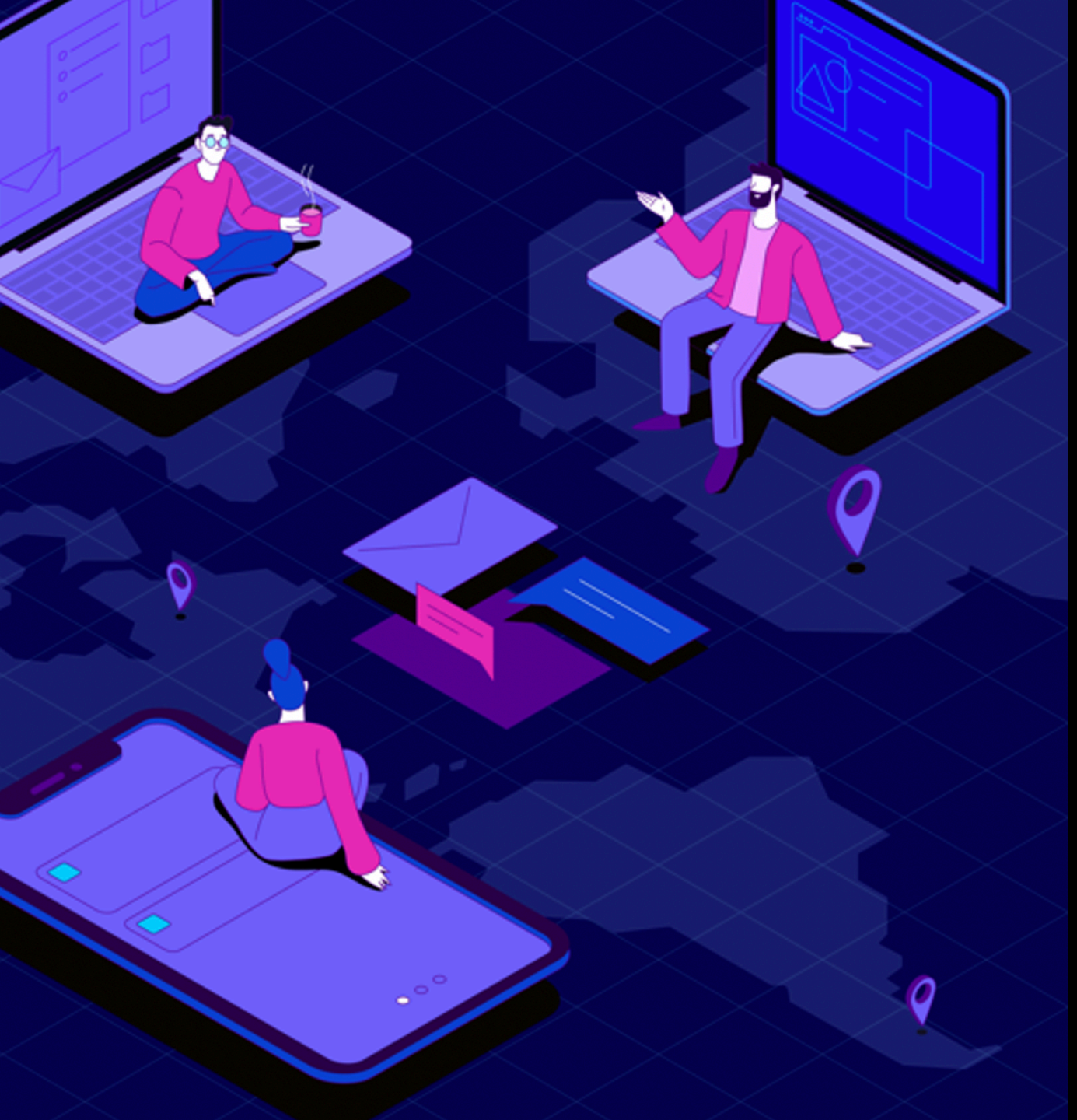


Unlock the full potential of EU policies by delivering relevant digital data

Why manufacturers need to digitise their information

30th YEARS ANNIVERSARY

CONSTRUCTION PRODUCTS EUROPE
LET'S BUILD AN EFFICIENT EUROPE

IBM

Market Challenges

Typical Challenges - Why

Complex ecosystems
Low collaboration
Low visibility

Low profit margins
Low productivity
High cost of failure

Disruption
New materials
New equipment
New ways of working

- Increasing project and site complexities
- ERP used mostly for internal operations
- Little transparency and fragmentation
- **Construction is not standardized**
- **Unstructured and silos data**
- Poor project management and execution
- Insufficient skilled labor

The construction sector accounts for 9.8% of Australia's gross domestic product (GDP)

We need to build better performing buildings, with less resource, and quicker!

We need a step-change in productivity in design, procurement & delivery

Carbon emissions from buildings are on average 3.8 times higher than they were designed to achieve**

Source: *UN. **Innovate UK

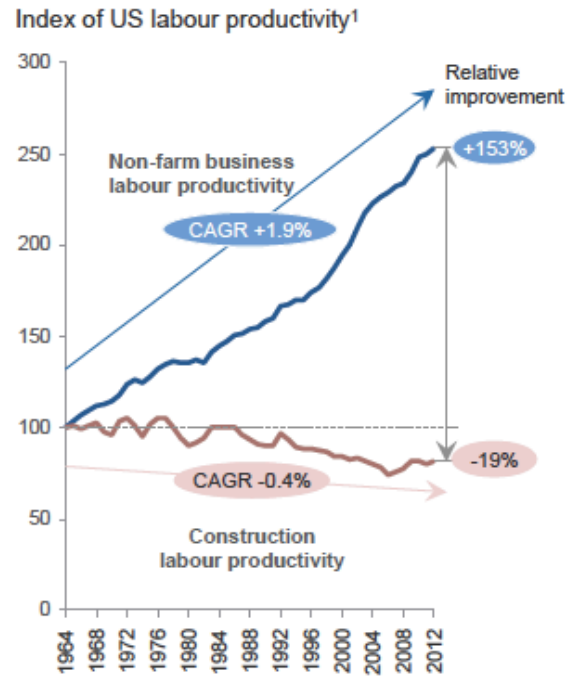
Many small niche firms providing solutions for AI / Big Data / IoT

Lack of Integrated platform execution

Lack of intelligence across project lifecycle stages, value chain and asset operations

Productivity and Digital opportunity

Figure 3: US Industry Productivity and Performance, 1964-2012[28]



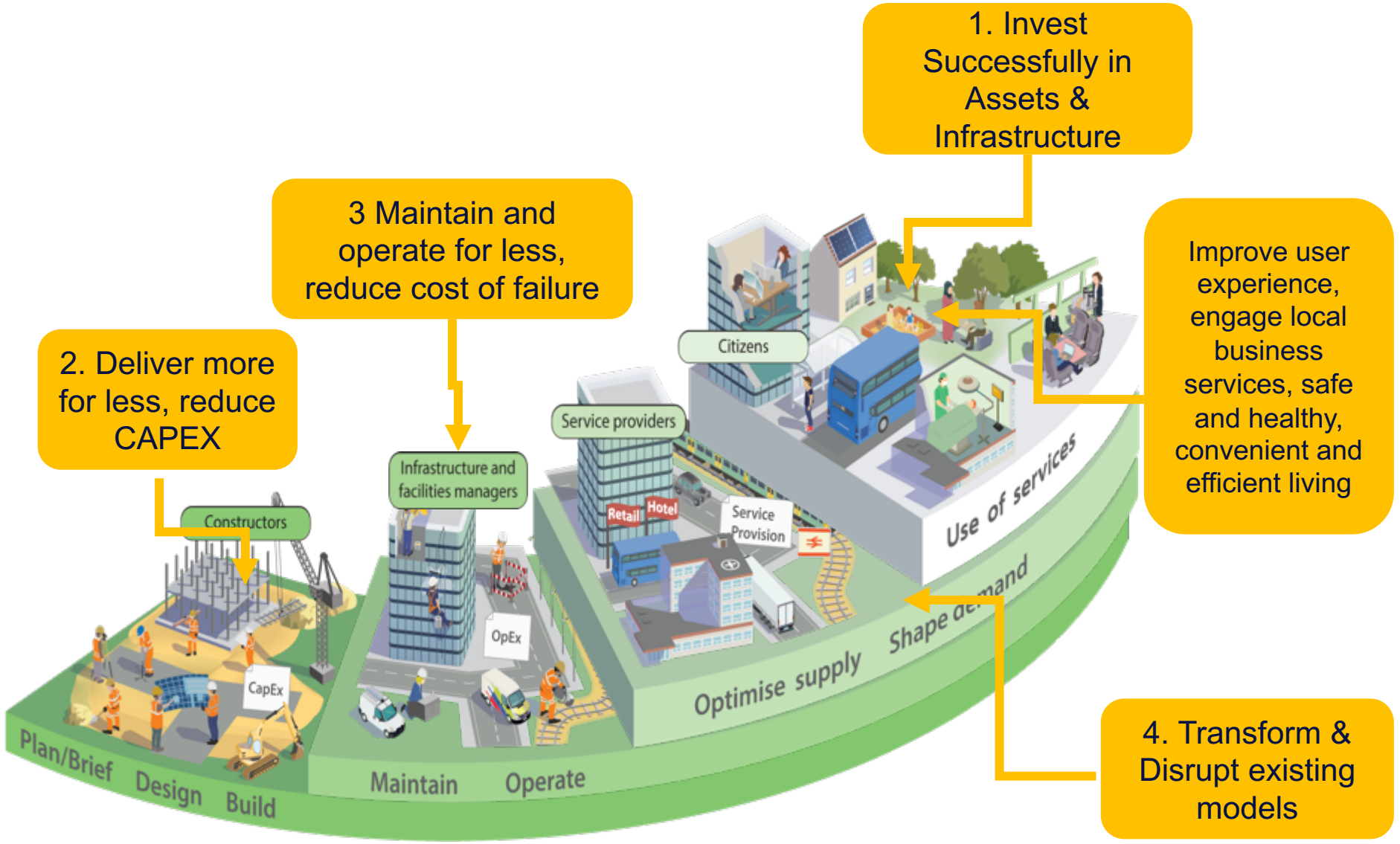
[1] Peer set based on US companies with Engineering, Construction and Services-related Standard Industrial Classification codes. Financials are inflation-adjusted and indexed to 1964; output per working hours.
CAGR = compound average growth rate
Source: Global Vantage; Compustat; Bloomberg; www.aecbytes.com/viewpoint/2013/issue_67.html; www.nber.org/papers/w1555.pdf; S&P Capital IQ; BCG ValueScience Center; World Economic Forum

How Digitally Advanced Is Your Sector?

An analysis of digital assets, usage, and labor.

SOURCE DATA ANALYSIS AND EXPERT INTERVIEWS CONDUCTED BY THE MCKINSEY GLOBAL INSTITUTE

Summary of why we need a step change in the way we design, construct and operate

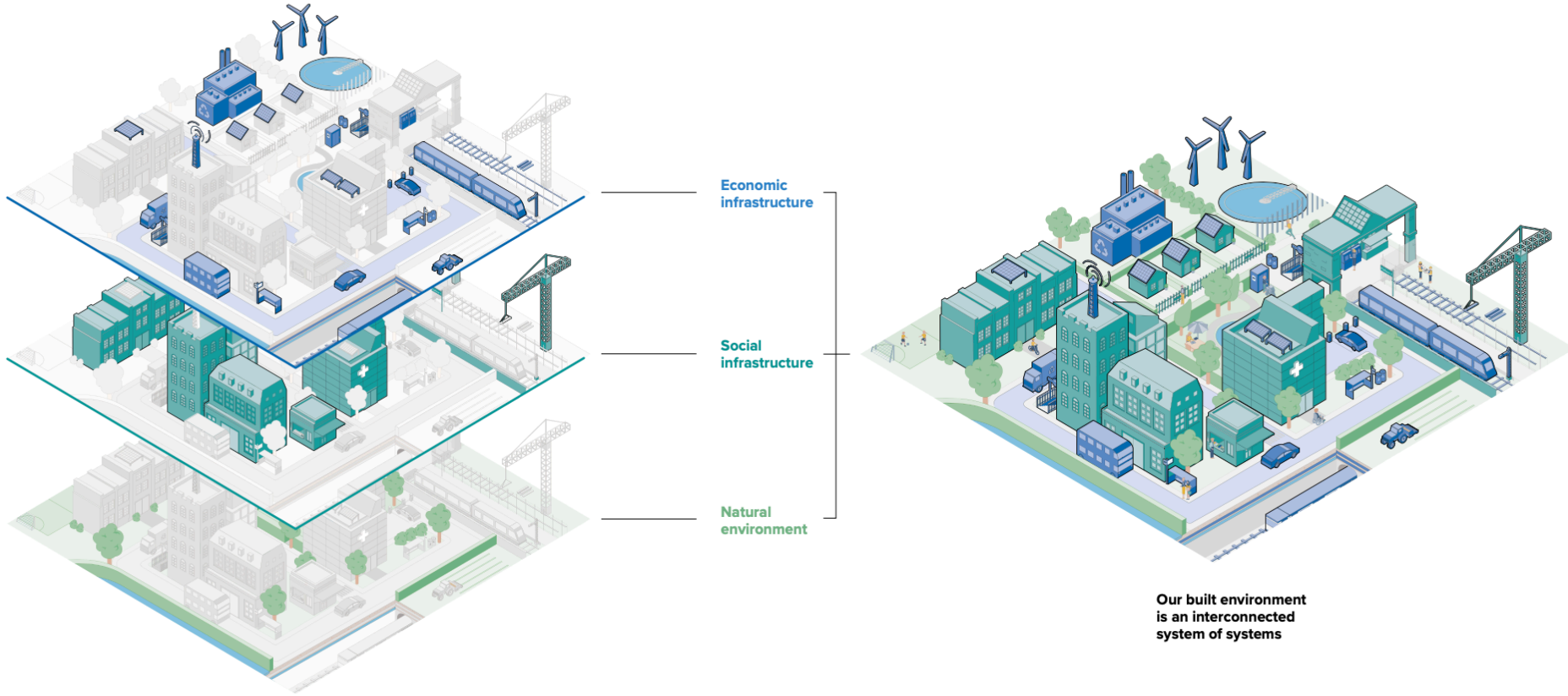


Source: CDDB, IBM

Strategic Market Shifts

What is the Built Environment

Our infrastructure needs effective connections between physical and digital assets



Our built environment is an interconnected system of systems

The built environment encompasses encompasses all forms of building (housing, industrial, commercial, hospitals, schools, etc.), and civil engineering infrastructure, both above and below ground and includes the managed landscapes between and around buildings.

Centre for Digital Built Britain (CDBB), the Cambridge Centre for Smart Infrastructure and Construction (CSIC) at the University of Cambridge, with the support of the Department for Business, Energy and Industrial Strategy, the Institution of Civil Engineers, the Institution of Engineering and Technology and the Institution of Mechanical Engineers.

There is a lot of buzz going on

‘BIM has the potential to enable **prefabrication**, more **standardized** products, and **easier changes**, without common construction-site **mistakes**’
- McKinsey

‘As important as the internet: Are **digital twins the next big thing** for construction?’
- Building.co.uk

‘Building information modeling (BIM) should be regarded as the **backbone of the new way of working**’
- Oliver Wyman

EU Green Deal, Hackitt Report
Levels, Digital Logbooks
CEN TC 442, ISO, Digital EPD

‘Modernise or die’
-The Farmer Review of UK Construction Labour Model

‘[BIM] could do to the **construction industry** what the **Amazon platform has done to retail**.’
-Roland Berger

‘Data is the new dollar’
- Amar Hanspal, Autodesk

‘**Every company** will eventually be in the **data business**.’
-Thomas H. Davenport

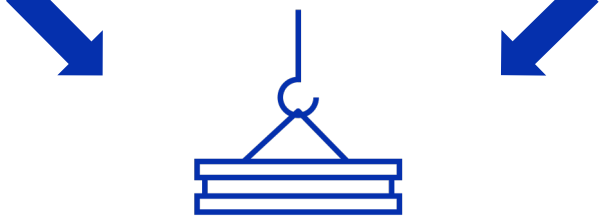
‘As the **construction industry starts to reorganize around BIM**, the **time** is now for building materials companies **to act**’
-Boston Consulting Group

‘The construction industry has been going through a **digital transformation ever since the introduction of BIM**, and its benefits are plain to see’
-BIMToday

Beyond the hype, there are some underlying trends that are worth paying attention to

New data aggregators
BIM, Digital Twins, data pools and BREEAM software providers act as new intermediaries to consolidate and manage construction data across the ecosystem

Regulations and circular economy
New regulations (e.g. **EN ISO 23386, EN ISO 23387**, **CPR revision**, introduction of Levels & **EU Green Deal**) driven by safety and environmental considerations set data format standards and require more comprehensive data reporting

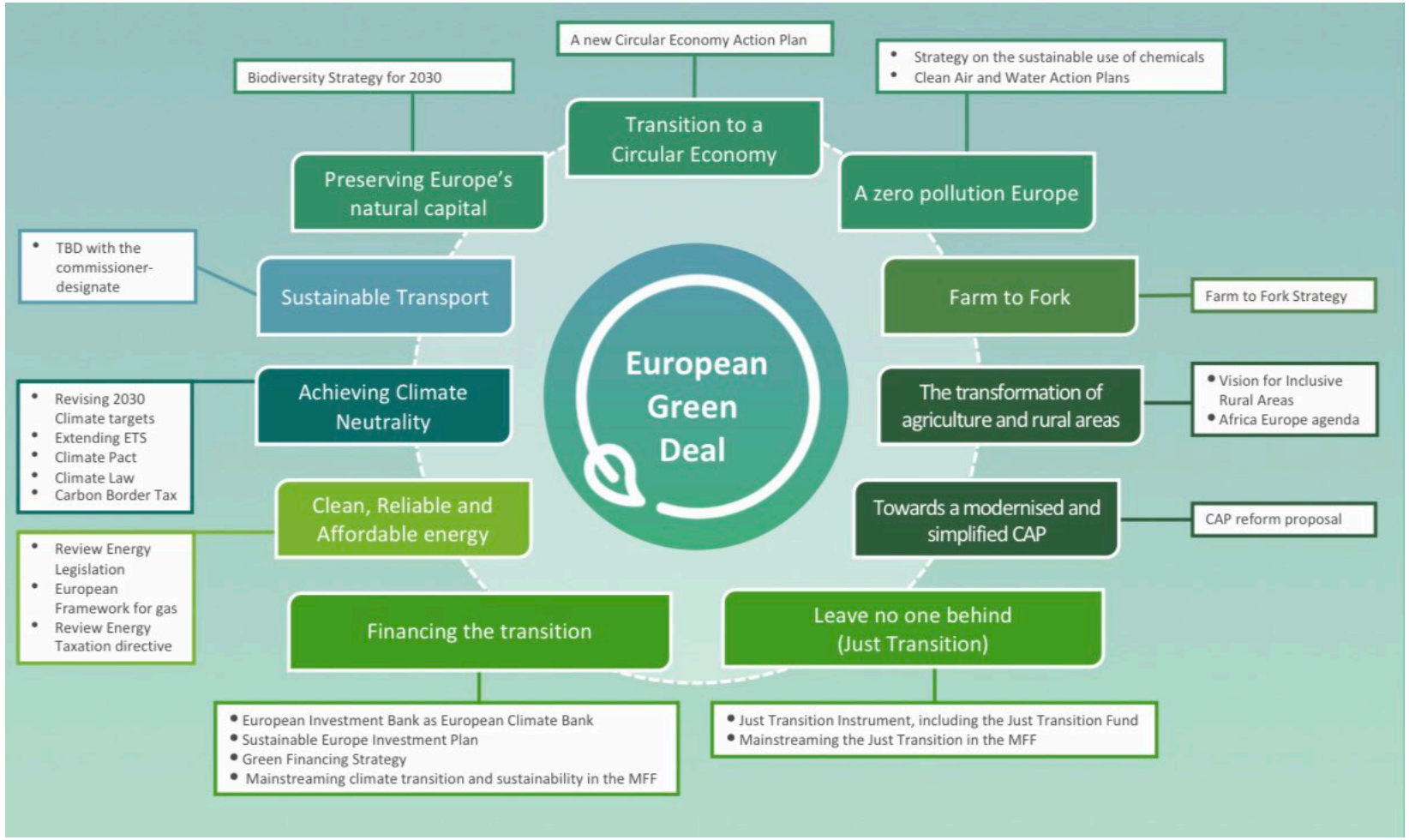


Construction Materials Manufacturing

Material lifecycle management
Materials are no longer one-off purchases. Material performance is monitored and managed from installation to operation (using IoT, predictive maintenance etc.)

Digital plants and Industry 4.0
Digital plants enable move to more efficient, customizable production and distribution (e.g. automation, additive manufacturing, customized component manufacturing, DfMA)

The EU Green Deal



The European Green Deal is a set of policy initiatives by the European Commission with the overarching aim of making Europe climate neutral in 2050.

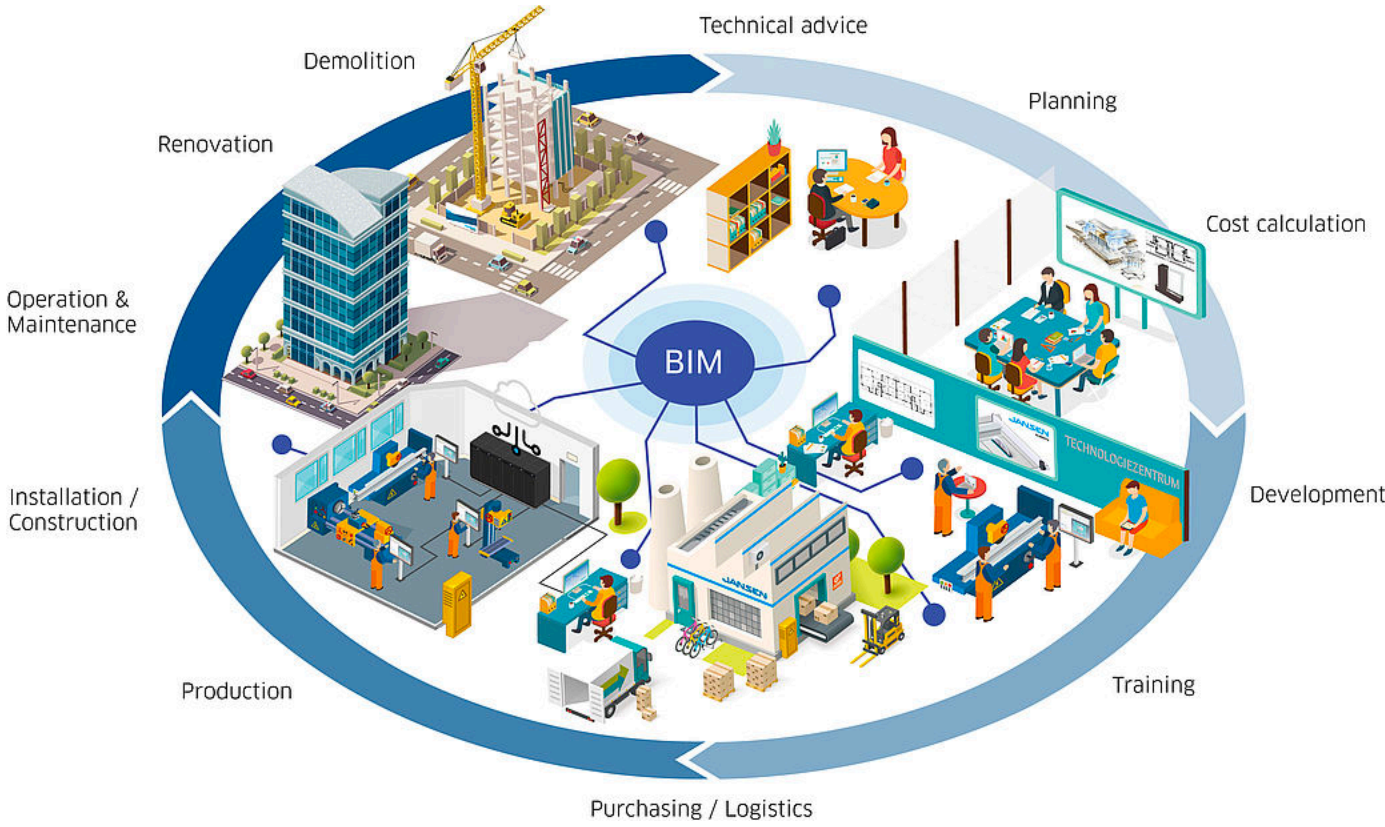
The plan is to review each existing law on its climate merits, and also introduce new legislation on the circular economy, building renovation, biodiversity, farming and innovation.

https://ec.europa.eu/, Wiikipediai

BIM is relevant for every stakeholder

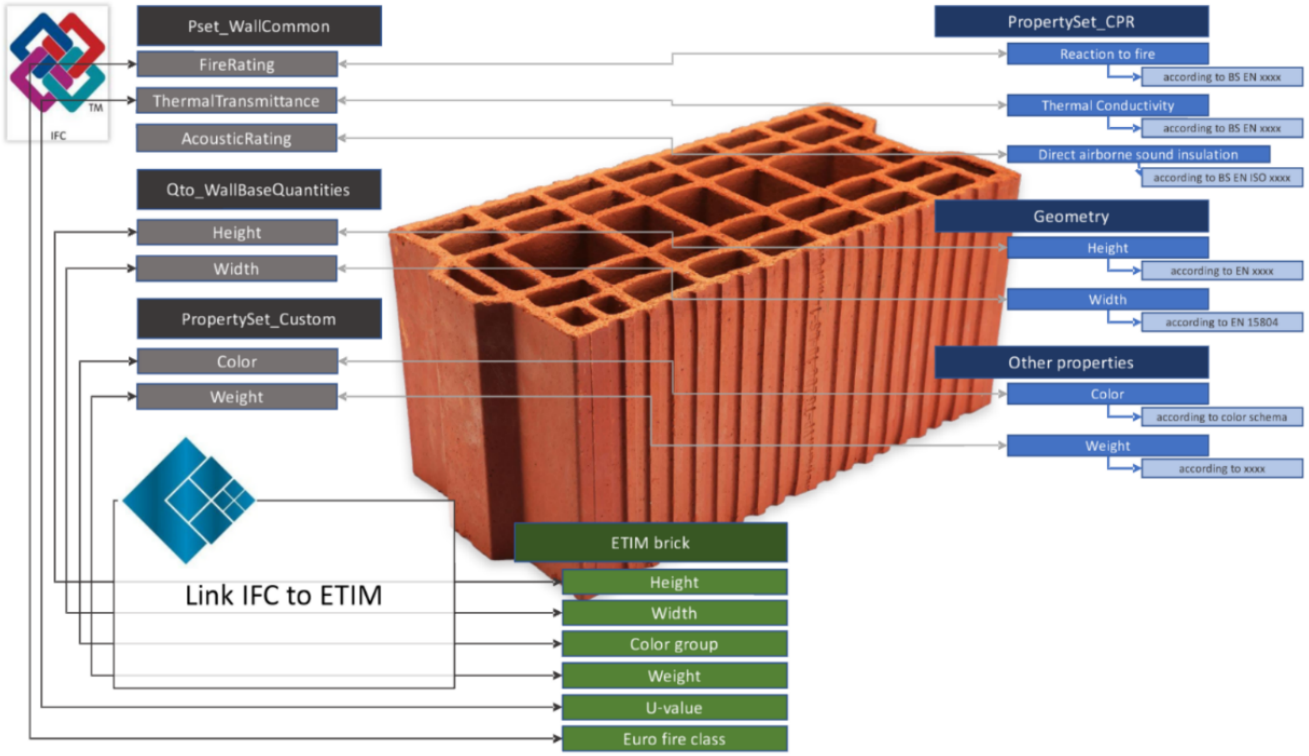
- Building Information Model – **What** thing is produced
- Building Information Modelling – **How** the thing is produced
- Building Information Management – **Who** produces **What** thing and **When**

*'BIM expands from 3D modelling to genuine collaboration; **from design and construction into operations**; **from individual buildings to cities** and their systems; and onto wherever digitizing the built environment may take us.*



Source: coBuilder, ISO19650, BIMlevel2.org

These trends clash with the operational reality of building material manufacturers



Challenges for building material manufacturers

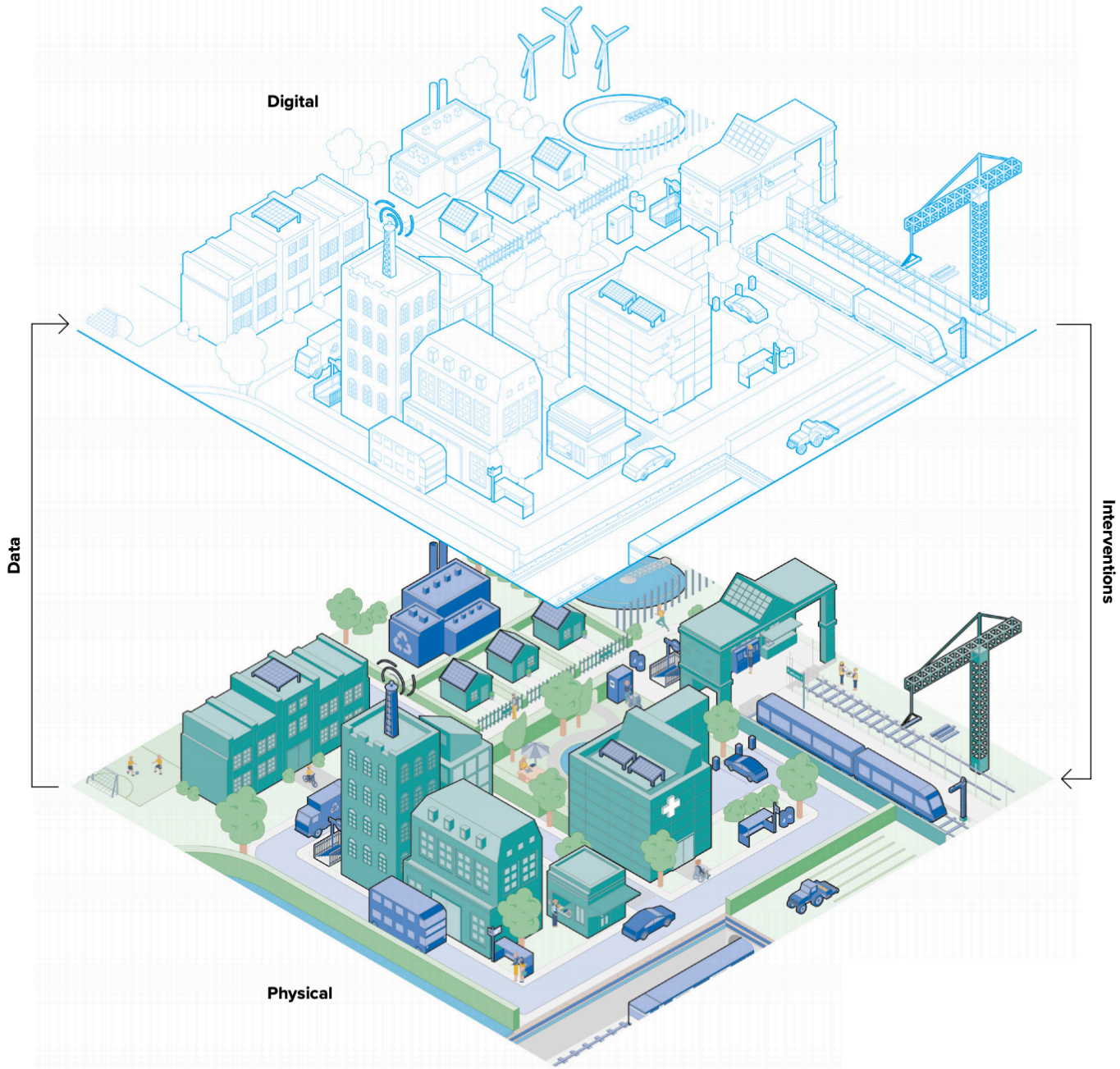
- **Siloed data** in inconsistent formats
- **Low data quality** and lack of data governance
- **Over 30 classification systems – BauClass, Uniclass, NRM**
- **Fragmented BIM landscape** with different standards (To BIM or not to BIM)
- Fragmented vendor landscape with **limited interoperability**
- **Lack of standards** for parts/equipment catalogues
- Lack of **IT & OT security** of Digital Twins and Models
- Sites **lack infrastructure to leverage data**
- Install base **lacks sensors and embedded** monitoring to benefit from IoT
- **Insufficiently skilled labor** to implement complex data projects

Simply investing in BIM is insufficient to address the data challenges faced by materials manufacturers

Digital Built Environment and BIM is even more relevant now

Our infrastructure needs effective connections between physical and digital assets

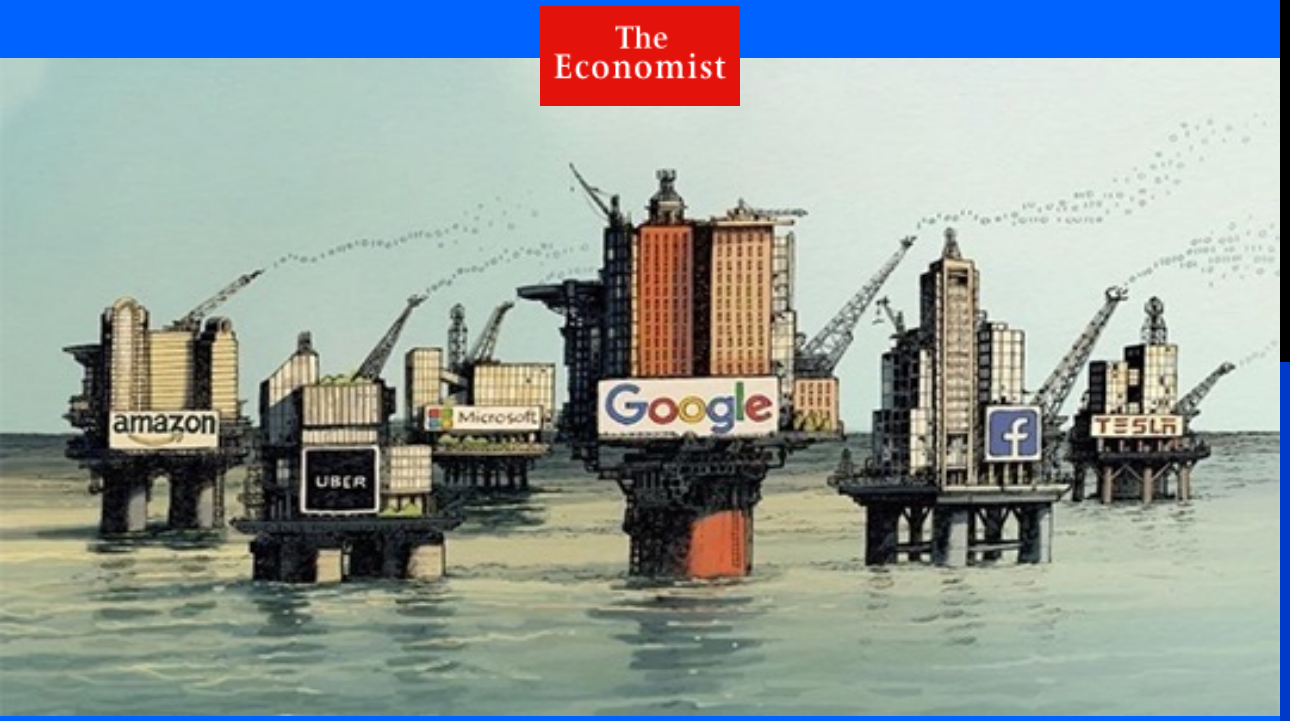
Manufacturers needs to treat data as an asset !



Centre for Digital Built Britain (CDBB), the Cambridge Centre for Smart Infrastructure and Construction (CSIC) at the University of Cambridge, with the support of the Department for Business, Energy and Industrial Strategy, the Institution of Civil Engineers, the Institution of Engineering and Technology and the Institution of Mechanical Engineers.

Why manufacturers need to digitize their information

Thriving in a data-driven world



The world's most valuable resource is DATA

20% of the world's data is searchable and anybody can get to it.

The other **80%** is like gold!

"80% of the world's data, whether it is underwriting, pricing, customer experience, risk in loans... That all lives within your data and you don't want to share it, it is **gold**. This is what we do, we help you use that."

Data is unlimited, reproducible, reusable, whose value increases as it is combined and analyzed.

10X

Growth in data 2016 to 2025

Those who can harness the opportunity that lies within their data, gain huge ***competitive advantage.***

Building materials manufacturers face fundamental data-related strategic requirements

New applications of enhanced data

- **Enhanced data** (e.g. time, cost, material performance, geometry, sustainability, availability)
- **Comprehensive track and tracing** to enable lifecycle monitoring based on **product data combined with logistics and construction data**
- **Extended platform** to supply chain partners to **broaden reach and lock-in**

New data formats & interfaces

- Building materials manufacturers need to be able to **flexibly provide data in different formats for different platforms** (e.g. regulators, BIM providers) in real time to ensure continued access to customers mandating BIM
- New interfaces **provide additional data** (e.g. customer and usage data from BIMs, Digital Twins) to manufacturers

New business models

- New data interfaces open up opportunities to launch **new products and services with significant potential** (e.g. customized production based on BIM data, building operations and maintenance support based on lifecycle data).
- **Servitization** leading to increased margins and volume

New capabilities

- **Master Data Management** needs to ensure availability and quality of internal (product) data
- **New skills** required to manage new data use cases (e.g. digital marketing based on customer data)
- **Accessibility of data** as differentiator for commodity products

Treat data as an asset

Know your data and Structure throughout the lifecycle

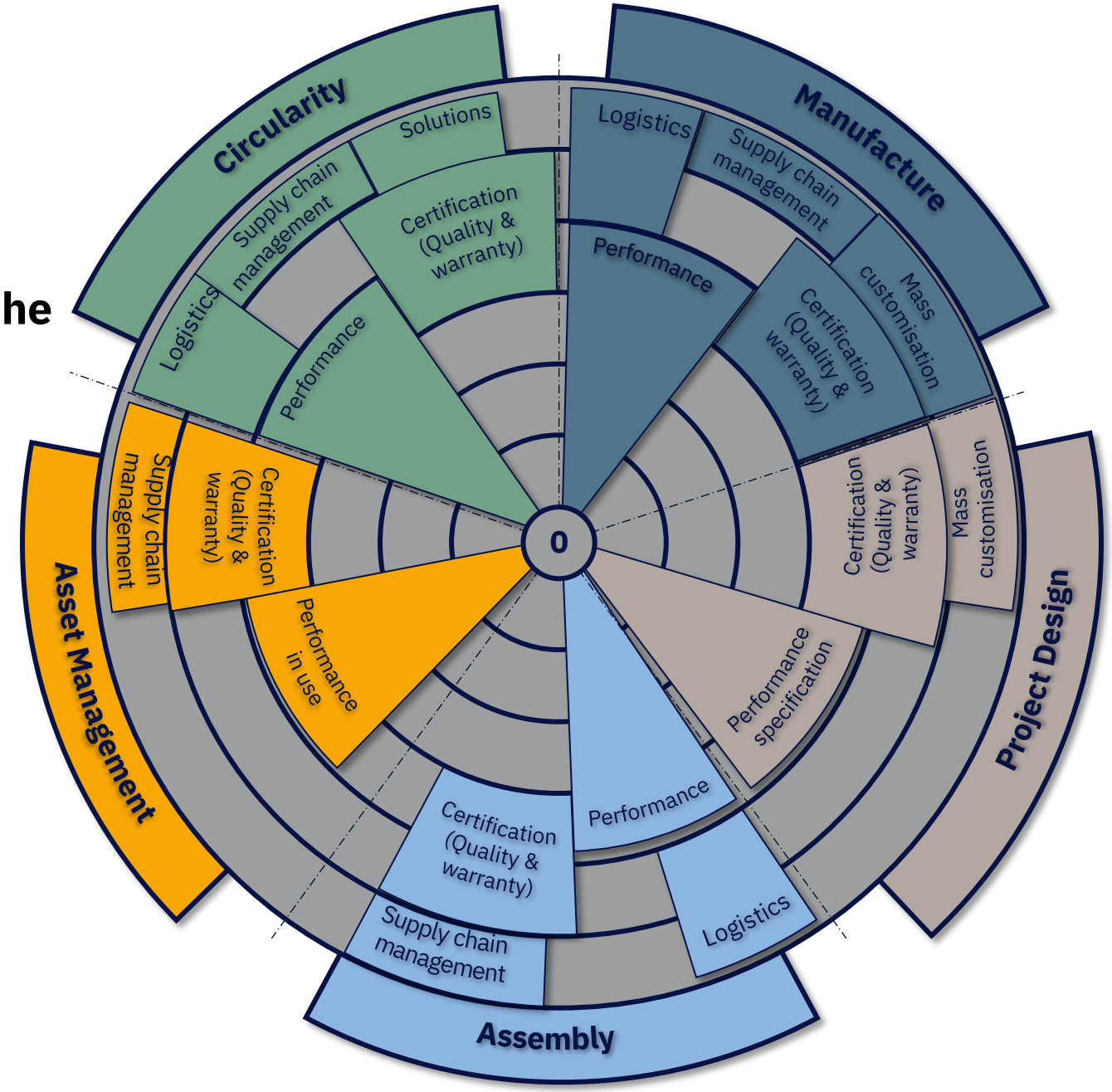
Structure it – CPR, LVD, local standards

Make it interoperable – SmartCE, EN ISO 23386, ISO/DIS 23387

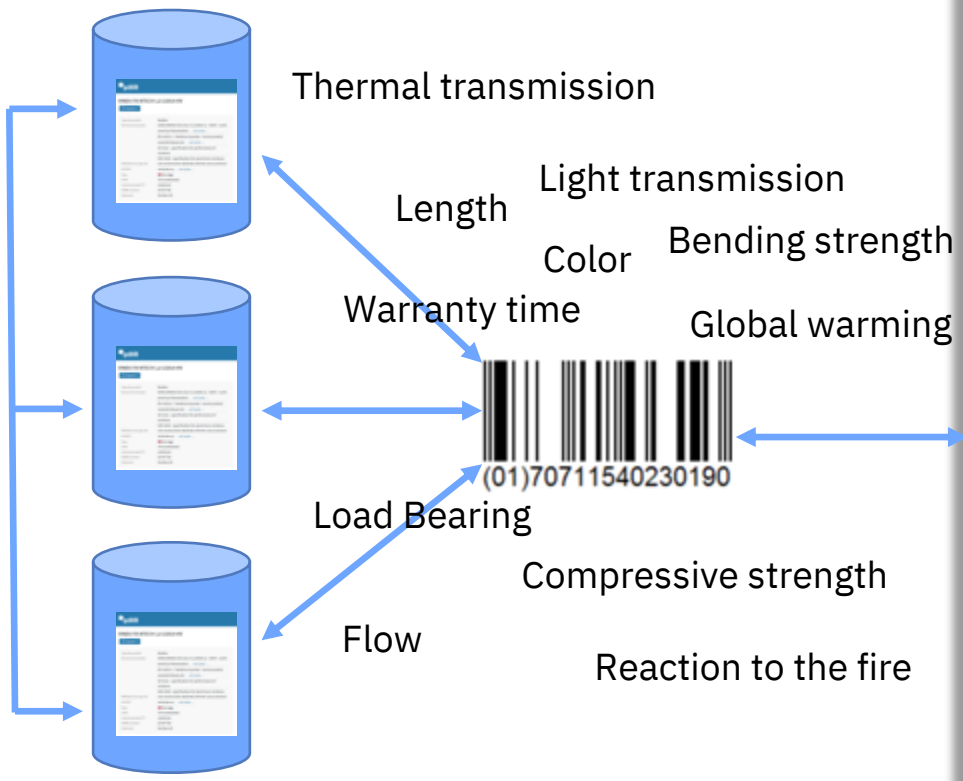
Governance is important

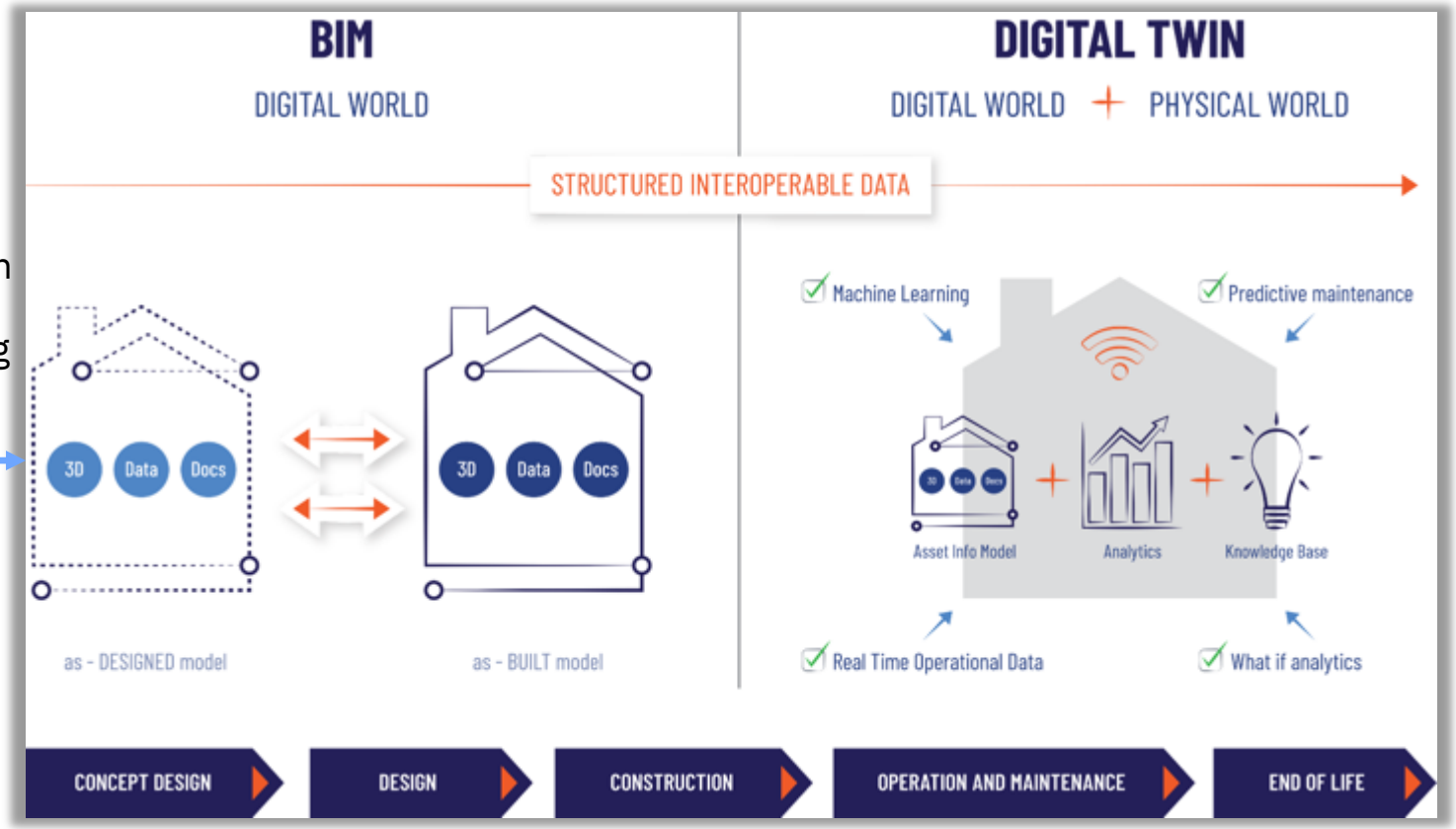
Verify, make it Trustworthy

Control and share



Standards and regulations combined with digital technologies

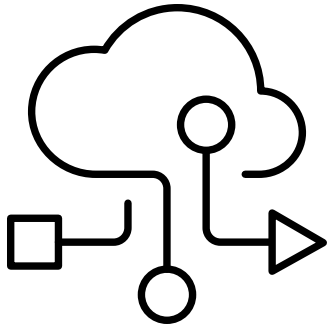




The as-designed model is based on input from the design teams which ultimately forms the basis for the as-built model that contains all the characteristics of a building.

Cognitive Enterprise enables to provide data to create Digital Twins. This opens a new digital market on planned development, where assets are sold. It also enables maintenance, energy optimization, machine learning, real time data = lower OPEX

Source: coBuilder, GS1, IBM



Industry Digitalization has benefited from the emergence of new **digital technologies** that are completely redefining the possibilities in construction, operations and manufacturing

APIs & Microservices

Rapidly creates new applications. Enables ecosystem partners to collectively innovate.

Automation & Advanced Robotics

Enhances productivity by working autonomously or in conjunction with staff. Increases worker safety.

Additive Manufacturing

Creates new and more efficient products. Slashes manufacturing processes.

Blockchain

Improves identity management and distribution. Enables transformational business model innovations.

Cloud

Allows data and applications to be stored and accessed from anywhere. Delivers cost-effective innovation quickly.

AI & Analytics

Supports staff to make decisions. Identifies business-critical operational improvements.

Internet of Things

Equips physical assets with digital data. Optimizes existing operational processes.

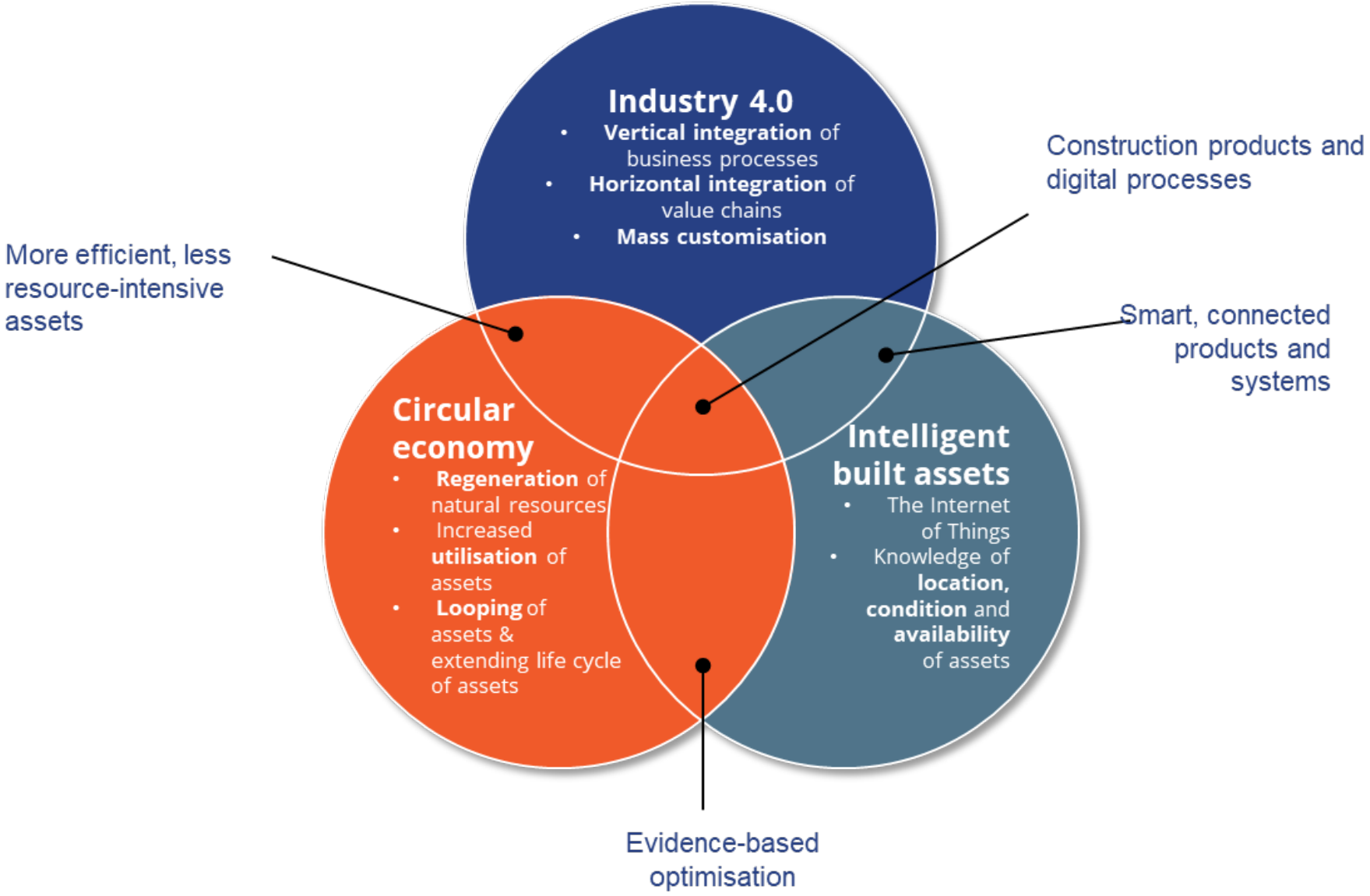
Mobile

Connects people with insights where they are. Enables on-going status and decisions.

Cybersecurity

Embeds safeguards into systems. Surfaces threats.

Holistic approach is the key to successfully increase the productivity and efficiency



Source: CPA (2016) – Future for Construction Product Manufacturing: Digitalization, Industry 4.0 and the Circular Economy

The Journey to the New Normal – Where are you ?

DATA is the new oil of the industry

Standards and regulations creates a common industry digital language

Technology as an enabler for digital transformation & post-corona re-invention

Post-COVID-19 new normal

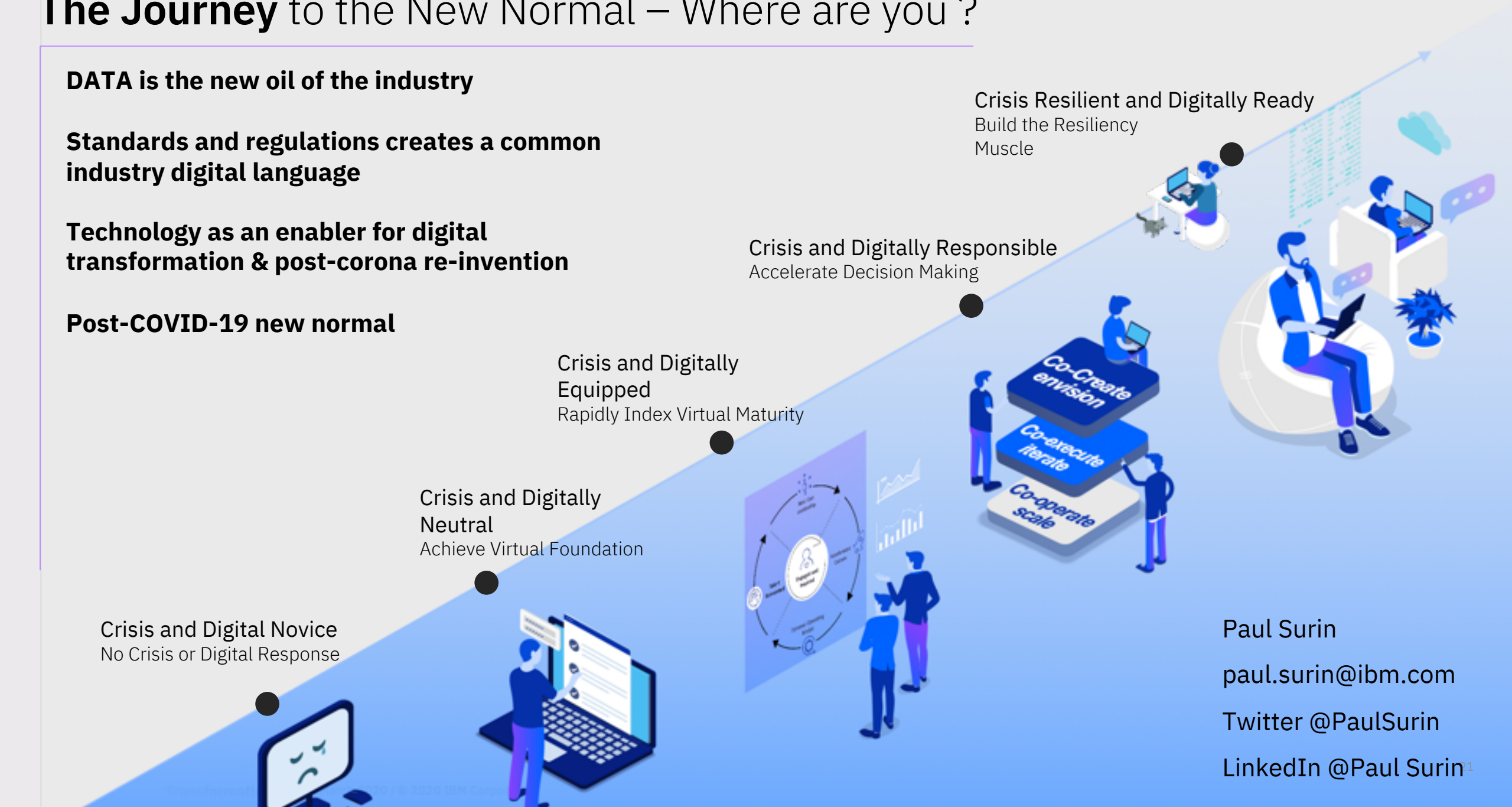
Crisis and Digital Novice
No Crisis or Digital Response

Crisis and Digitally Neutral
Achieve Virtual Foundation

Crisis and Digitally Equipped
Rapidly Index Virtual Maturity

Crisis and Digitally Responsible
Accelerate Decision Making

Crisis Resilient and Digitally Ready
Build the Resiliency Muscle



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Thank you

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