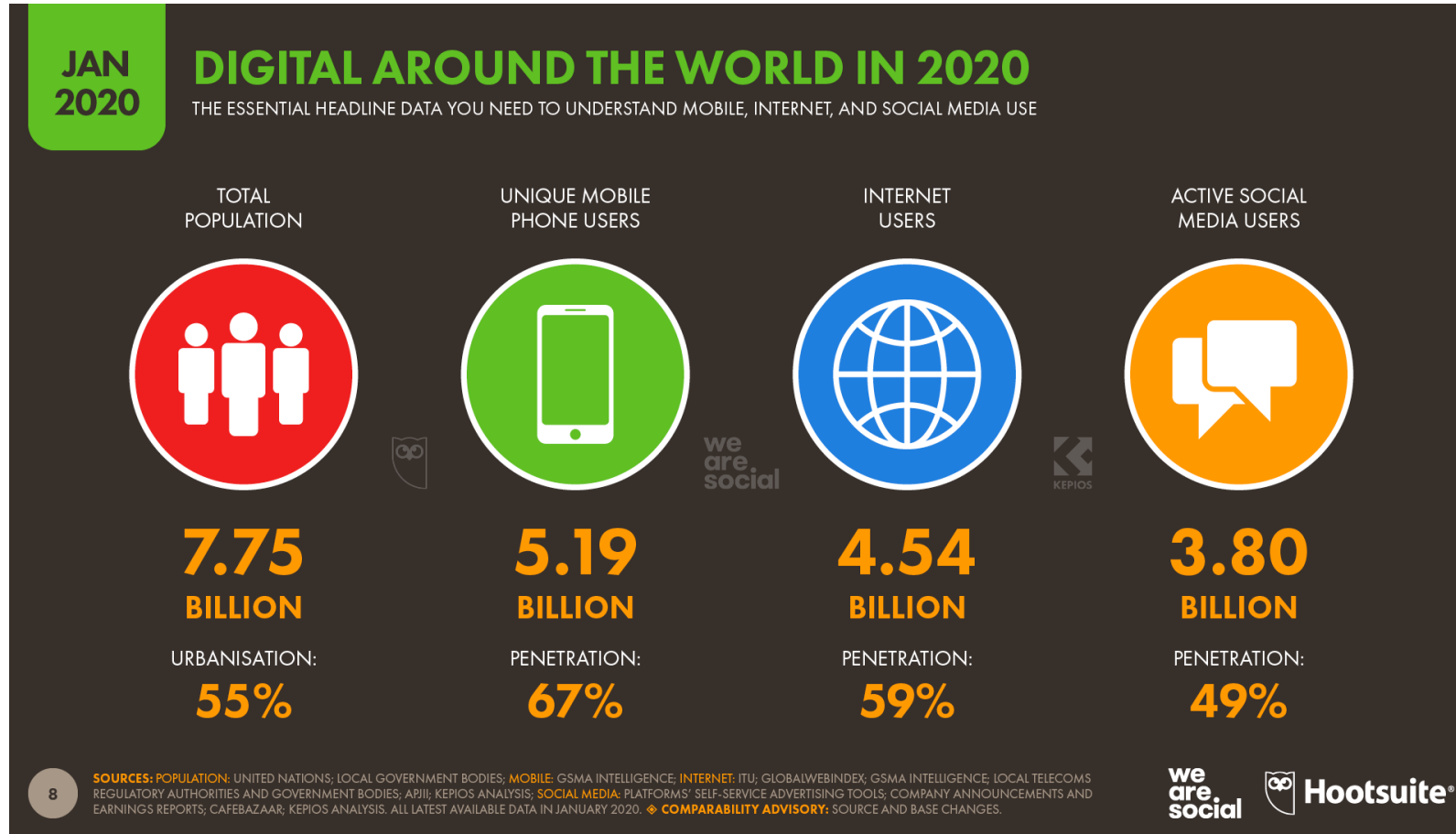
Design Thinking for Sustainability and the significance of Stakeholder Engagement in the development of the Circular Economy for the Data Centre Industry

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Connectivity – data traffic = 4.2 trillion gigabytes / yr by 2022



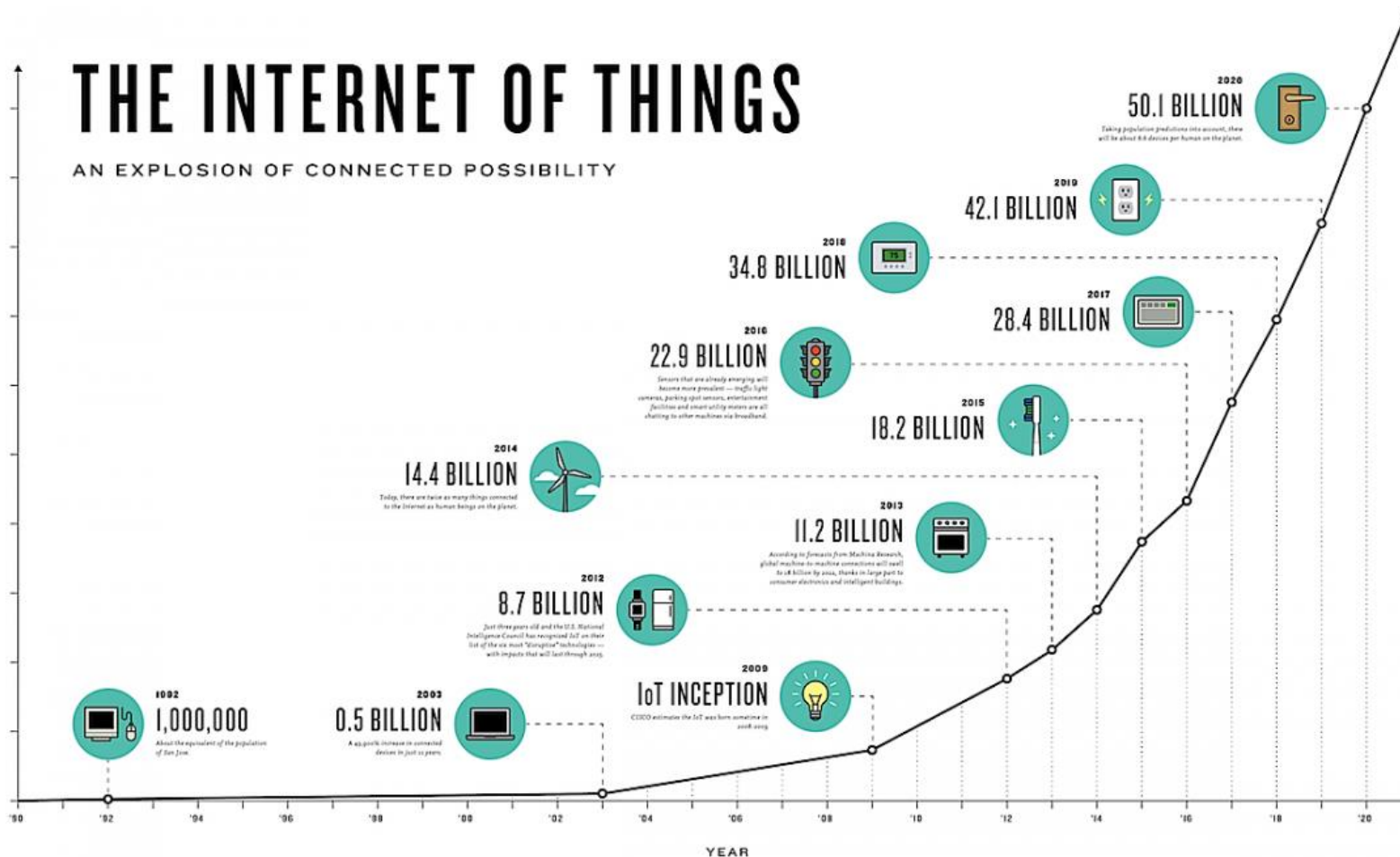
Data Centres

8m+ globally / 60,000 in EU - 66% in UK, Germany, France & Netherlands

2010-2020 – \$100bn investment in sector



DC growth – 300% in EU by 2025 / 500% global 2030



emphasis on 24/7 operation and performance - greatest impact - operational energy –
Sectoral energy demand is predicted to reach ~200TWh by 2021 – 1% global energy use



DCI growth much quicker than reprocessing methods & infrastructure....

DCI - major contributor to global total of ~50Mt/year of e-waste

WEEE growing 3-5% / year in EU

formal / documented collection & recycling < 20% global & 32% EU

majority is sent to landfill / exported – is being stockpiled

Export of e-waste



Critical Raw Materials
British Geological Survey
Risk List 2015 –
elements of economic value

Green – low risk
Red – high risk

DC industry

rare earth elements	REE	9.5	China	China
antimony	Sb	9.0	China	China
bismuth	Bi	8.8	China	China
germanium	Ge	8.6	China	
vanadium	V	8.6	China	China
gallium	Ga	8.6	China	
strontium	Sr	8.3	China	China
tungsten	W	8.1	China	China
molybdenum	Mo	8.1	China	China
cobalt	Co	8.1	DRC	DRC
indium	In	8.1	China	
arsenic	As	7.9	China	
magnesium	Mg	7.6	China	Russia
platinum group elements	PGE	7.6	South Africa	South Africa
lithium	Li	7.6	Australia	Chile
barium	Ba	7.6	China	China
carbon (graphite)	C	7.4	China	China
beryllium	Be	7.1	USA	
silver	Ag	7.1	Mexico	Peru
cadmium	Cd	7.1	China	
tantalum	Ta	7.1	Rwanda	Australia
rhenium	Re	7.1	Chile	Chile
selenium	Se	6.9	Japan	China
mercury	Hg	6.9	China	
fluorine	F	6.9	China	South Africa
niobium	Nb	6.7	Brazil	Brazil
zirconium	Zr	6.4	Australia	Australia
chromium	Cr	6.2	South Africa	Kazakhstan
tin	Sn	6.0	China	China
manganese	Mn	5.7	China	South Africa
nickel	Ni	5.7	Indonesia	Australia
thorium	Th	5.7		USA
uranium	U	5.5	Kazakhstan	Australia
lead	Pb	5.5	China	Australia
iron	Fe	5.2	China	Australia
carbon (diamond)	C	5.2	Russia	Australia
titanium	Ti	4.8	Canada	China
copper	Cu	4.8	Chile	Chile
zinc	Zn	4.8	China	Australia
aluminium	Al	4.8	Australia	Guinea
gold	Au	4.5	China	Australia

CRM - EU
Dy, Nd, Pr, Tb

Sb
Co
Mg
Pd
Be
Si

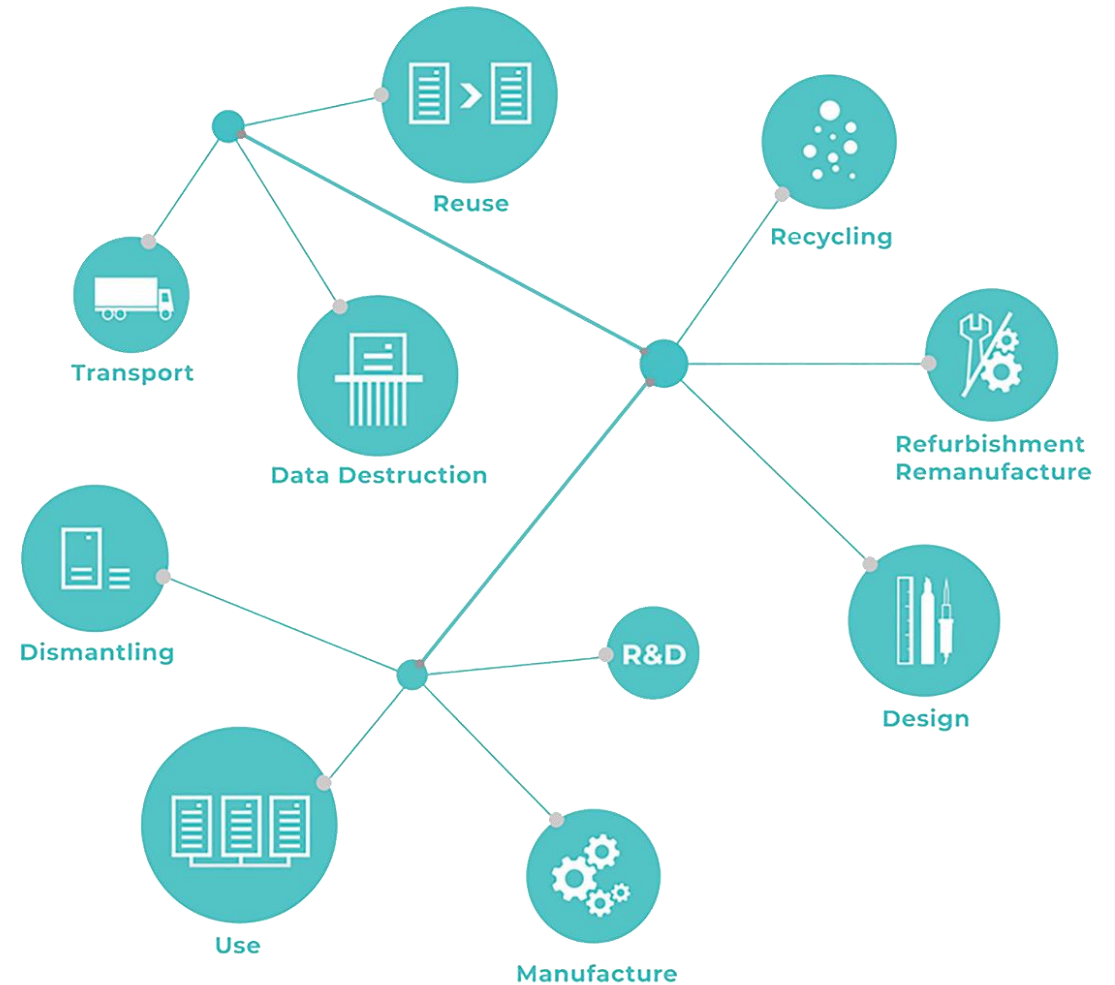
CRM - 0.2% by mass

DCI- emphasis - 24/7 uninterrupted service

sub-sectors – significant expertise –
silo culture

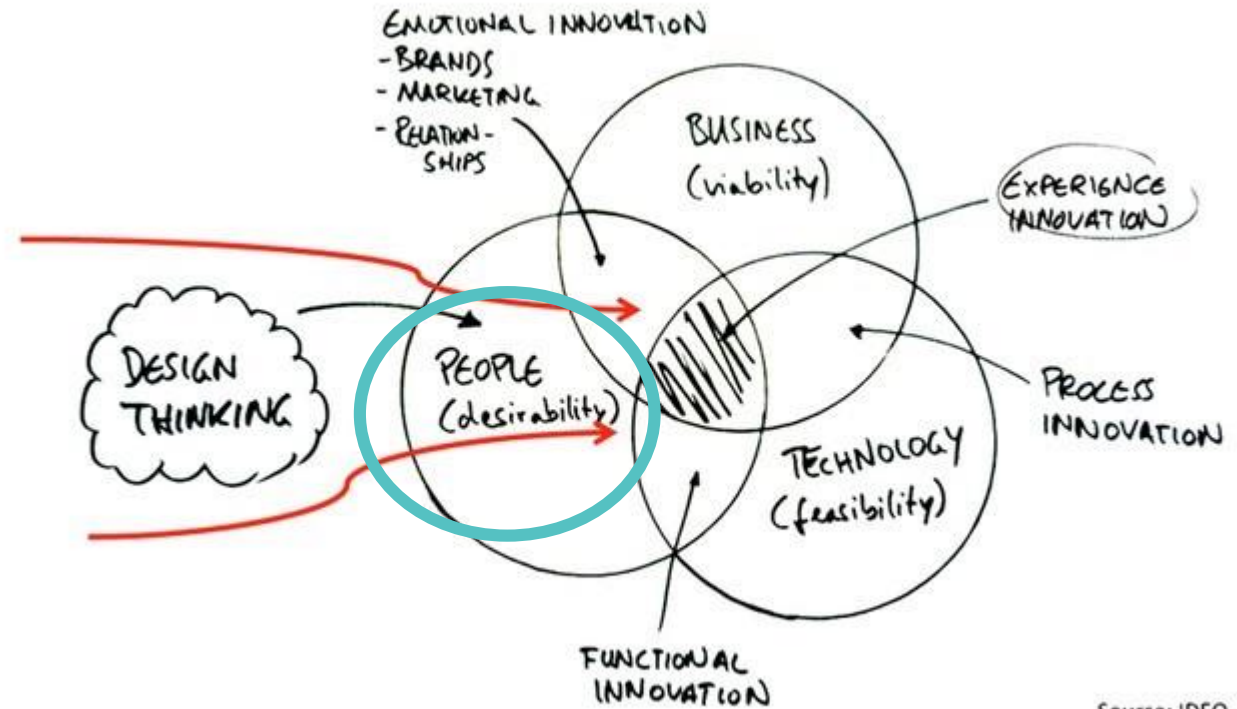
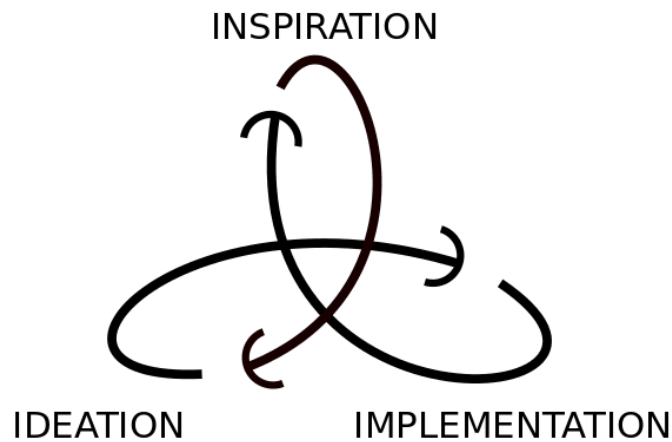
CE – holistic approach

CEDaCI - kick start sectoral CE
USP - bring together experts from
all life cycle stages / sub sectors



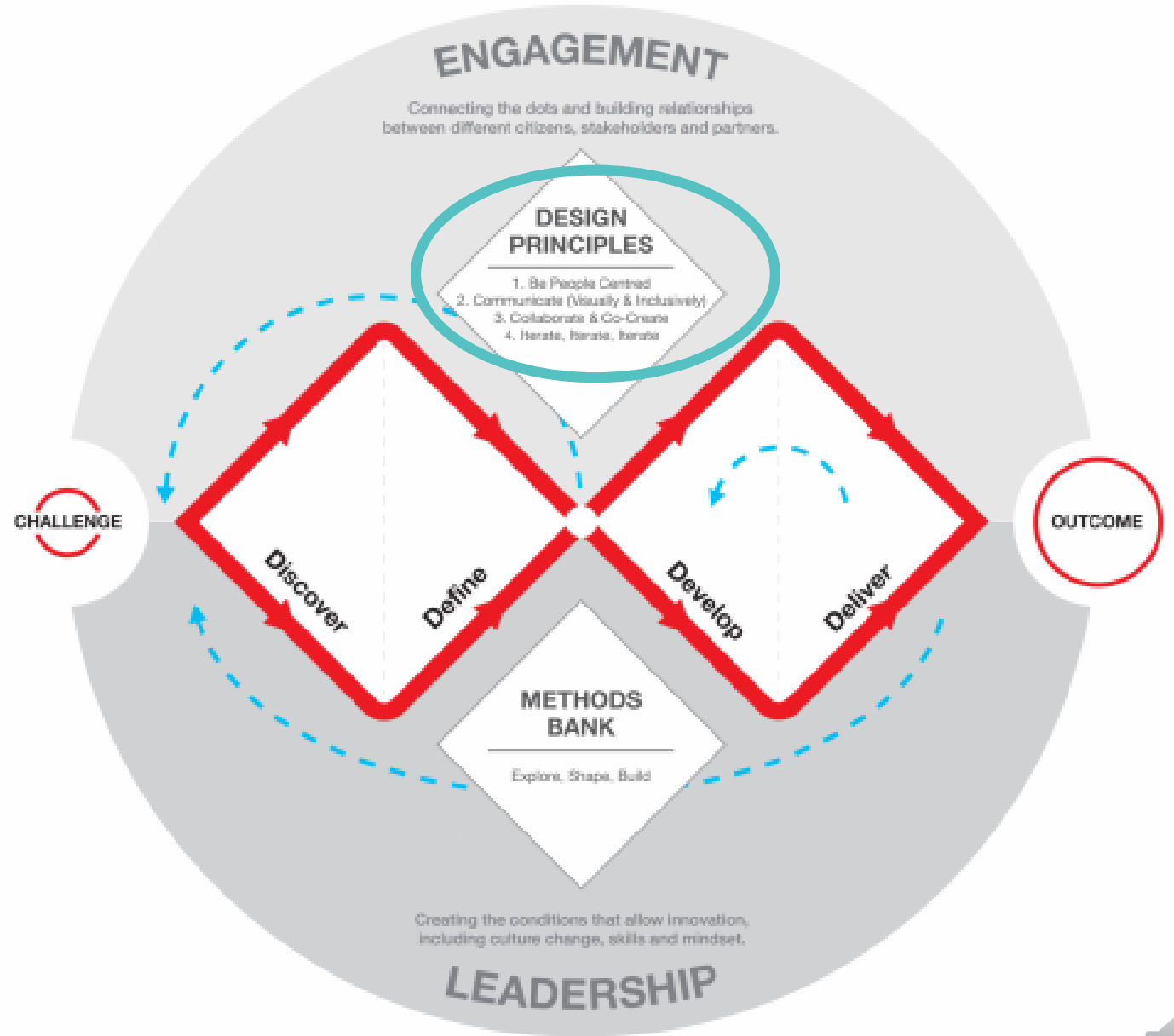
Design Thinking - approach formalised & popularised by leading design consultancy

IDEO



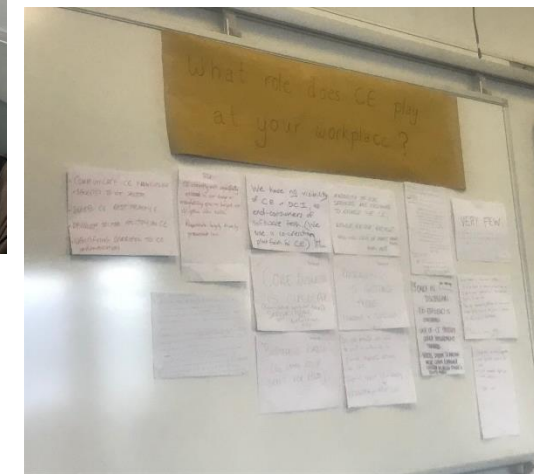
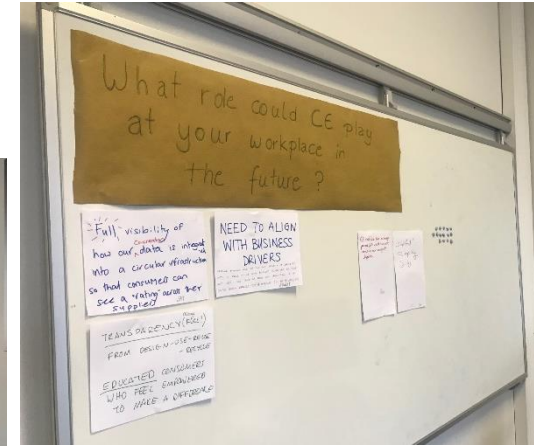
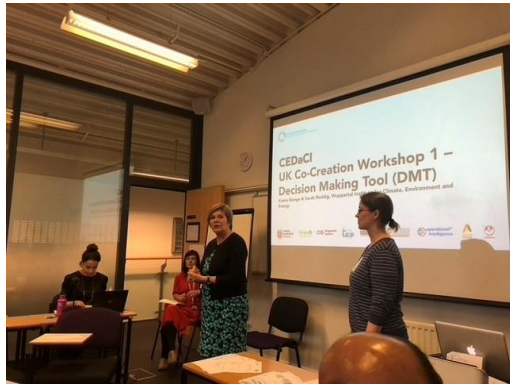
Source: IDEO

Double Diamond Design Method



Co-creation Workshops – development of CDCC – Circular Data Centre Compass

methods include the Dephi Technique for decision making



Working Group Meetings – cross sectoral experts – monitor progress & advise

Review design & development work – iterate and improve



Design Thinking for Sustainability – DCI collaboration – conclusions

DCI – unique sector – need engagement across sector to develop CE

- time and resource intensive

- need to convince people to attend

but knowledge sharing is invaluable –

- experts learn from each other –

 - challenges & opportunities in other sub sectors

 - increases understanding of circularity / improves current and future business practice

method is successful because

- using human behaviour / traits

 - contributions - feel valued

 - develop sense of ownership and belonging

Therefore more likely to implement Circular thinking and practice in DCI

Thank you for listening

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