Digital Techniques to Improve Competitiveness

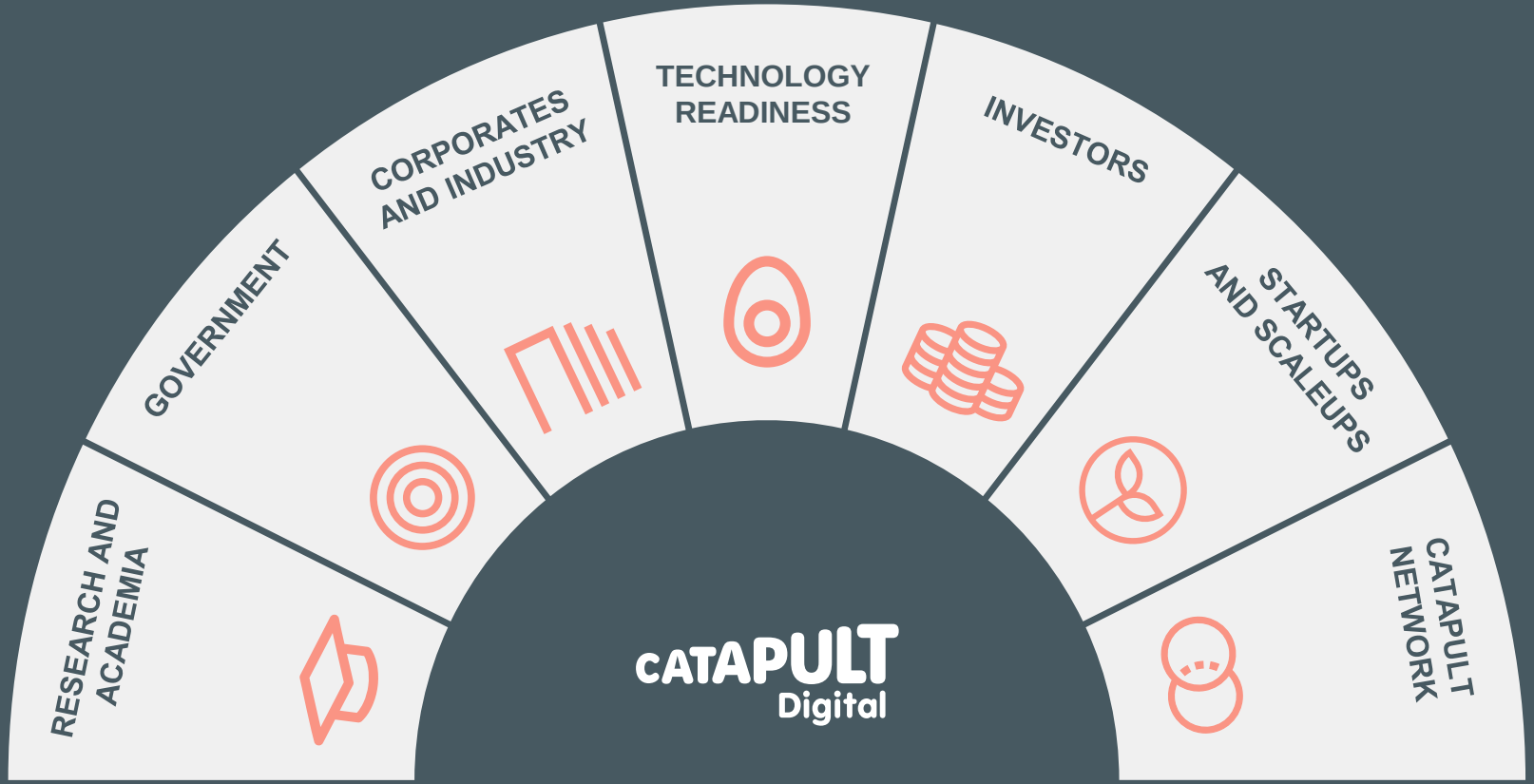
John Pattinson

Commercial Product Lead - IoT | Digital Catapult
john.pattinson@digicatapult.org.uk

CATAPULT Digital

Digital Catapult is the UK’s leading advanced digital technology innovation centre. We drive early adoption of advanced digital technology across the manufacturing and creative sectors.

Digital Catapult is a non profit sitting in a unique position to move markets as the bridge across the system



The right technologies, with the highest impact potential, to move markets and improve UK competitiveness

Future Networks

5G, IoT & Low Powered Wide Area Networks (LPWAN)

Providing high quality, accessible data that tracks assets & secures the integrity of claims

Artificial Intelligence

AI & Machine Learning

Enables real time mega process optimisation through unprecedented, insight analysis & prediction capacity

Distributed Systems

Blockchain, smart contracts & ledgers

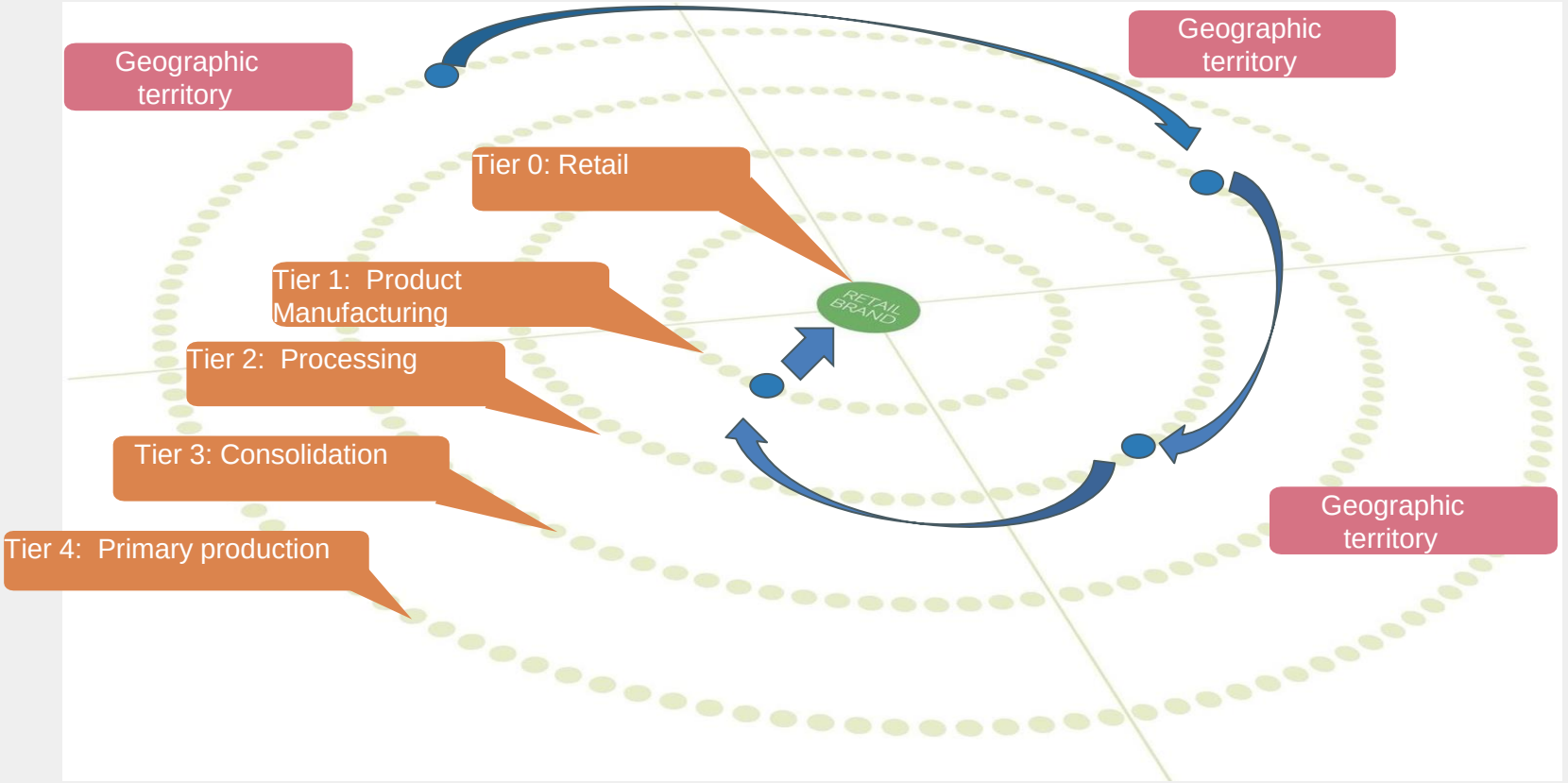
Unlocks distruptive new value streams & business models from the ability to securely share data at scale

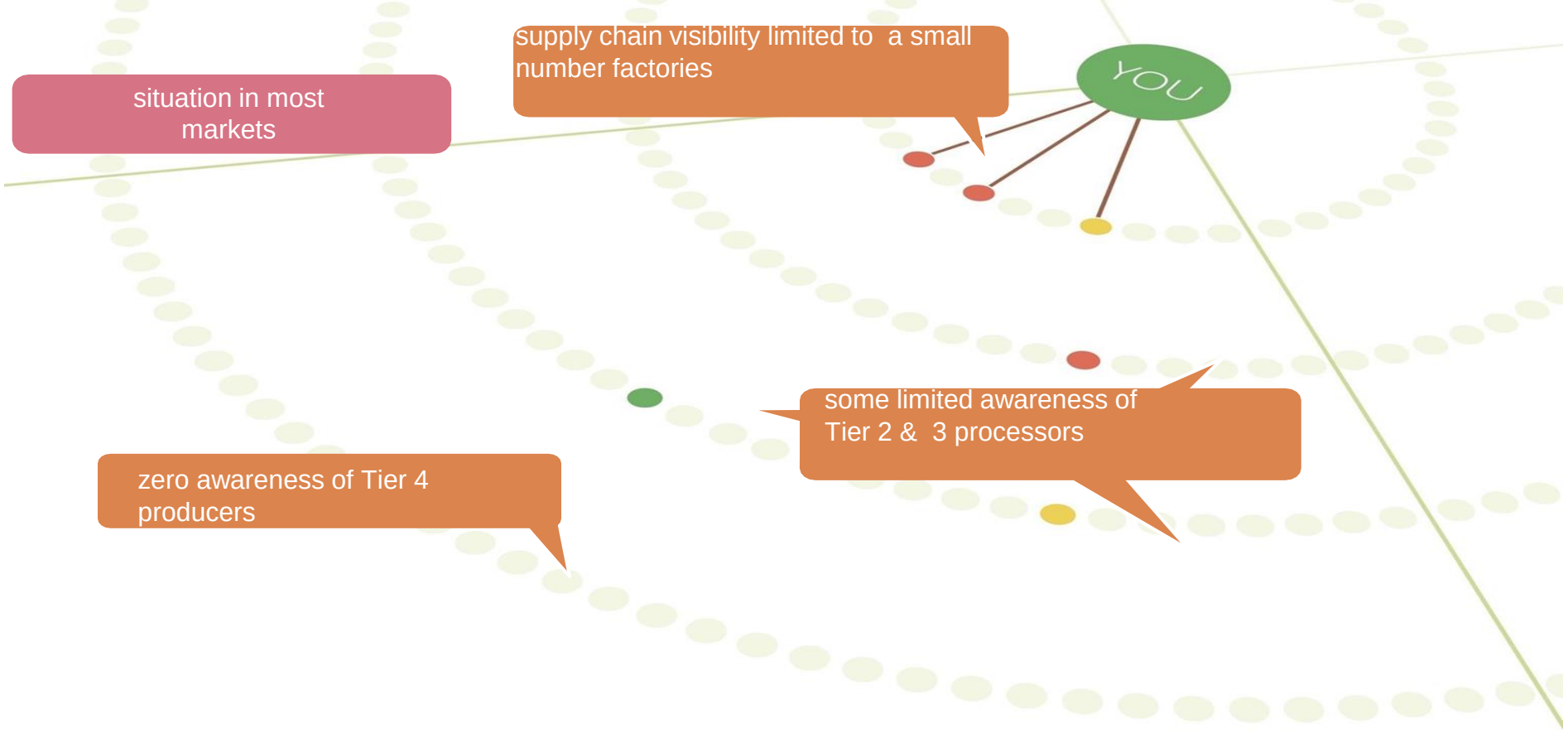
Immersive

Virtual Reality, Augmented Reality, mixed reality and haptics

Transforms the way we experience data to enable zero burden new service adoption or better training

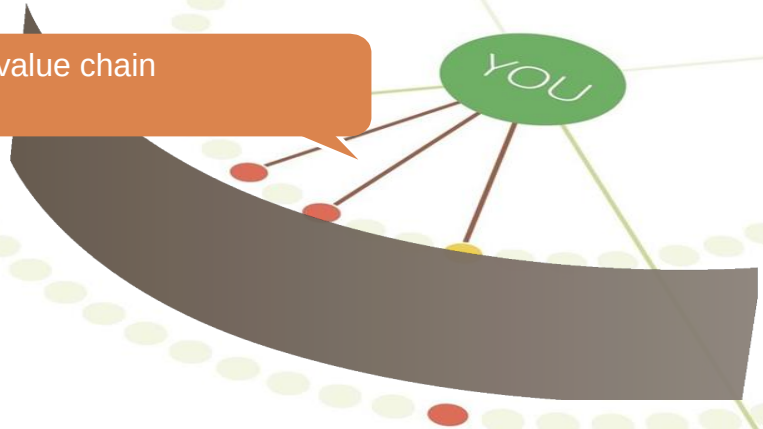
Challenges and opportunities for supply chains


Geographic territory
Geographic territory
Tier 0: Retail
Tier 1: Product Manufacturing
Tier 2: Processing
Tier 3: Consolidation
Tier 4: Primary production
RETAIL BRAND
Geographic territory

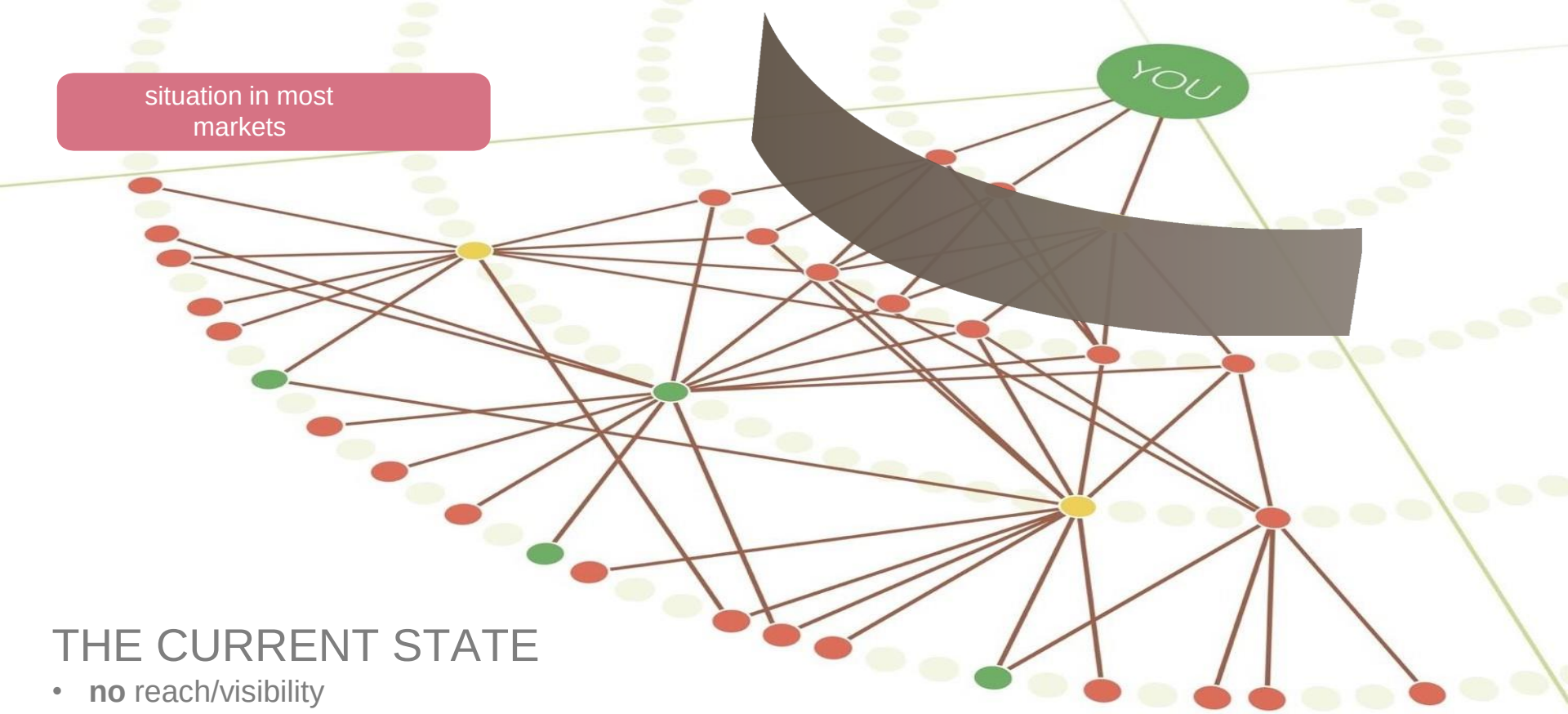

supply chain visibility limited to a small number factories
YOU
situation in most markets
some limited awareness of Tier 2 & 3 processors
zero awareness of Tier 4 producers

situation in most markets

very limited value chain visibility

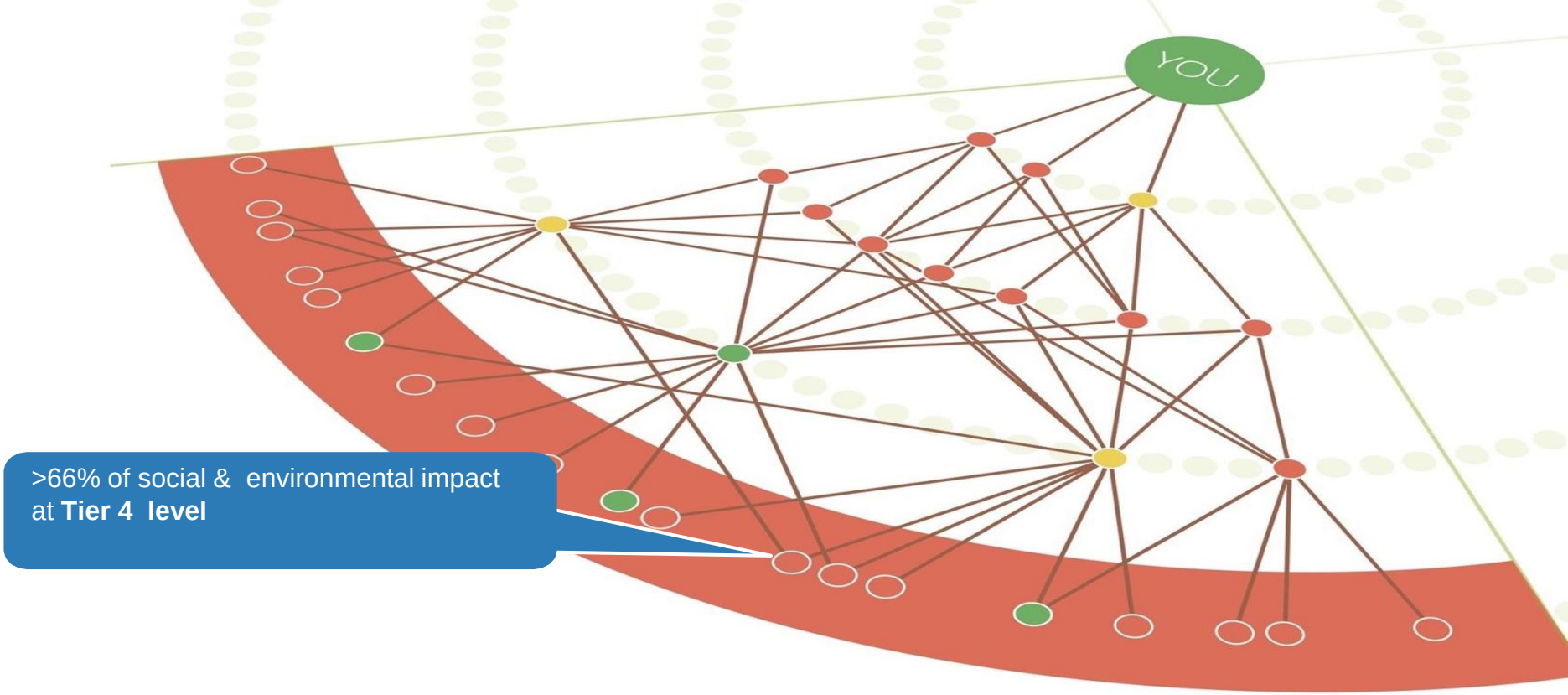


situation in most markets



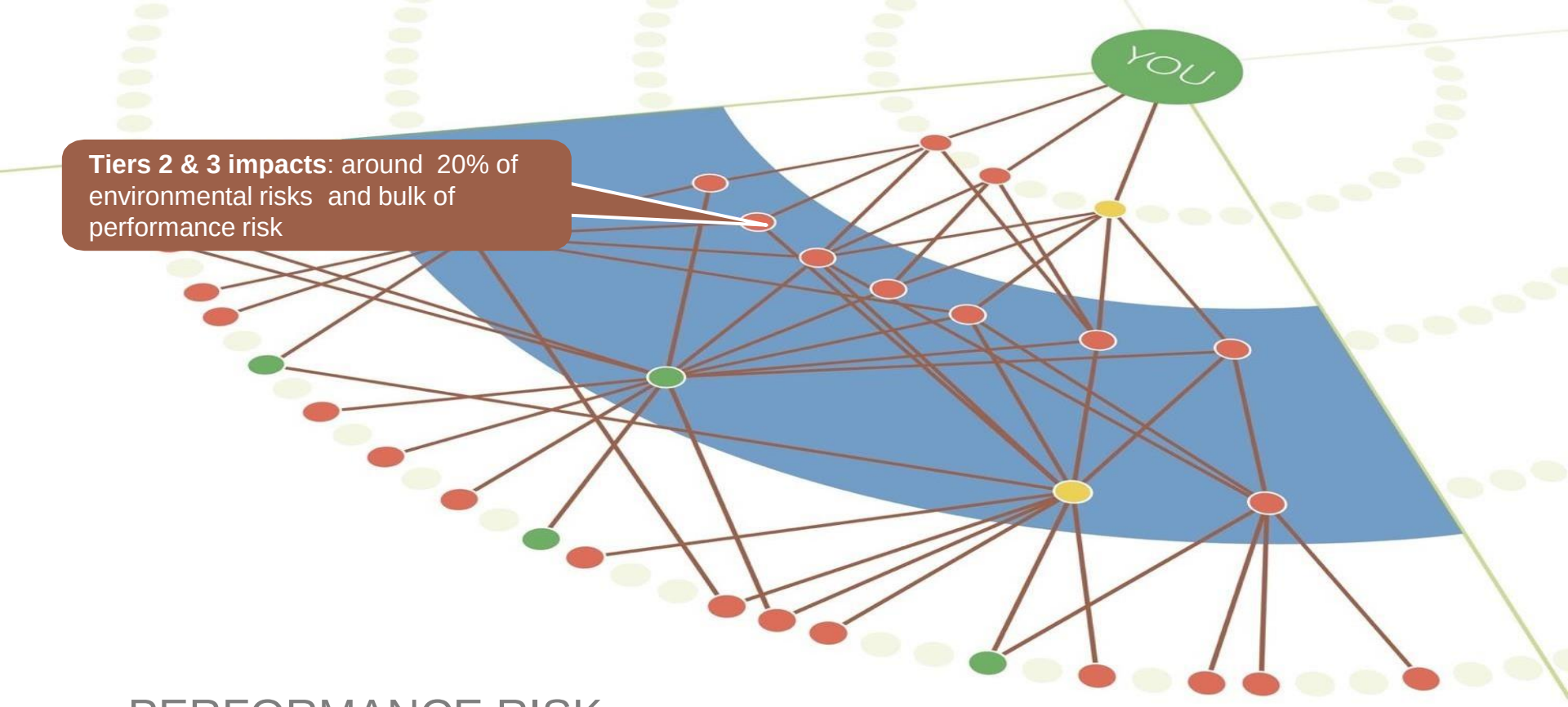
THE CURRENT STATE

- **no** reach/visibility
- **no** relationships
- **no** trust
- **no** aligned incentives
- **OUTCOME**: opacity, chaos, inefficiency



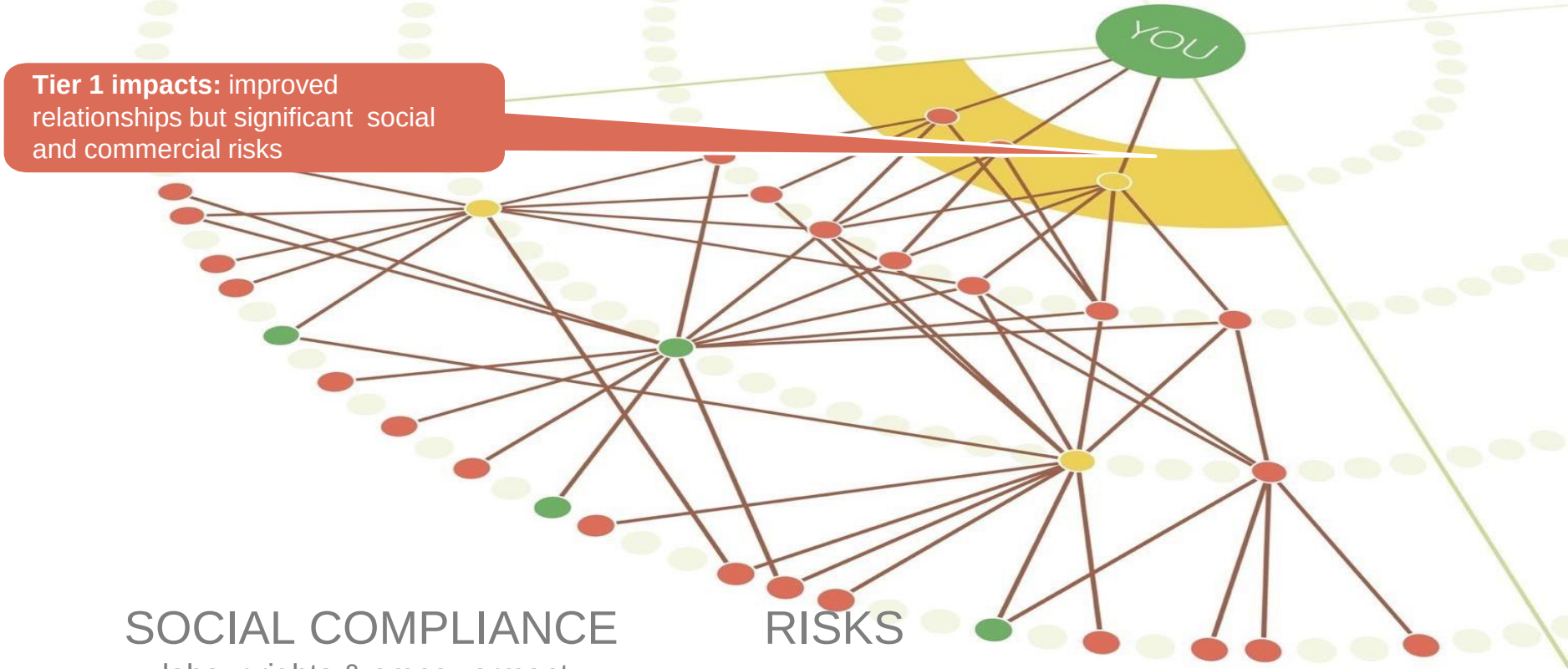
SUSTAINABILITY IMPACTS

- carbon, water, waste, biodiversity
- social, human and financial



PERFORMANCE RISK

- very difficult to measure risk
- raw material quality, suitability & lead time
- economies of scale



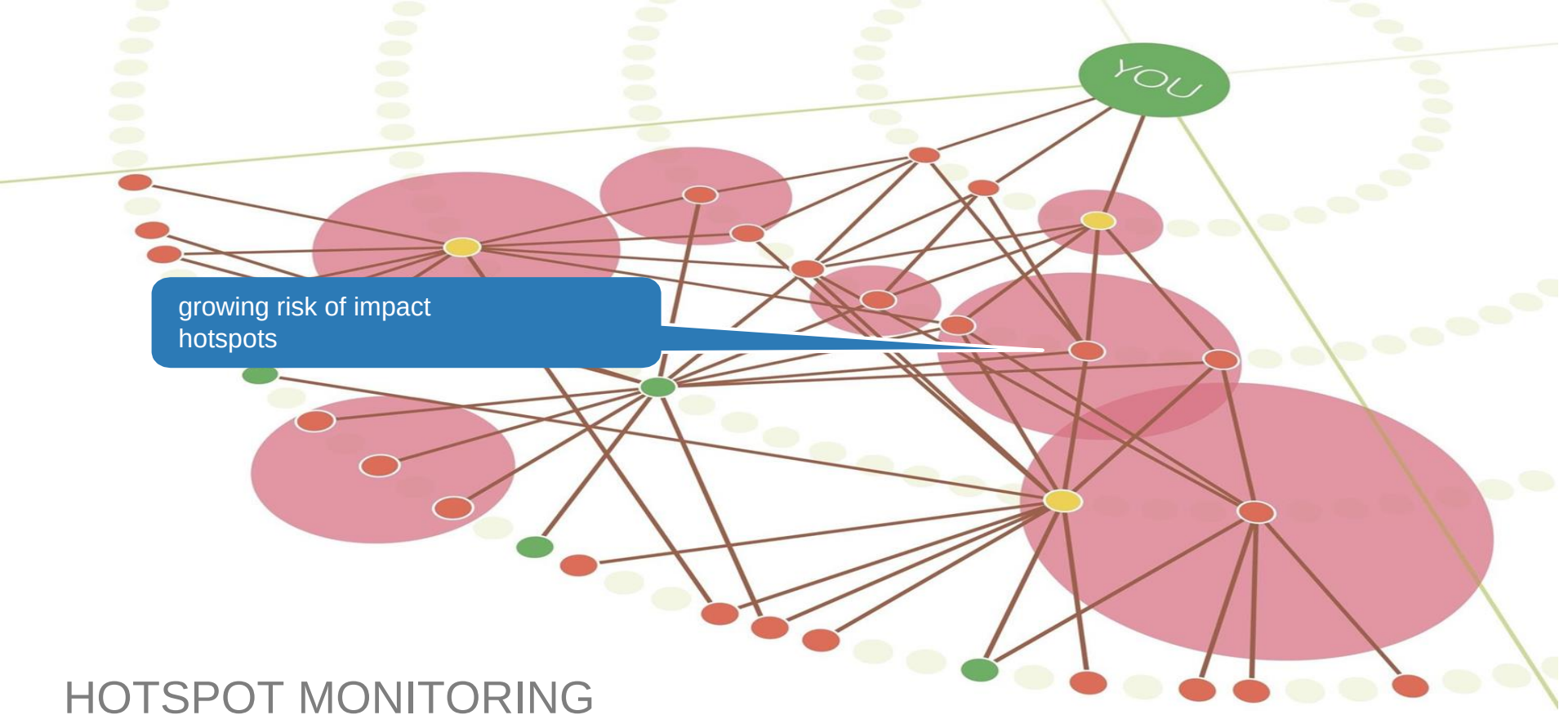
Tier 1 impacts: improved relationships but significant social and commercial risks

SOCIAL COMPLIANCE RISKS

- labour rights & empowerment
- safety standards

COMMERCIAL

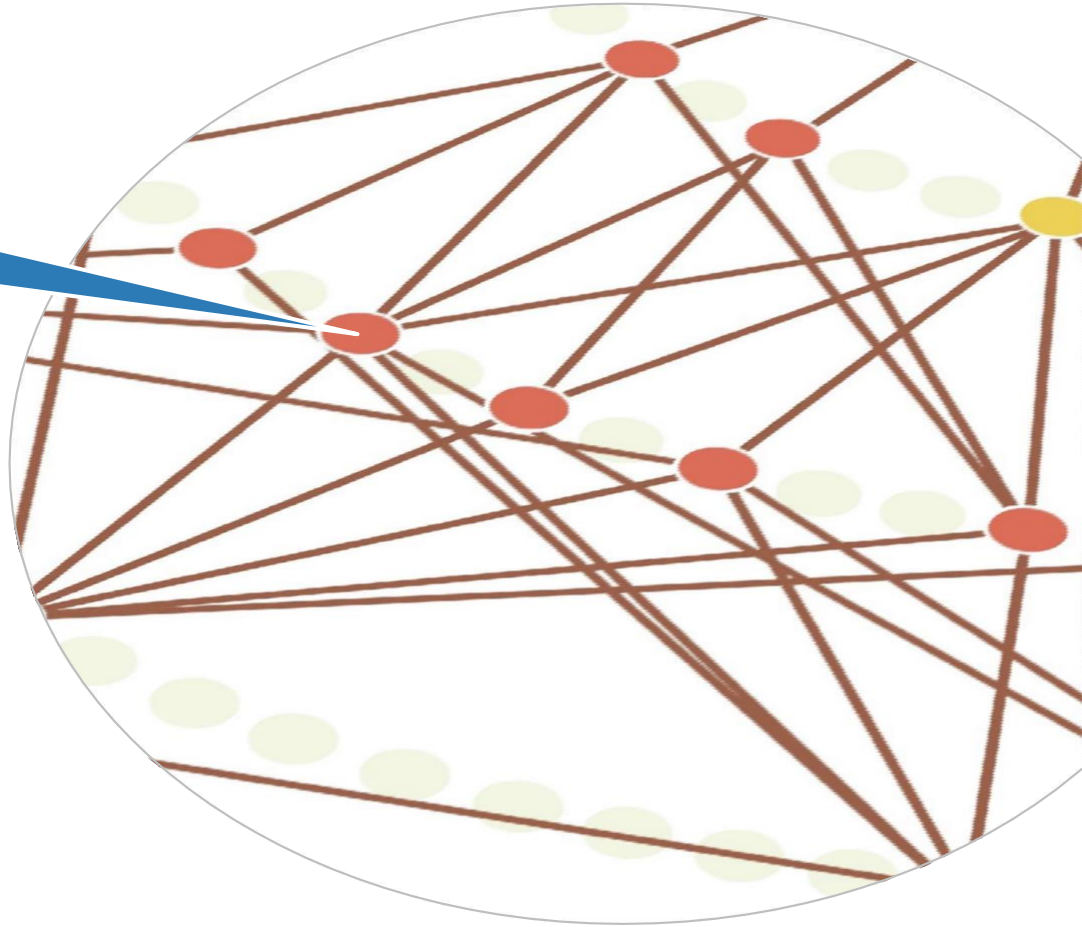
- seasonality curves



HOTSPOT MONITORING

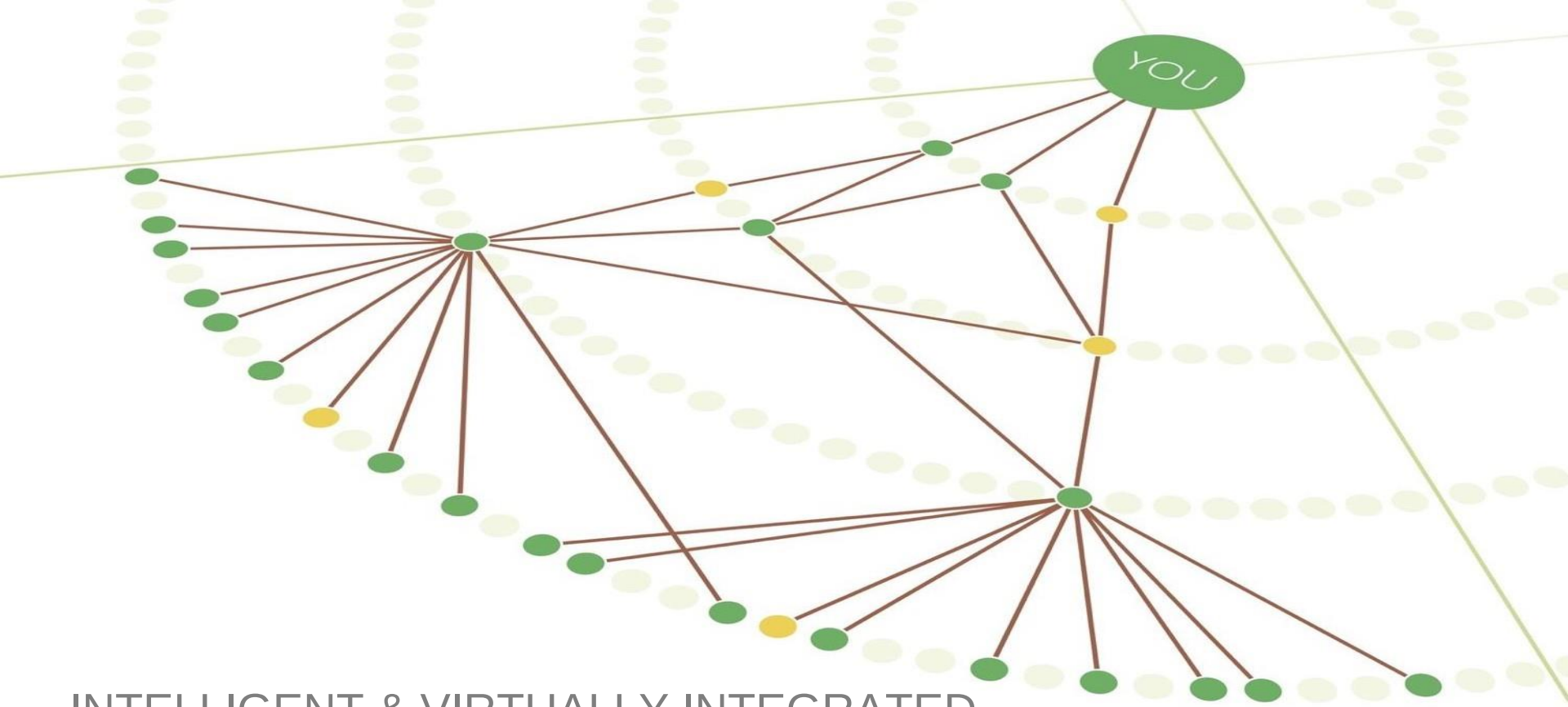
- seldom measured
- environmental
- social
- financial

Internal inefficiencies



INTERNAL INEFFICIENCIES

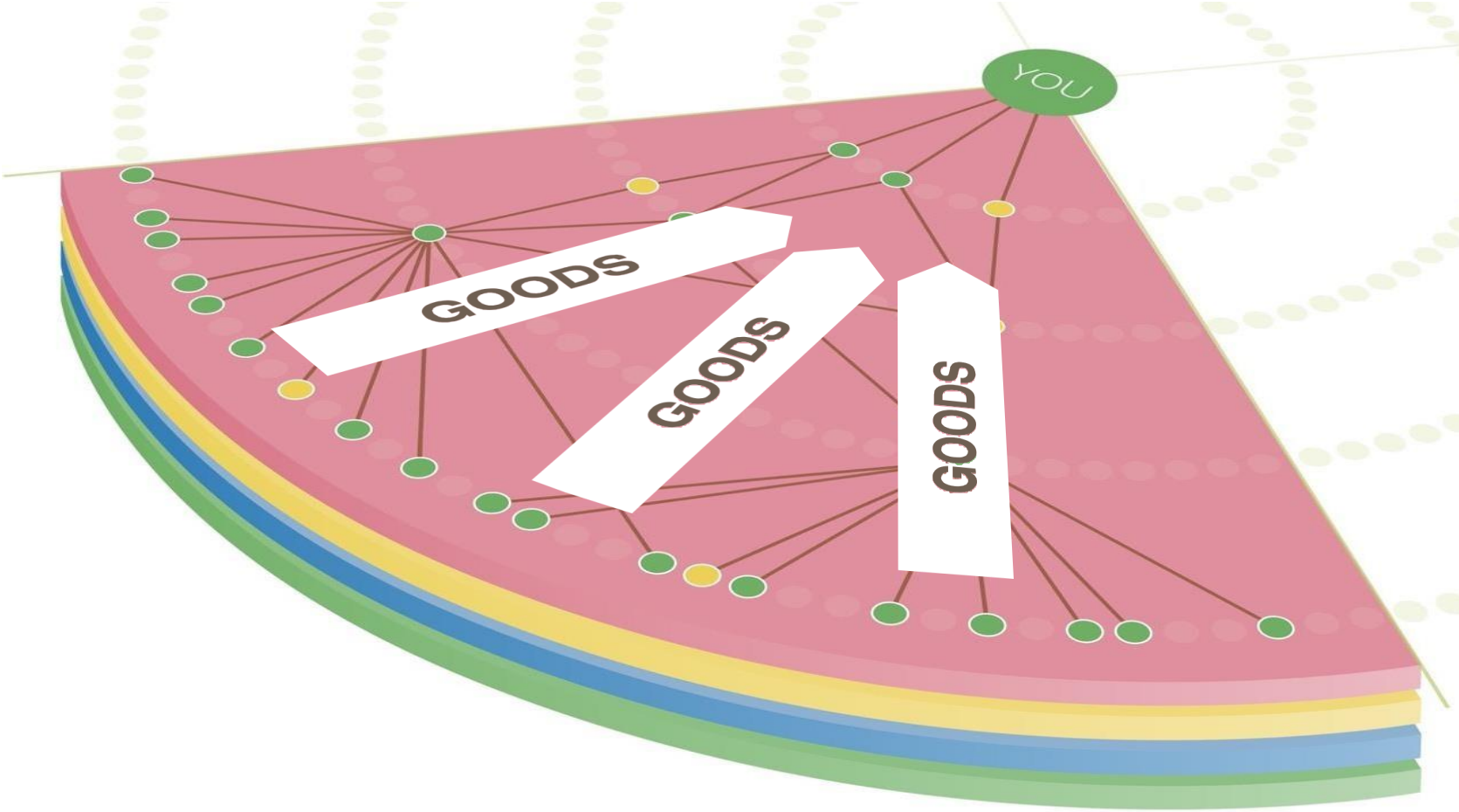
- Poor quality data & management
- Inefficient processes
- Weak performance management



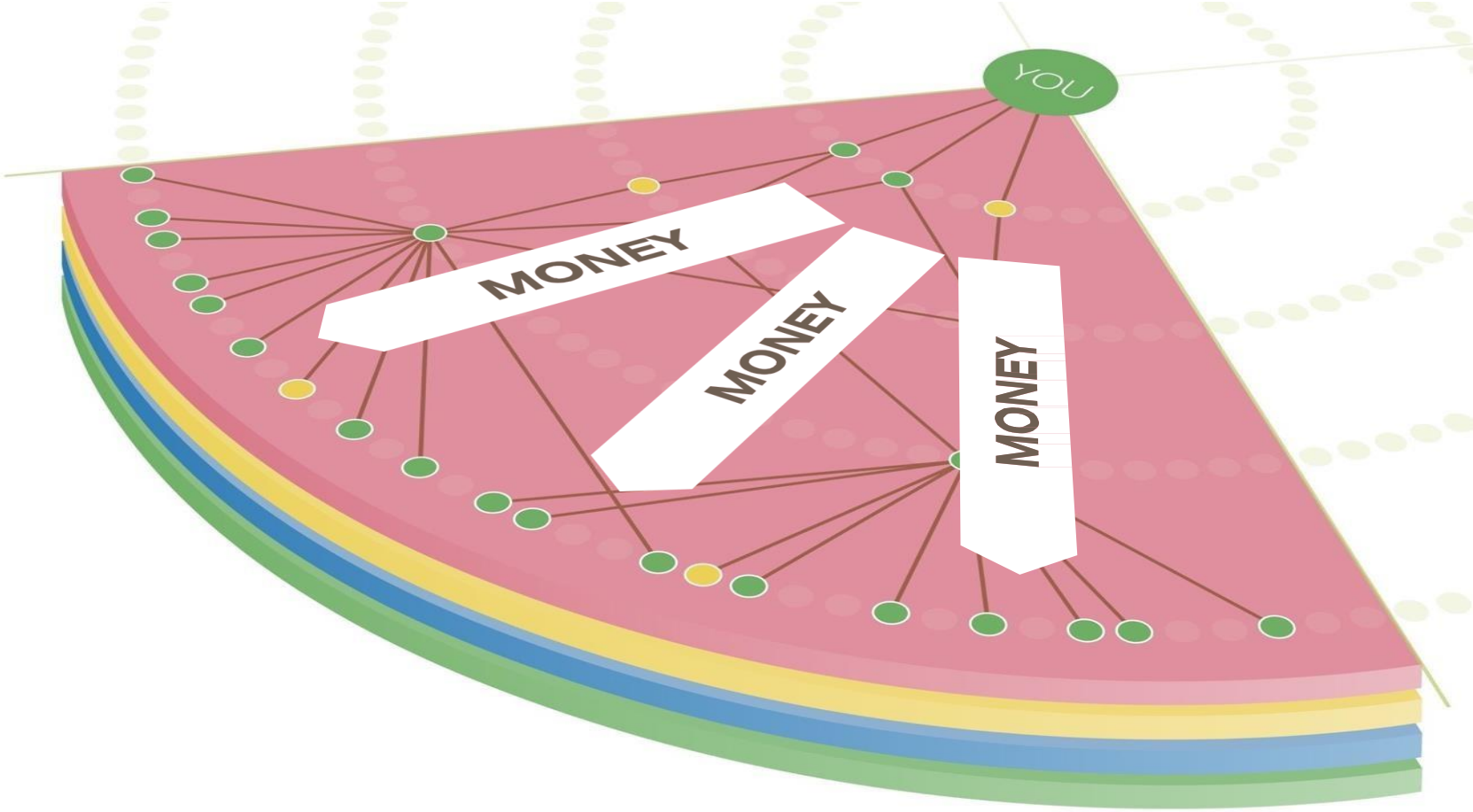
INTELLIGENT & VIRTUALLY INTEGRATED

- integrated
- optimised
- responsive

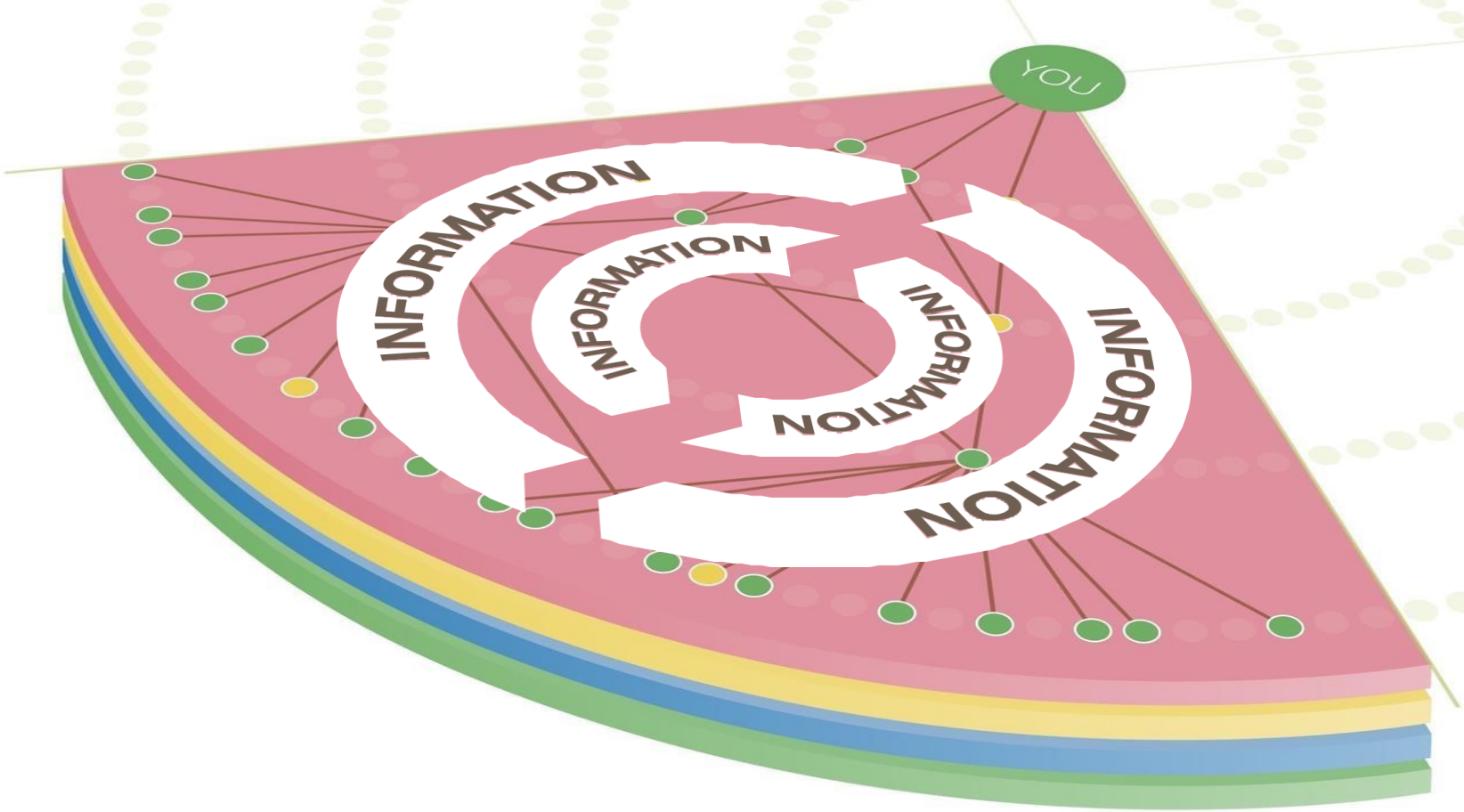
Visibility needs information



VALUE FLOWS

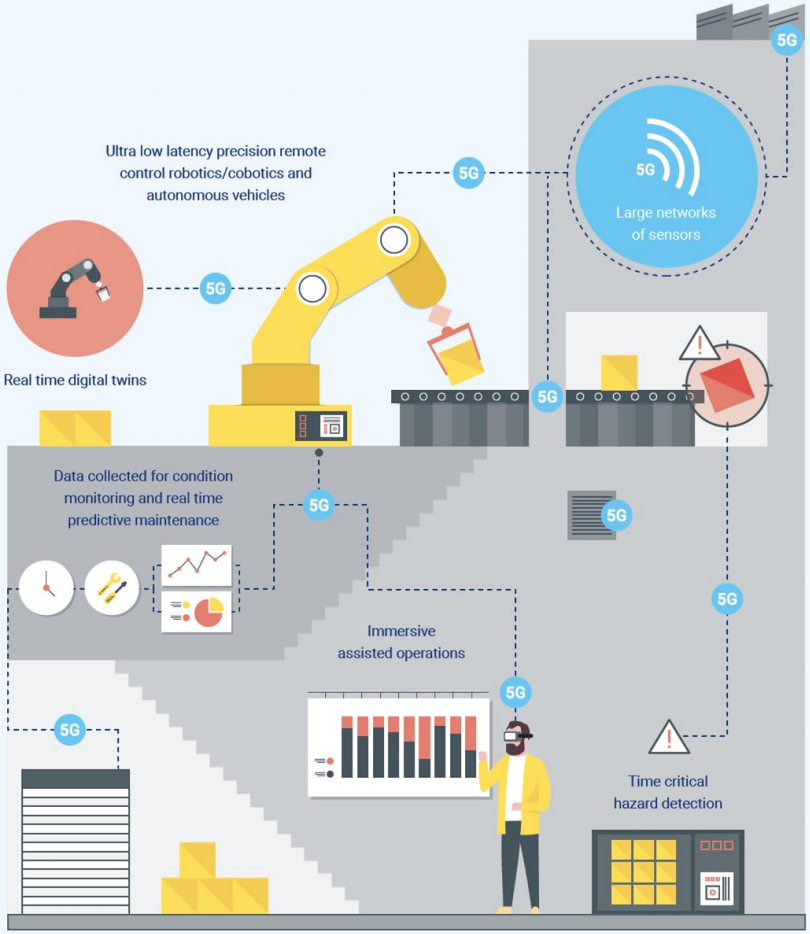


VALUE FLOWS



VALUE FLOWS

Examples of digital techniques to improve competitiveness



1 On-site and in-factory production optimisation

For example:

Robots and cobots
– More responsive, more intelligent and more configurable

Time-critical hazard detection
– Feedback and control in real time to improve safety while reducing failure rates and downtime

Immersive assisted operations
– Reducing errors, improving productivity and safety

Monitoring
– Product flow
– Machine calibration
– Environmental conditions
– Resources

Department for Digital, Culture, Media & Sport

5G Factory of the Future

5G productivity boost for the North

"The 5G FoF programme will drive forward holistic connectivity and unlock the potential of industrial digitalisation. It will define a new paradigm for how future factories will operate enabling connectivity and business agility both across manufacturing operations and beyond, into the supply chain."

Andy Schofield - Manufacturing and Materials Technology Director

BAE Systems

CATAPULT Digital

Project Context

The £9.5 million award, which includes match funding from industry, was made by DCMS and is part of the government's £200m investment in 5G test bed facilities across the country

Project Overview

5G-FoF will establish a 5G manufacturing testbed to address UK/international industrial 5G manufacturing challenges using 5 use cases:

1. Real-time Monitoring and Adaptive Closed-Loop Control
2. Digital Twin Track and Trace
3. Factory Ecosystem Monitoring
4. Chain of Custody System
5. Distributed and Shared Hybrid Reality Spaces

5G-FoF will deliver a sustainable business model and demonstrate testbed operation in real industrial settings.

Bid Partners

BAE SYSTEMS

AMRC / ADVANCED MANUFACTURING RESEARCH CENTRE

MTT MACHINE TOOL TECHNOLOGIES

aql

IBM

MIRALIS

Projected Impact

15-25% reduction in defects, waste and machine downtime

15-20% increase in machine utilisation & factory efficiency

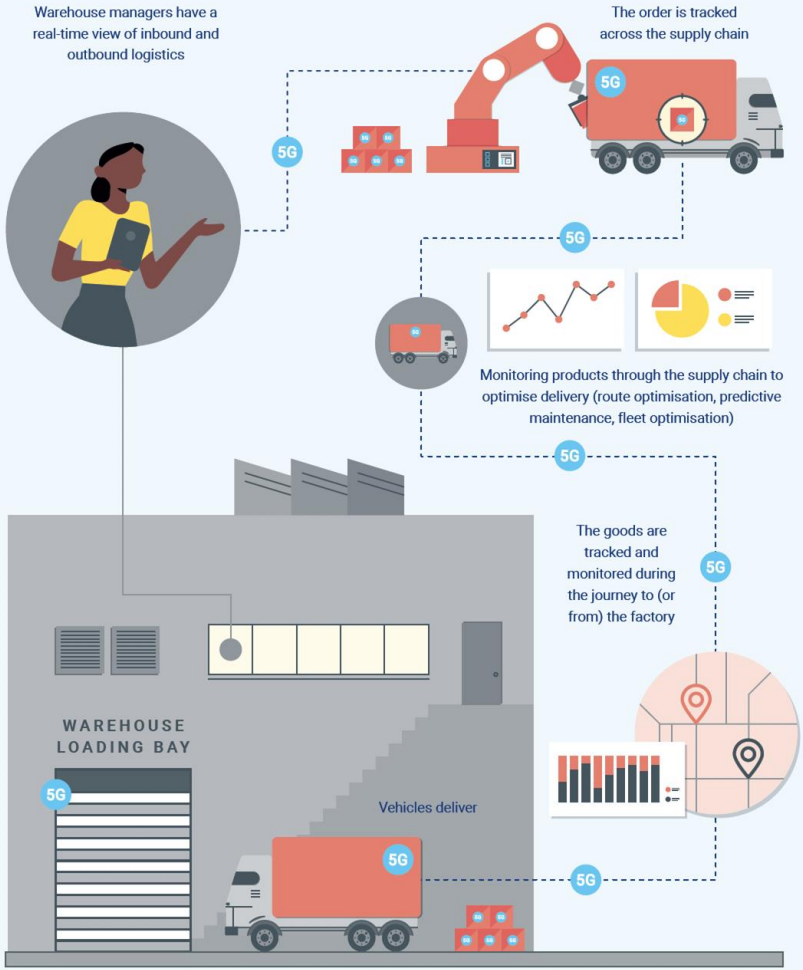
10-20% reduction in energy use & maintenance time

30% reduction in lost and damaged assets

65% reduction in T&S and training costs

Digital Ratapult Role

Digital Catapult will be the technical authority lead and coordinate 5G integration, working closely with Three and the use case developers.



CATAPULT Digital

2 Monitoring and management of goods across the supply chain

Just in time coordination of production line

- **Enabling configurability**
- **Reducing waste throughout the value chain**

Improved customer delivery processes

- Done by tracking key indicators in real time, **for example:**
  - Location
  - Condition (temperature, humidity level)
  - Condition of assets

KNOWRISK CONSORTIUM

Robust, transparent, and agile supply chains.

"At present, 75% of businesses say that supply chain insurance is insufficient with 43% of losses remaining uninsured. As we build back better, this platform shows how we can create permanent capacity in our supply chains ensuring critical medicines, food, and goods are delivered, allowing us to maintain and improve our industries, institutions, and way of life."

Lord Wei of Shoreditch

Client Context

CATAPULT Digital

The COVID-19 pandemic has highlighted how vulnerable our supply chains are to disruption, with resilience now the key focus as we prepare for an increasingly uncertain future.

Digital Catapult Role

The consortium includes: Sweetbridge, Engine B, Digital Catapult, CyStellar,Industria and Intelligent AI. Digital Catapult will offer capabilities of:

- Extraction of risks and mitigations using machine learning models
- Utilising its vast network to create survey reports from multiple insurers using federated learning
- Proof of feasibility of general supply chain risk analysis in general using federated learning.
- AI Model transparency framework
- Tooling to increase robustness and transparency of Federated Learning system

Projected Impact

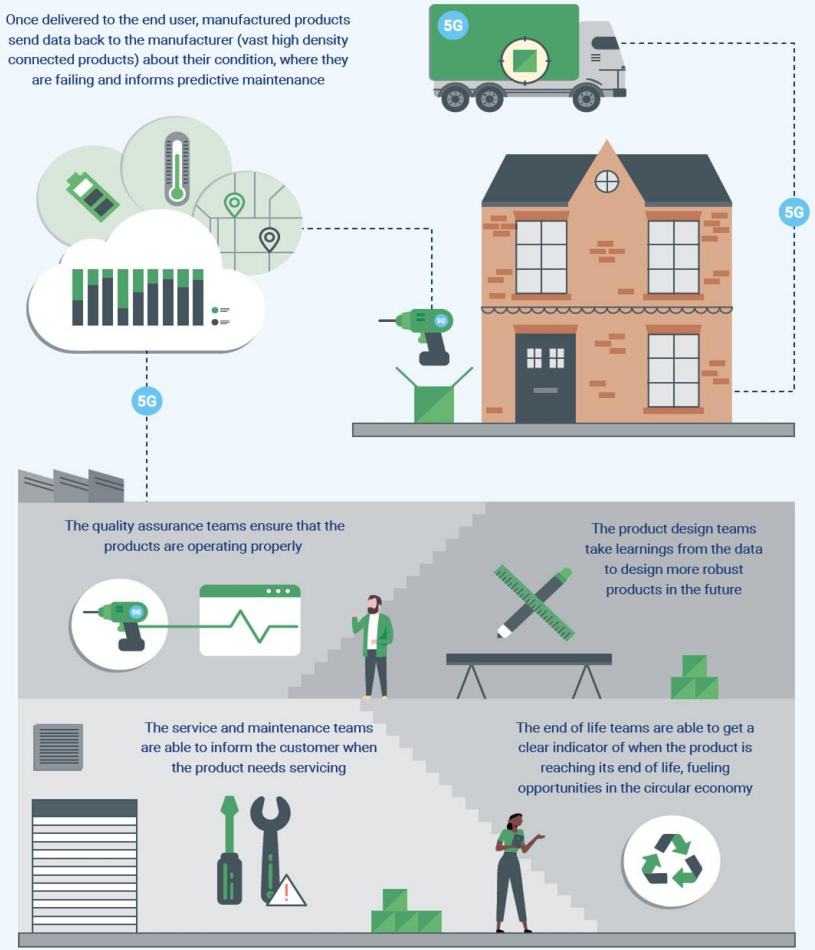
- Reduce risk of supply chain disruption by providing 360 degree view of risk portfolio
- Lower insurance cost and real-time measurement of risk will increase profit, reduce cost
- Collaborative work significantly reduce rates of fraud in insurance which is currently at 5%-10% of claims
- Will support up to 50% reduction in project completion delays
- Reducing back office costs ~10%

Partners

sweetbridge, ENGINE B, Intelligent AI, CYSTELLAR, UKRI Innovate UK, INDUSTRIA

What's Next?

KnowRisk will finalise in June 2021 and will show how internal business risk and across supply chains, can be measured, mitigated, and insured in real-time through the use of the latest technologies.



CATAPULT Digital

3 Product in-service maintenance and end of life management

Goods transmit relevant data during the entire lifecycle, providing:

- Better understanding of product performance, improving design and manufacturing processes
- Additional revenue stream through Servitised business models
- New value from partnerships by combining data from multiple sources to deliver new value from partnerships
- Opportunities in the circular economy
- Remote monitoring for maintenance

MADE SMARTER

Servitisation Demonstrator

Servitisation provides huge opportunities for manufacturers to offer products as a service, as opposed to selling discrete units. This has huge implications for ongoing revenues, new business opportunities and a circular economy.

CATAPULT Digital

Client Context

Boiler manufacturer, Baxi, is looking to move from selling individual units to homeowners or housing associations, to providing a service that offers reliable and clean energy to its customers. We will be using the learnings from this activity to host a servitisation demonstrator to help UK manufacturers to understand and adopt new business models.

Digital Catapult Role

Digital Catapult has been tasked to design and deliver information on how technology companies can develop capabilities to help industry develop servitisation offerings and a roadmap towards 'as a service' industrial offerings.

As part of this work, we are identifying the digital 'components' that make a product servitisable, with a detailed analysis that will help industry to correctly apply digital technologies to enable new value propositions and business models.

Projected Impact

- Develop new business models, built on data for home heating
- Provide new revenue streams to manufacturers
- Enable manufacturers to design products for service life intensification and a circular economy
- 10 SME manufacturers learning directly from the project and giving insight on the feasibility of the business model

Partners

SIEMENS

Kooltii not like everybody else

BAXI

Aston University

What's Next?

Build of the digital and physical demonstrators will take place in 2021

John Pattinson
John.Pattinson@digicatapult.org.uk

CATAPULT Digital