

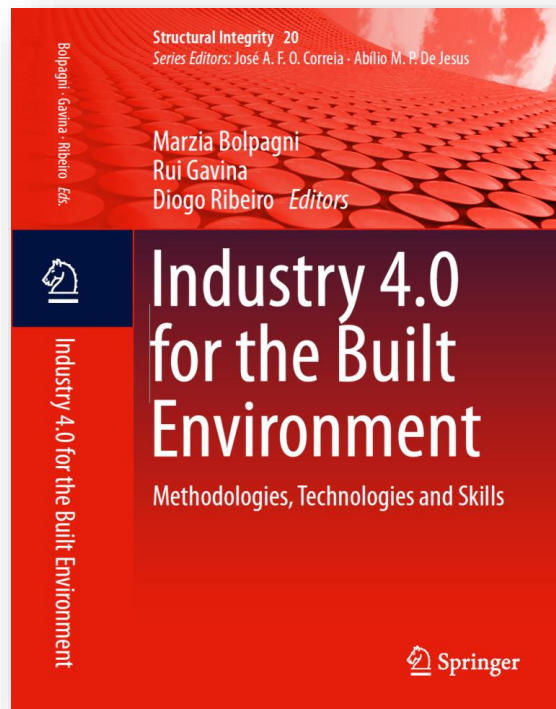
Industry 4.0 for the Built Environment

Dr. Marzia Bolpagni, Mace

ORGANIZED BY:



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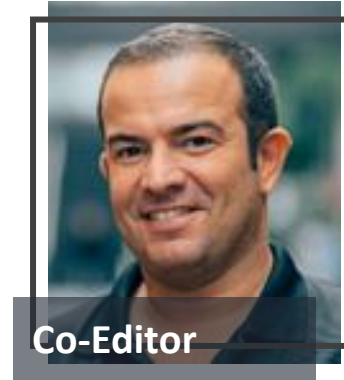


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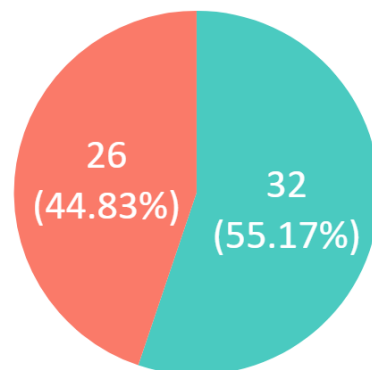
Authors



55
Industry and
Academic Experts

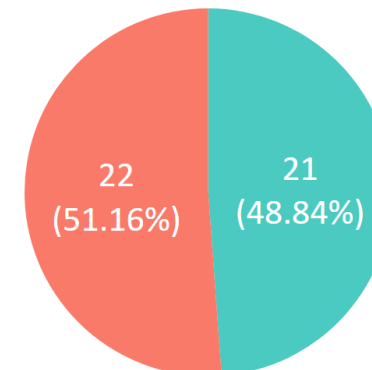
Co-Author and Main Author

● Co-Author ● Main Author

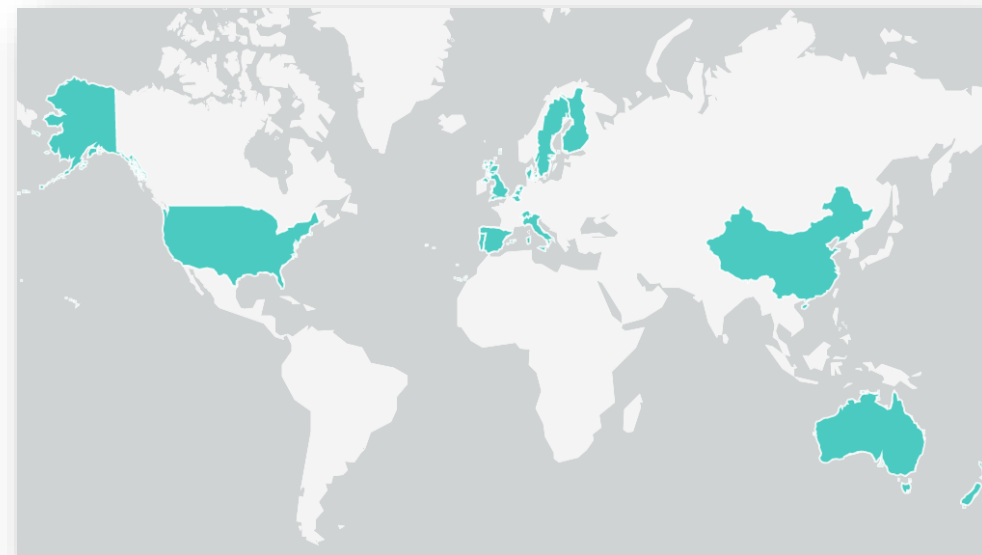
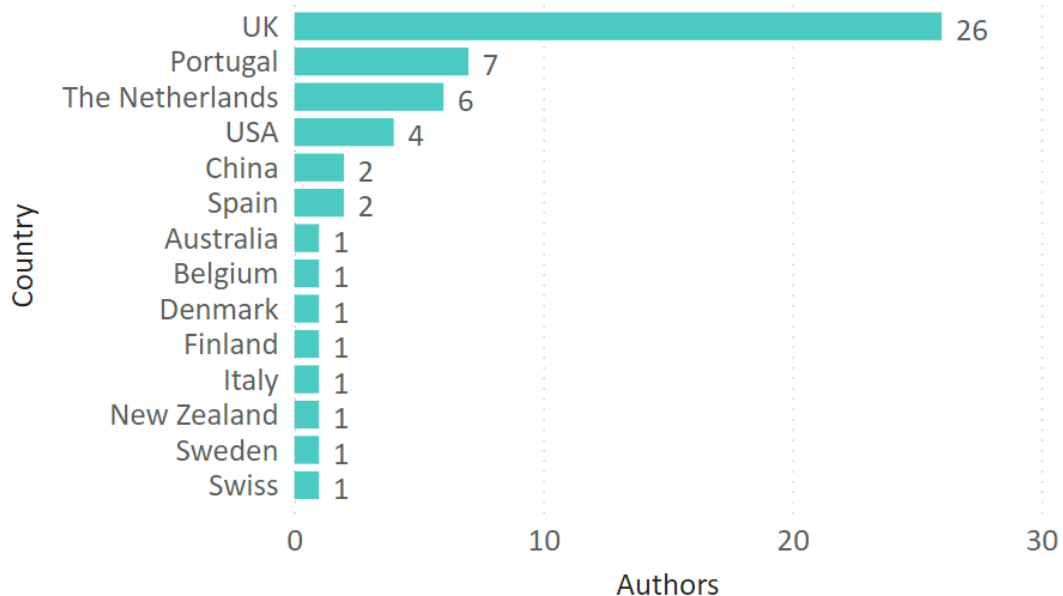


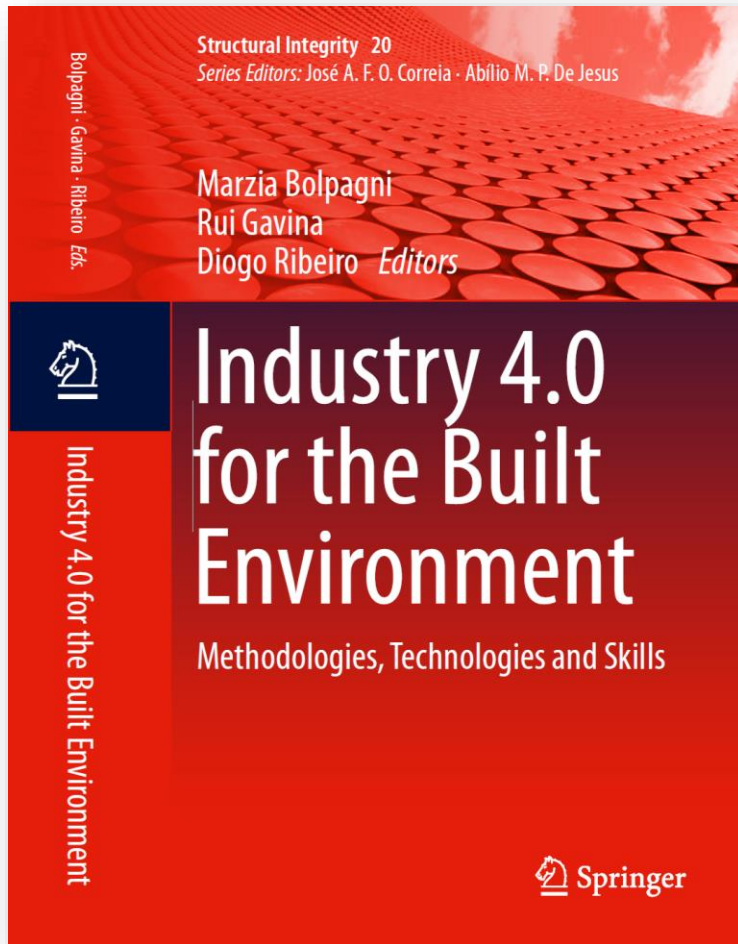
Number of Companies and Number of Universities

● Number of Companies ● Number of Universities



Authors by Country



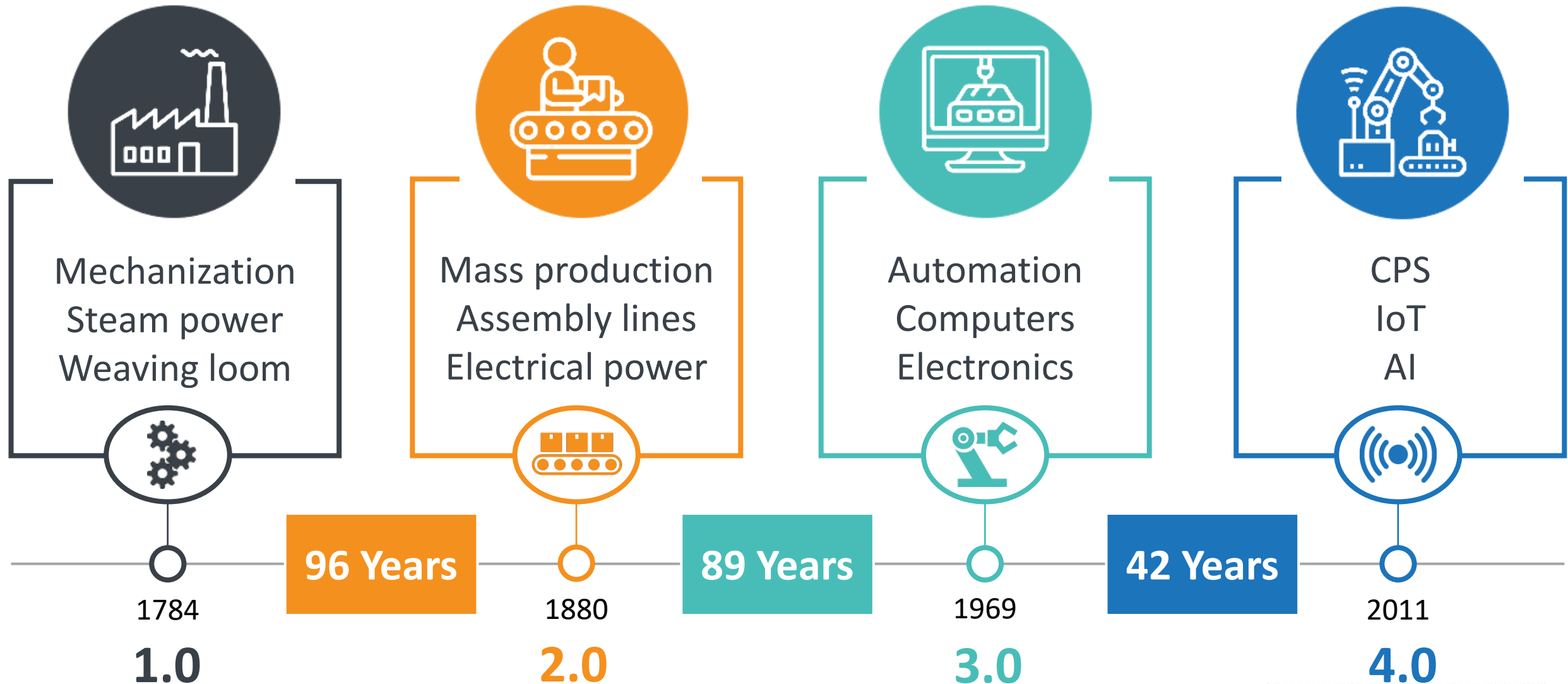


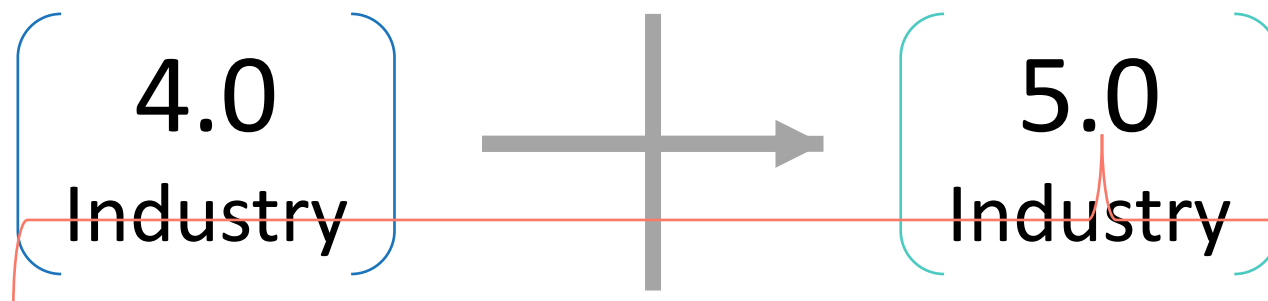
28
Chapters

Concepts and Methodologies for the Built Environment

Technologies for the Built Environment

Trends in Soft Skills for the Built Environment

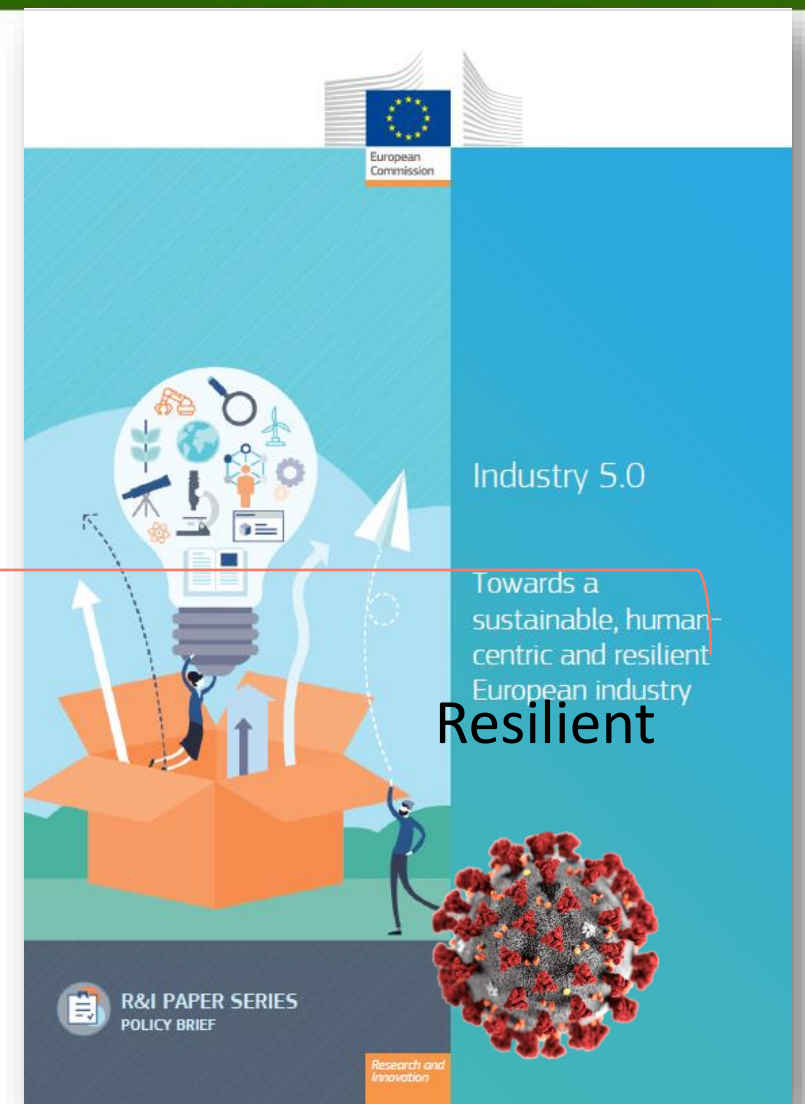




Human-Centric
2011



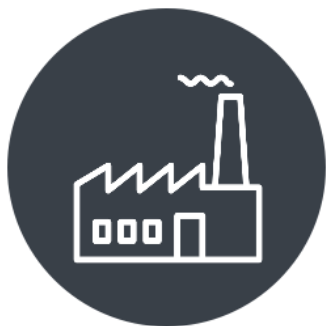
Sustainable
2021



17% of the world as nearly 1.3 billion people still lack access to electricity

more than half of the world's population, lack internet access

K. Schwab, The fourth industrial revolution. Currency, 2017



Industry 1.0



100%

Replacement of
complete loom



Industry 2.0



~10-20%

Most equipments and
tools were kept.



Industry 3.0

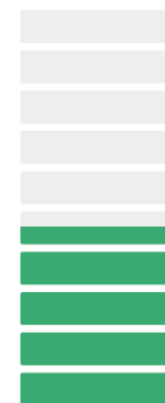


~80-90%

High level of
replacement of tools
and equipments with
machines and
computers



Industry 4.0



~40-50%

Existing machines
are connected with
only partial
replacement of
equipment

Replacement of Equipment



Prior to Industrialization

Construction was a craftsmanship. Innovations in materials from the stone age, to the copper, bronze and iron age, enabled the creation of basic tools to shape materials

prior to the 17th Century



Construction 1.0

The use of mechanical equipment to manufacture new construction materials with the emergence of mass production systems

17/18-19th Century



Construction 2.0

Shift from analogue to digital and assembly lines alongside with the rising of CAD solutions, to support mass production and prefabrication technologies

19-20th Century



Construction 3.0

Emergence of integrated information systems such as BIM, CAM and CNC methods to adapt to a mass customization production system

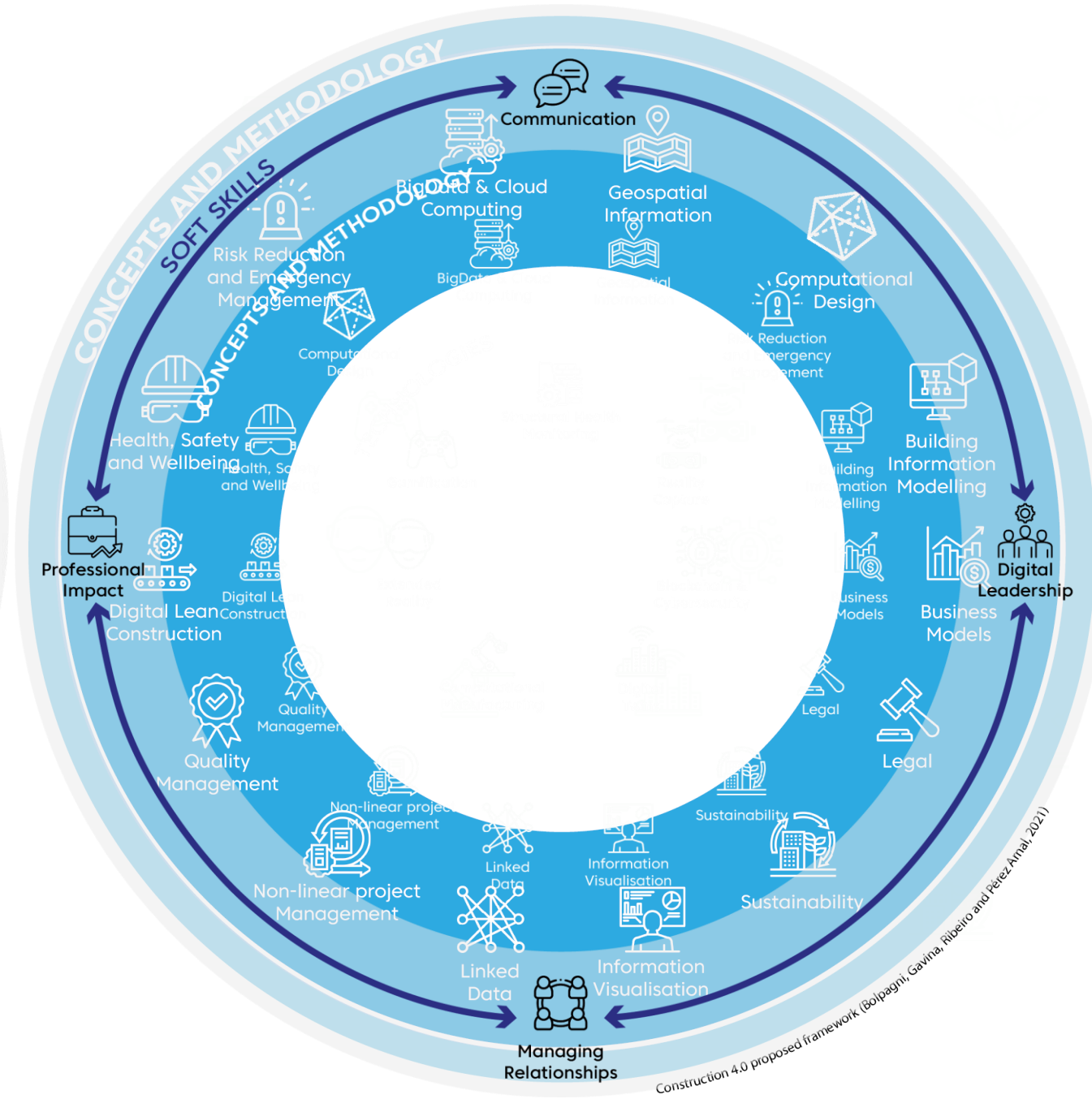
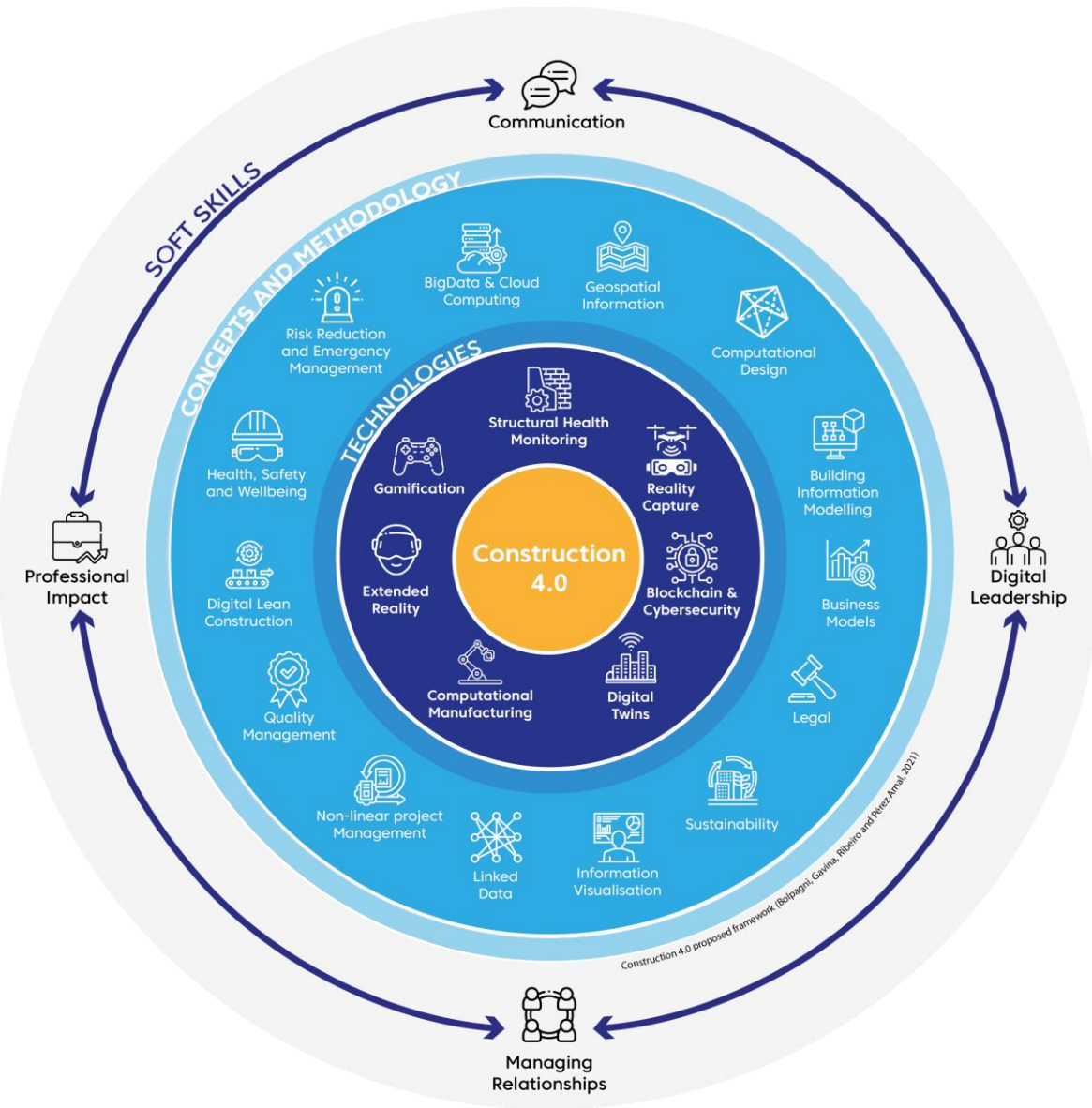
20-21st Century

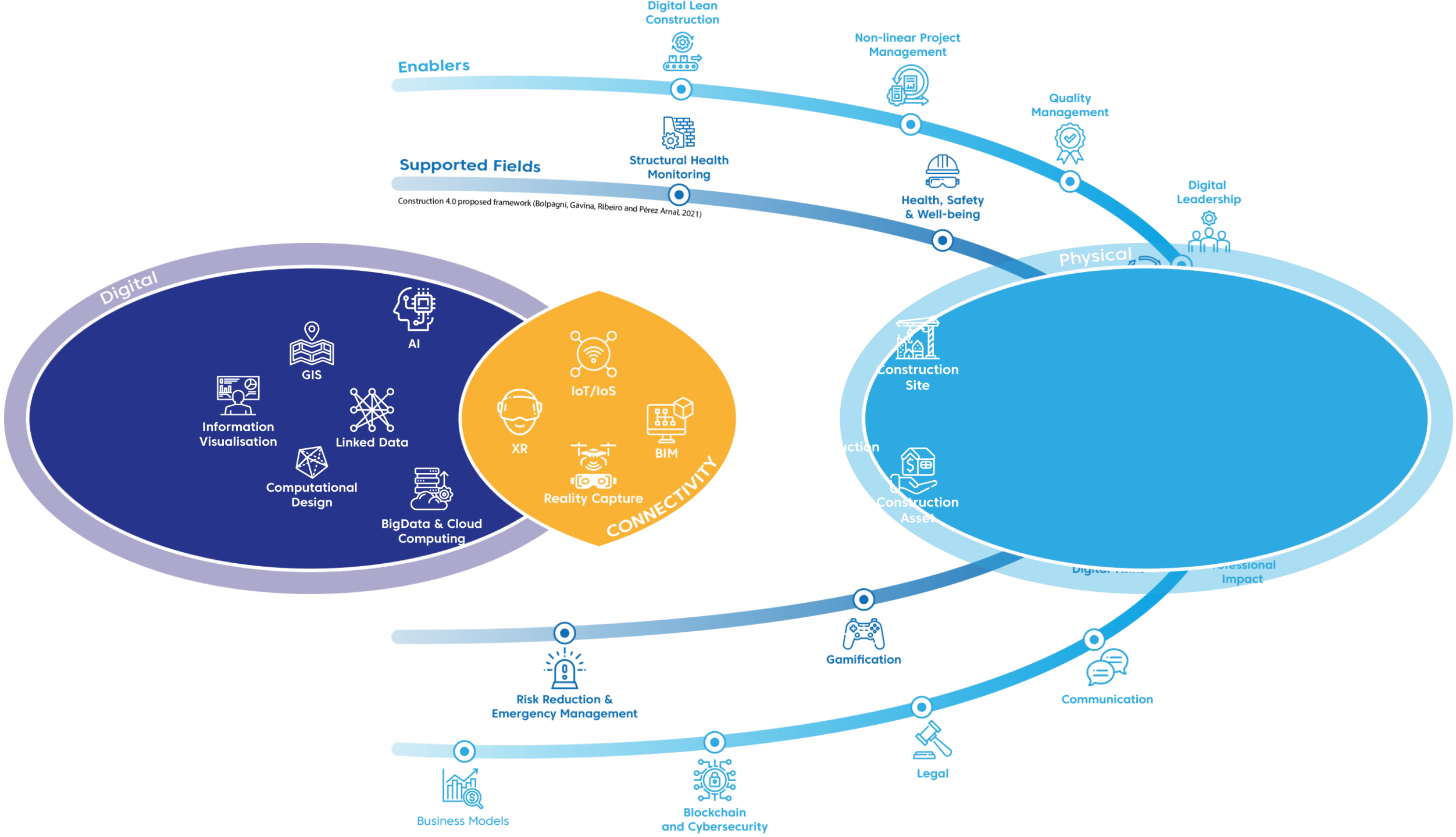


Construction 4.0

The development of BIM, IoT, Big Data, AI and lean management systems, drove the opportunity for digital twins, and interconnected supply chains and production process in the construction industry

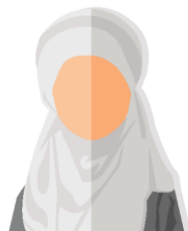
21st Century







NATIONAL DIGITAL TWIN PROGRAMME



Data Steward

Organisational

NEED
MORE



Data Regulator

National

NEW
ROLE



Data Custodian

Organisational



Ontologist

National

NEW
ROLE



Data Producer

Organisational



Data Leader

Organisational

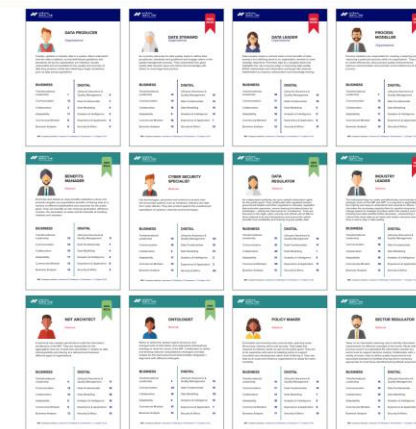
NEED
MORE



NDT Architect

National

NEW
ROLE



- Reskill & Upskill
- Hard Skills & Soft Skills
- Standardize before Digitalise



2ND BUILDING DIGITAL TWIN International Congress

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