Cofinanciado por:
COMPETE 2020
PORTUGAL 2020
UNIÃO EUROPEIA
Fundos Europeus
Estruturais e de Investimento

OPORTO, PORTUGAL - October 17-18th

FUTURE TRENDS IN THE CONSULTING ENGINEERING INDUSTRY

COGNITIVE ENGINEERING

MAURIZIO BOI

The EFCA Future Trends booklet 2018 and 2019 are available on
www.efcanet.org

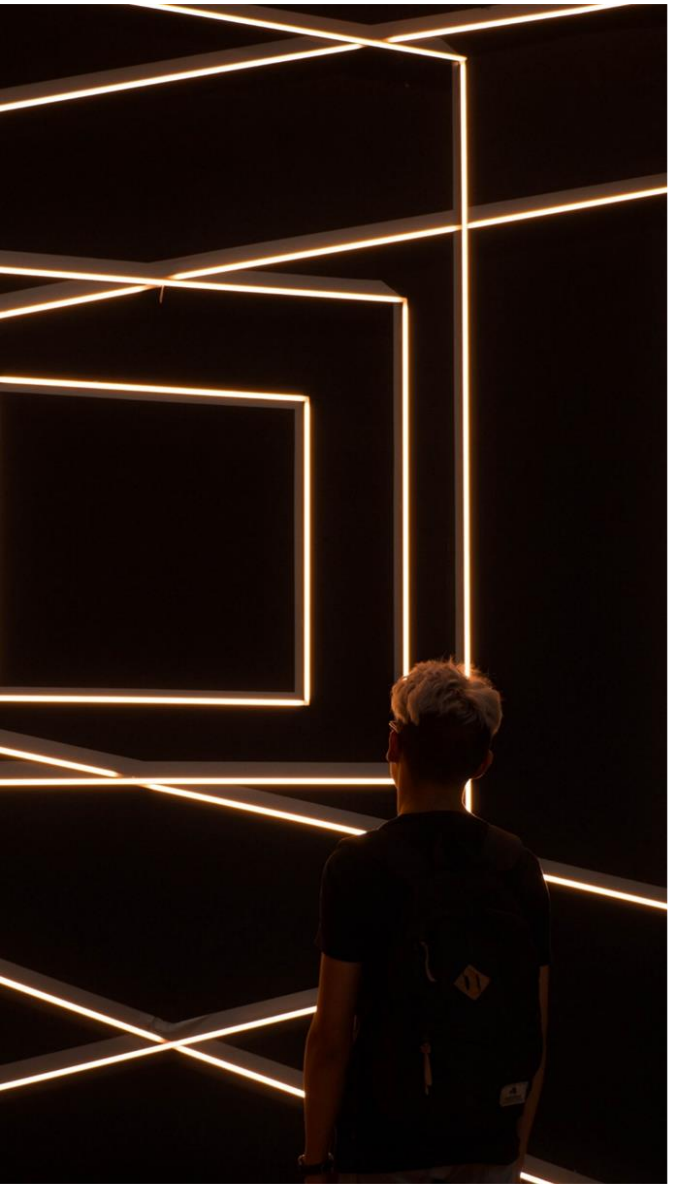
FUTURE TRENDS 2018 - 2019

Future trends in the consulting engineering industry

2018 Edition

2019 Edition

EFCA – European federation of engineering consultancy associations



Future Trends Task Force


Maurizio Boi

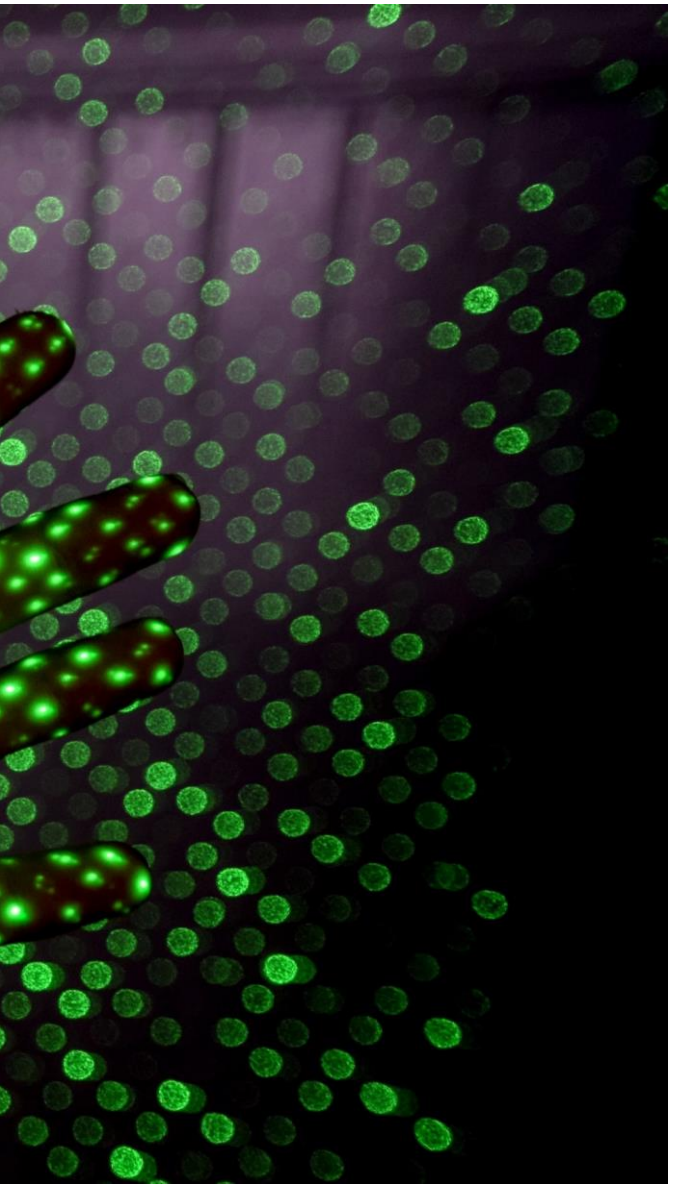

Nikola Matić


Kevin Rudden


Maximilian Grauvogl


Jan Van der Putten


Christophe Castaing



Examples from 2018 edition

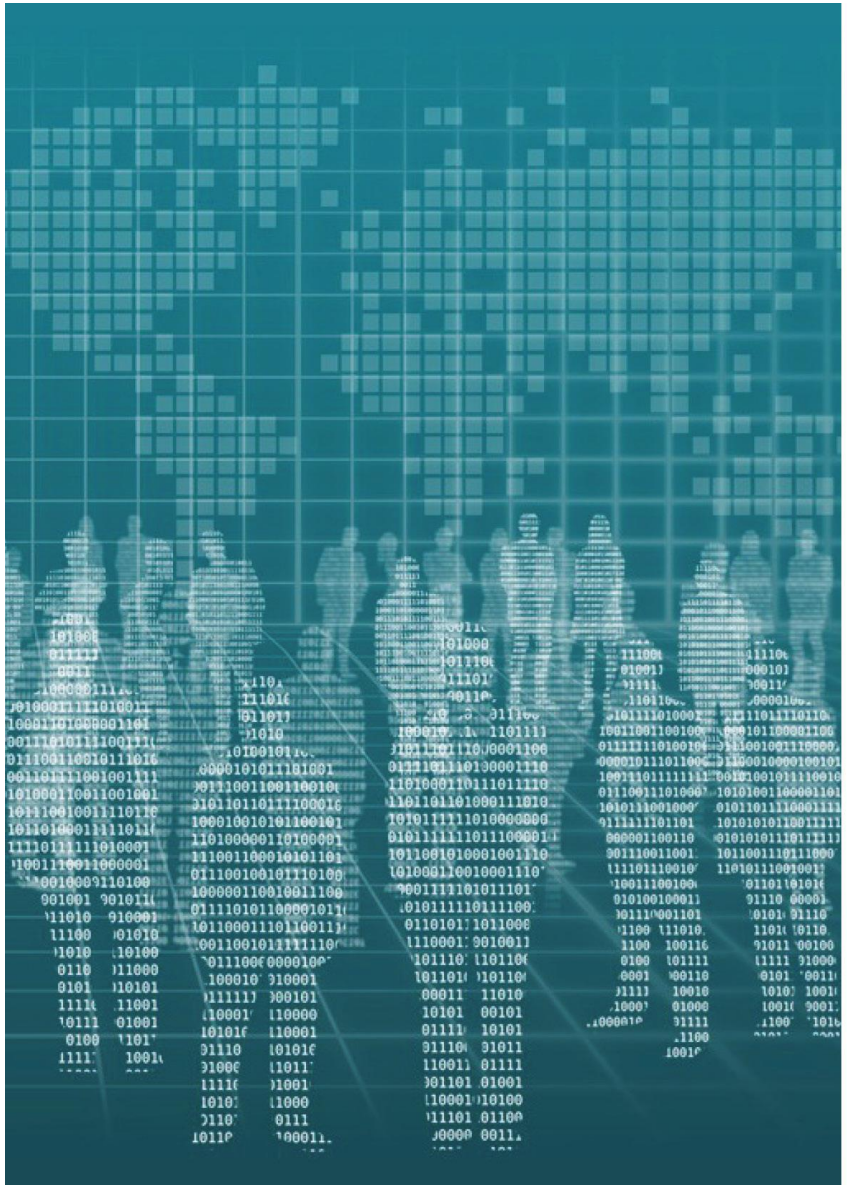
In the 2018 booklet we looked at the principle trends in the engineering industry.

Now let’s focus on some operative examples:

- Collaborative Engineering and Networking
- Construction Tech Trends
- Blockchain Technology

Future Trends 2019

Table of Contents

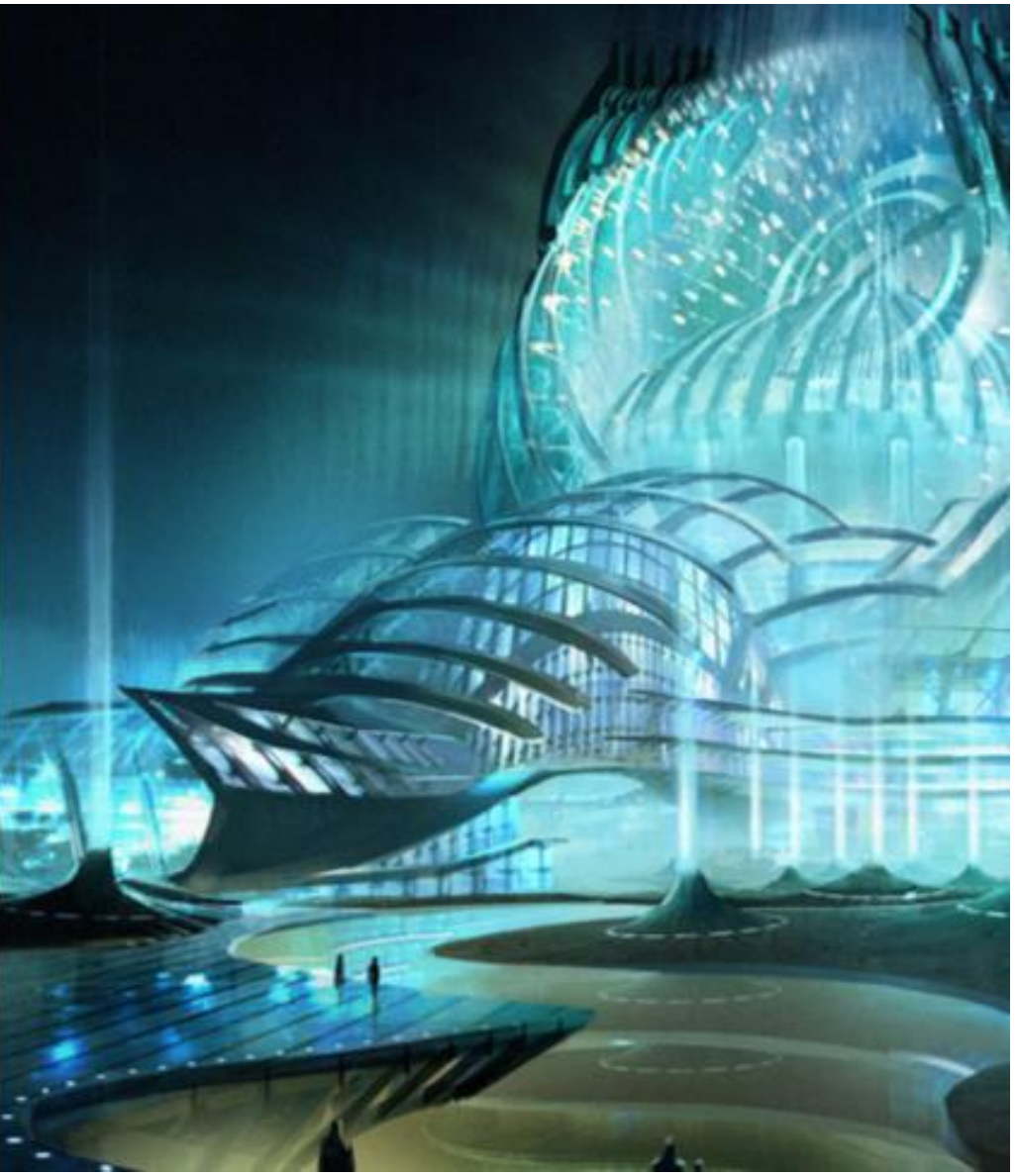


AGILE MANAGEMENT, WIKINOMIKS AND IPD

"Agile management is about working smarter rather than harder. It's not about doing more work in less time: It's about generating more value from less work." (Stephen Denning)

Agile Management

Traditional management practice assumes that the world is:	But in today's digital age we accept that the world is:
▪ deterministic ▪ predictable ▪ orderly ▪ certain	▪ probabilistic ▪ unpredictable ▪ disorderly ▪ uncertain
For Stephen Denning traditional management applies detailed command techniques that lead to:	But in today's accelerated world we need a mission command approach characterized by:
▪ centralization ▪ coercion ▪ formality ▪ tight rein ▪ imposed discipline ▪ obedience ▪ compliance ▪ optimal decisions that take place later ▪ a focus on harnessing ability at the top **In a word, Bureaucracy.**	▪ decentralization ▪ spontaneity ▪ informality ▪ loose rein ▪ self discipline ▪ initiative ▪ cooperation ▪ acceptable decisions that are made faster ▪ focus on harnessing ability at all levels **In essence, Agile Management.**

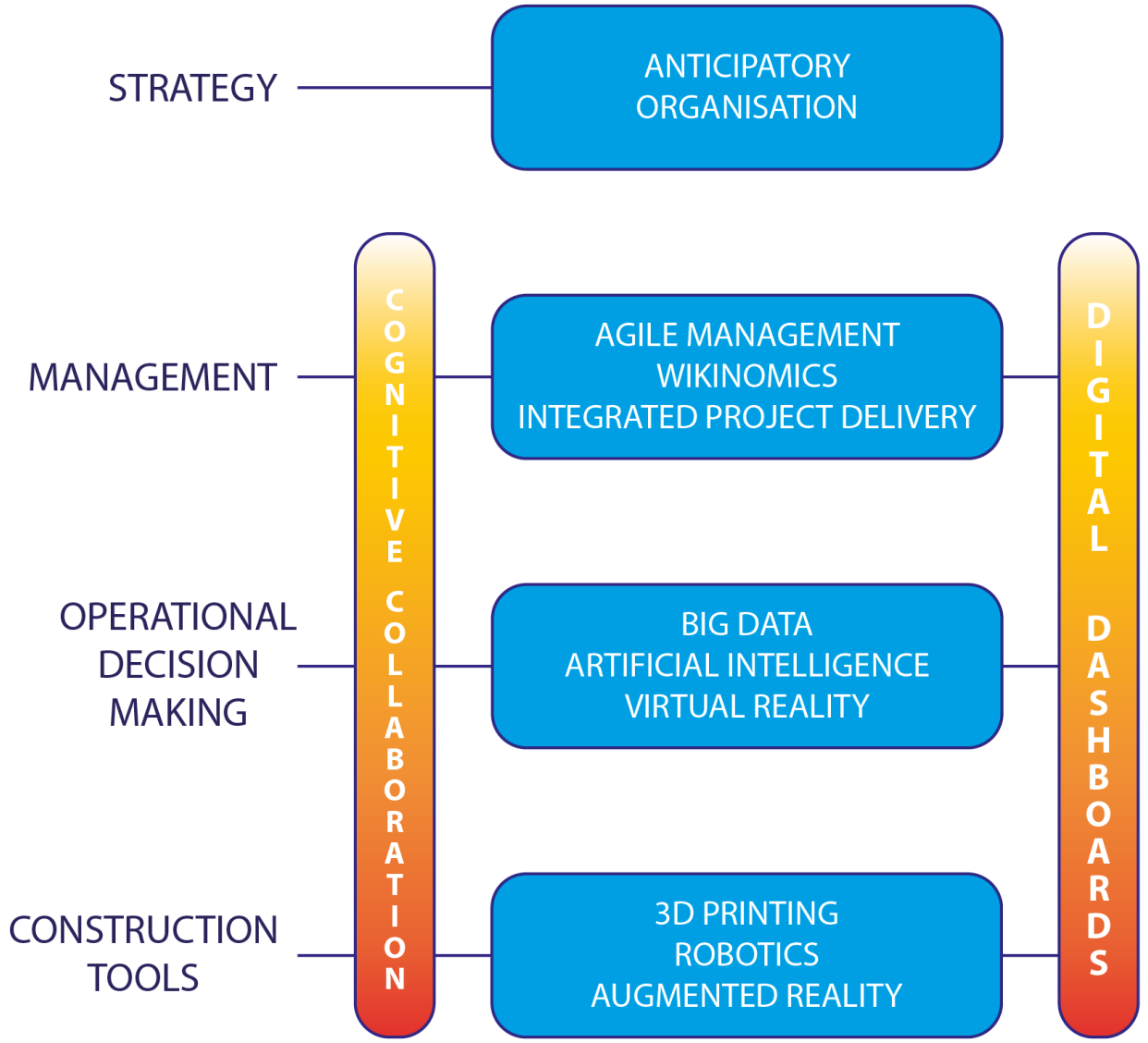


PREMISE

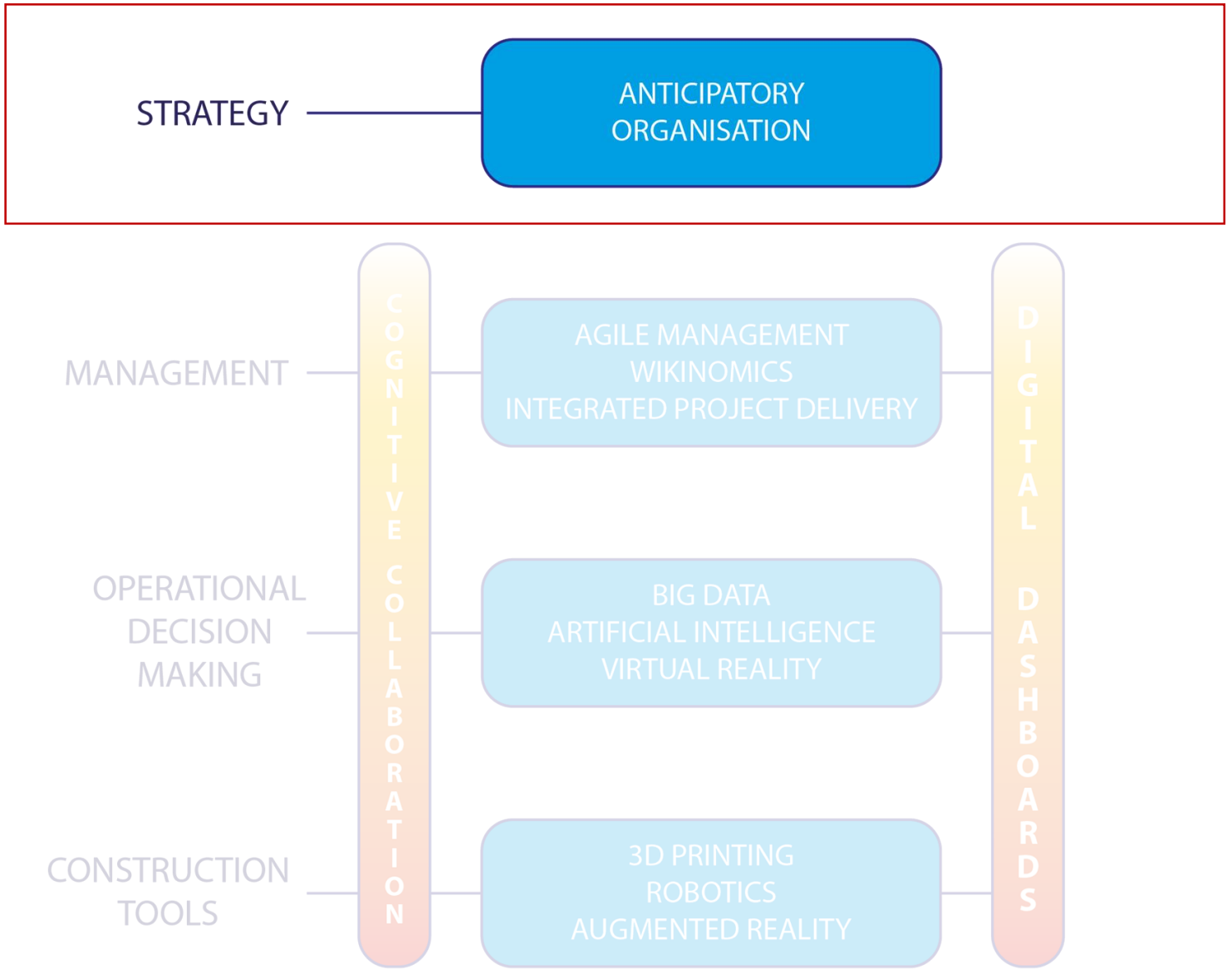
In today's digital era,

"**collaboration is inevitable**",
not just necessary.

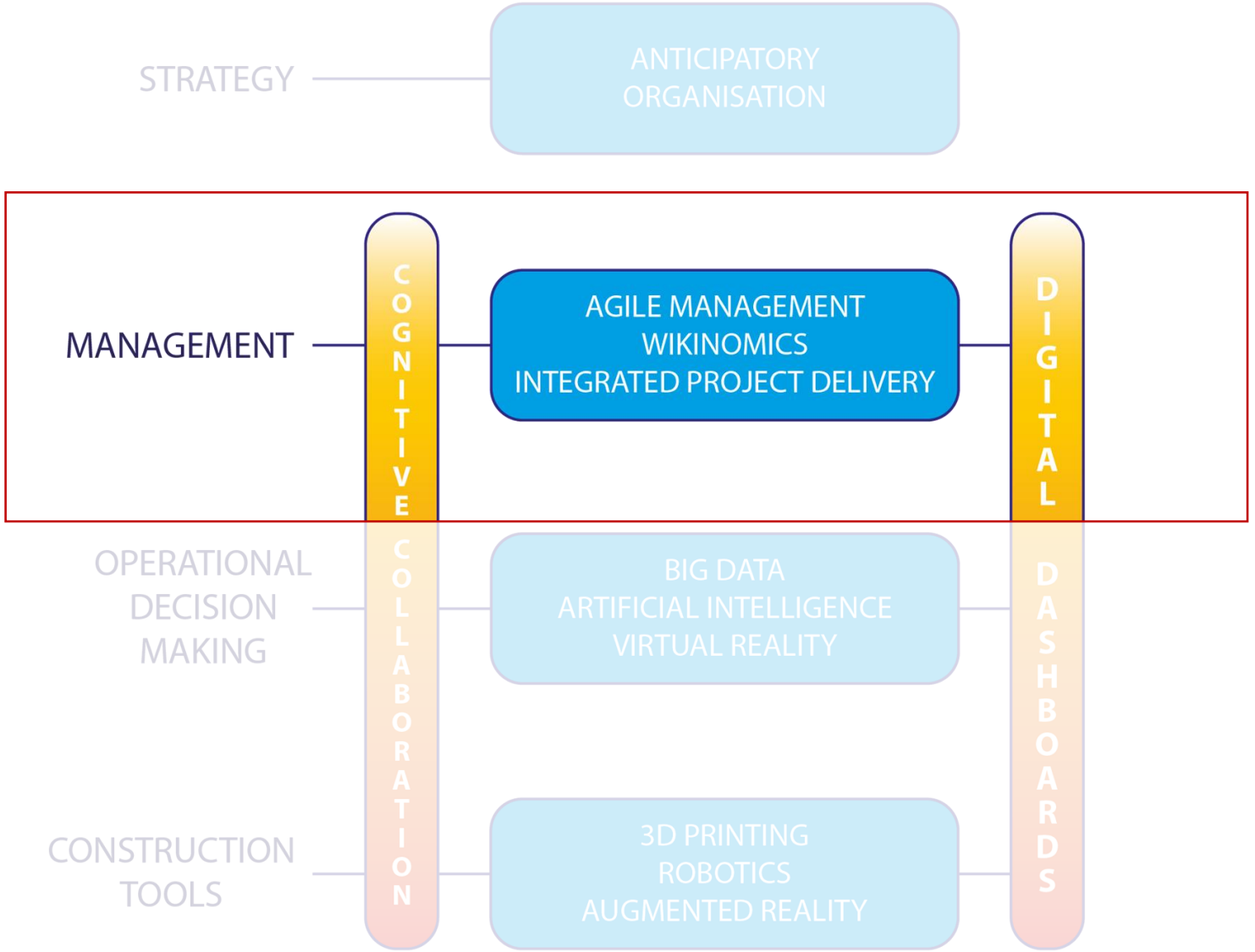
COGNITIVE ENGINEERING



STRATEGY


STRATEGY
ANTICIPATORY ORGANISATION
MANAGEMENT
OPERATIONAL DECISION MAKING
CONSTRUCTION TOOLS
COGNITIVE COLLABORATION
AGILE MANAGEMENT
WIKINOMICS
INTEGRATED PROJECT DELIVERY
BIG DATA
ARTIFICIAL INTELLIGENCE
VIRTUAL REALITY
3D PRINTING
ROBOTICS
AUGMENTED REALITY
DIGITAL DASHBOARDS

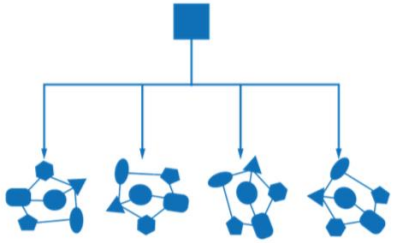
MANAGEMENT


STRATEGY
ANTICIPATORY ORGANISATION
MANAGEMENT
COGNITIVE
AGILE MANAGEMENT
WIKINOMICS
INTEGRATED PROJECT DELIVERY
DIGITAL
OPERATIONAL DECISION MAKING
BIG DATA
ARTIFICIAL INTELLIGENCE
VIRTUAL REALITY
COLLABORATION
DASHBOARDS
CONSTRUCTION TOOLS
3D PRINTING
ROBOTICS
AUGMENTED REALITY

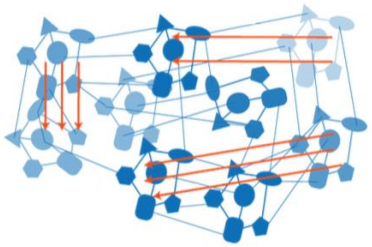
Core Characteristics in the Organizations that have embraced Agile:

1. The law of the small team

3. The law of the network

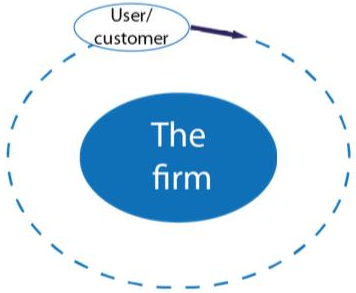


Command of teams

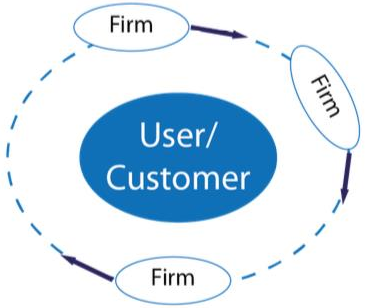


Network

2. The law of the customer



Traditional



Agile

"Agile management is about working smarter rather than harder.
It's not about doing more work in less time: It's about generating more value from less work"

Stephen Denning – The age of agile.

Why is the engineering industry perfectly suited to agile management?

- Because the industry operates in an **uncertain ecosystem**;
- The purpose of the engineering company is to design single projects perfectly suited to the **law of the small team**;
- Each single project needs to satisfy the client, in other words to apply the **law of the customer**;
- The success of the project depends on the ability to manage integrated information, in essence to apply the **law of the network**;
- The management in an engineering company needs to be primarily a **hierarchy of competence**, not a hierarchy of authority;
- In today's digital age, engineering companies need to achieve both **execution and innovation** disciplines.

Wikinomics

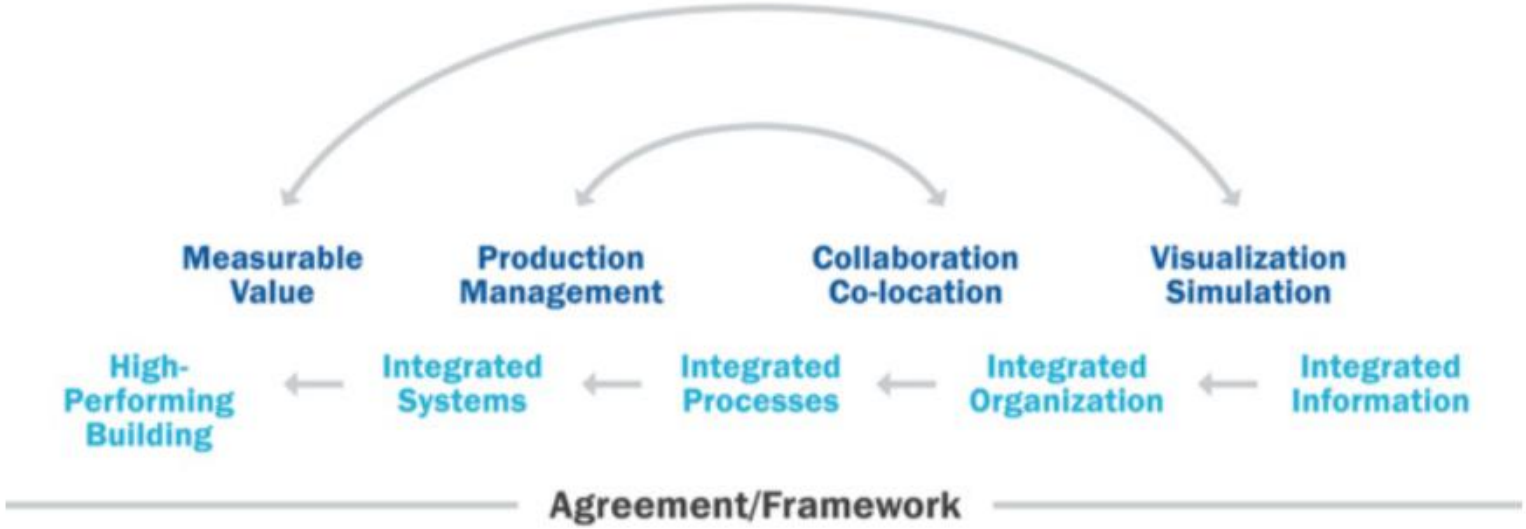
is the theory and practice of mass collaboration using electronic communications.

"No matter who you are, most of the smartest people work for someone else"

- Billy Joy -

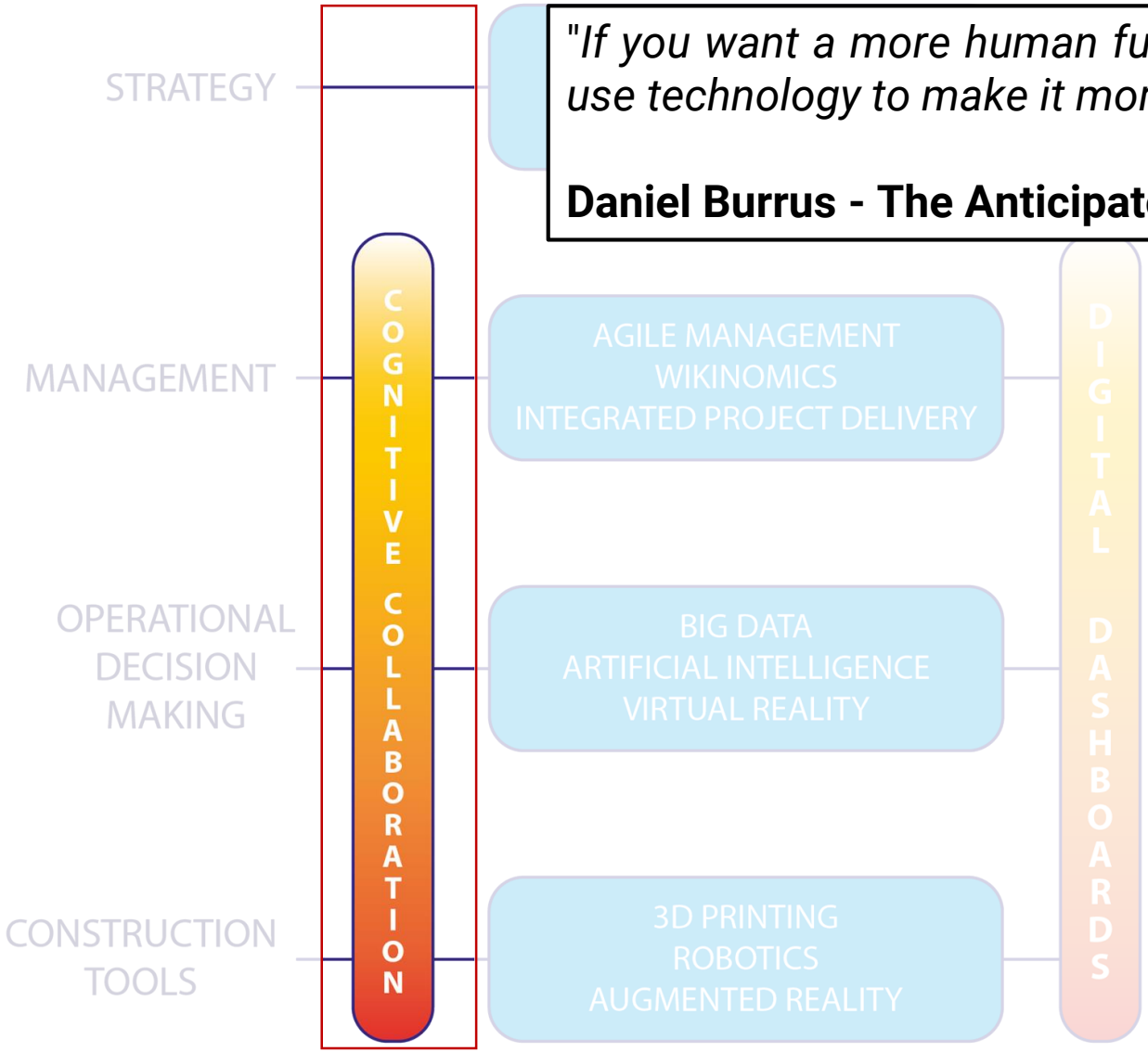
Integrated Project Delivery (IPD)

Is a collaborative alliance of people, systems, business structures and practices



"Building the right building" and "building the building right"
Zigmund Rubel

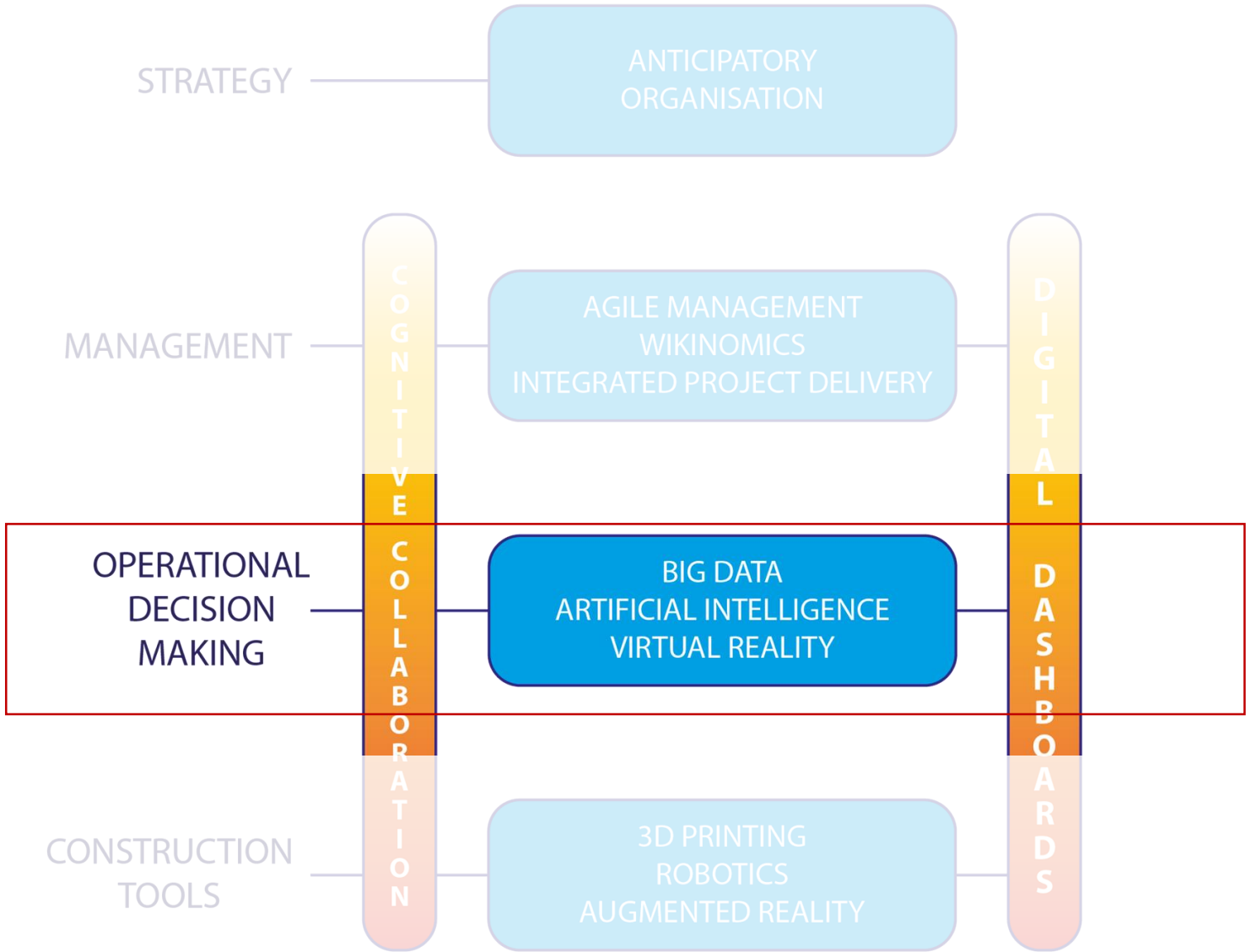
COGNITIVE COLLABORATION



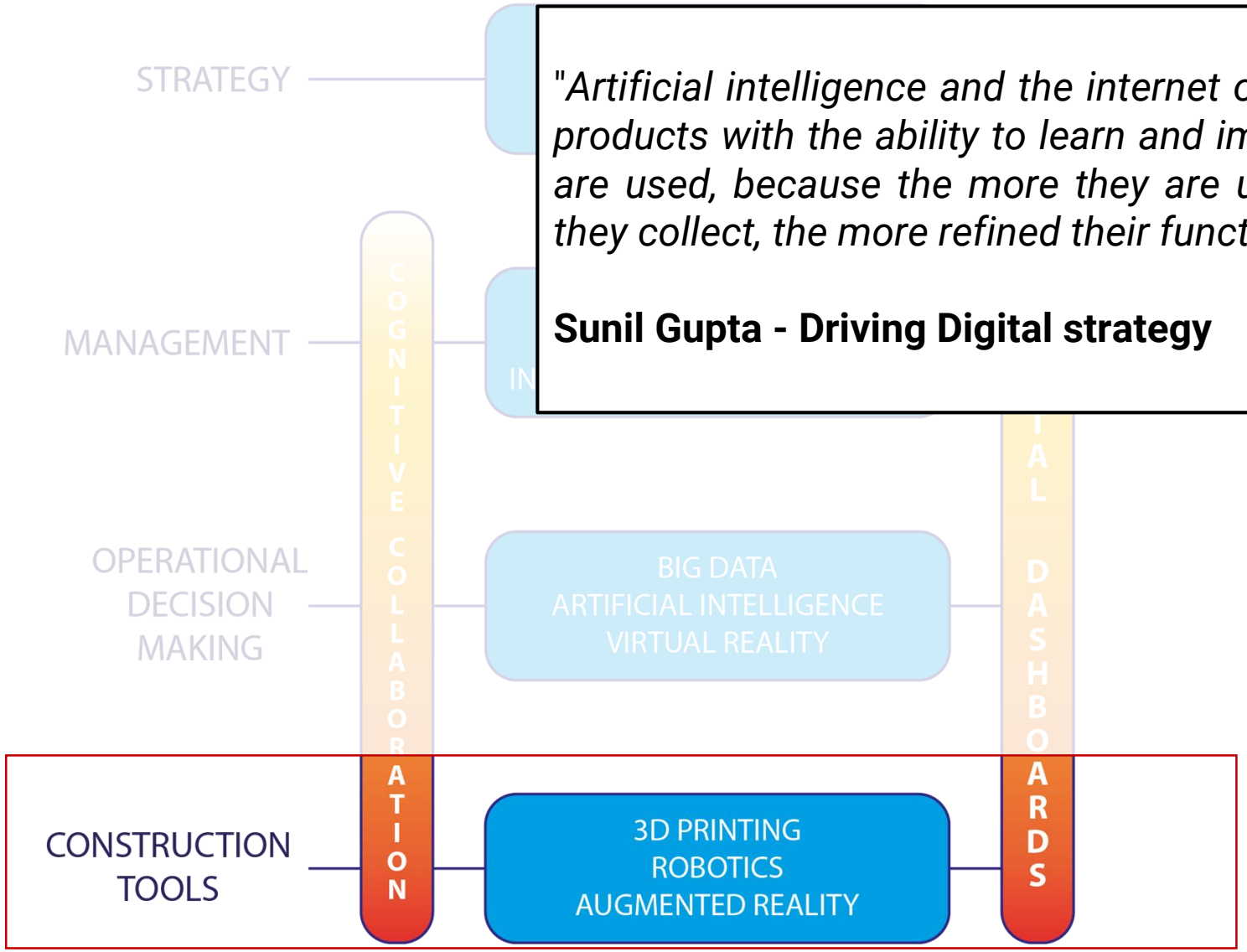
"*If you want a more human future, we had better use technology to make it more human*"

Daniel Burrus - The Anticipatory Organization

OPERATIONAL DECISION MAKING



CONSTRUCTION TOOLS

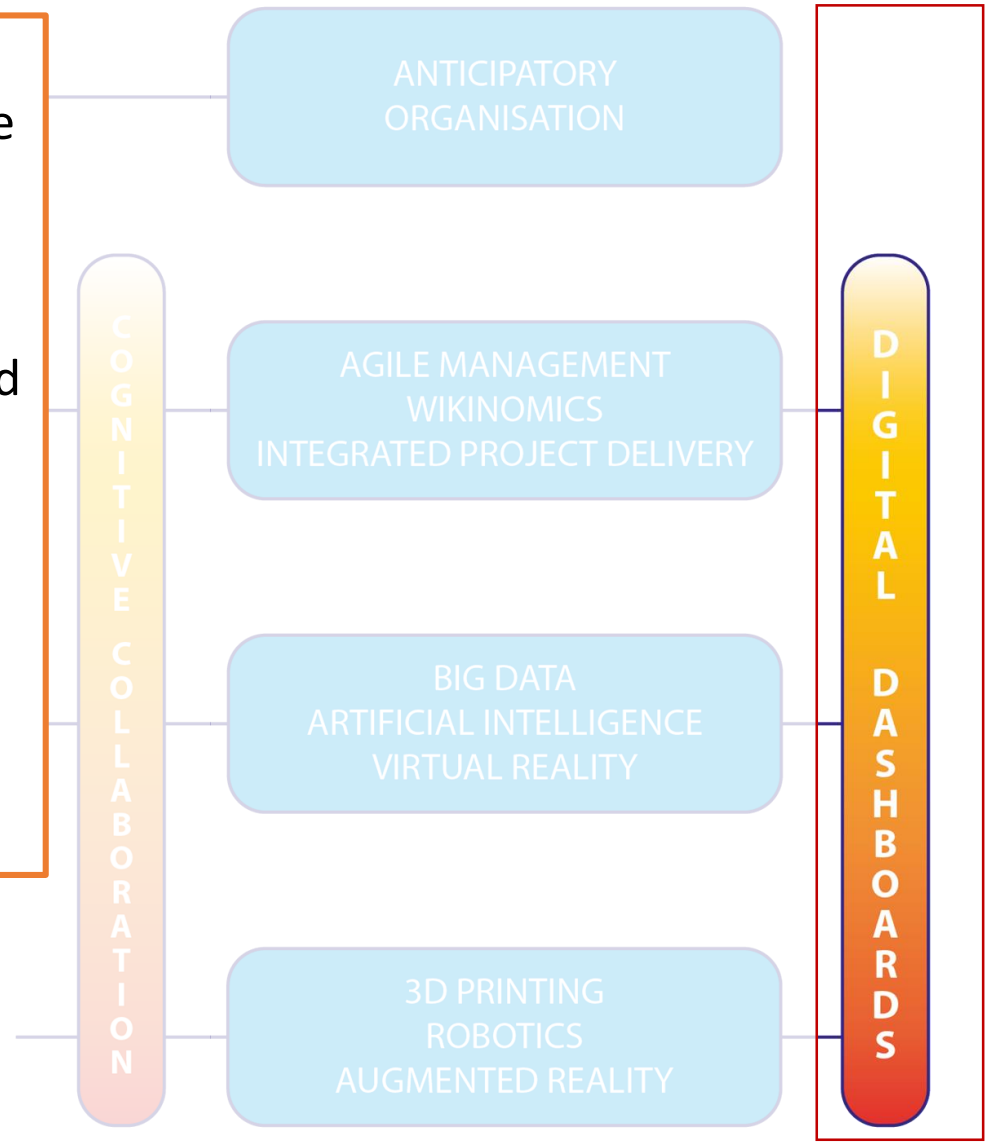


"Artificial intelligence and the internet of things are creating products with the ability to learn and improve the more they are used, because the more they are used , the more data they collect, the more refined their functioning becomes"

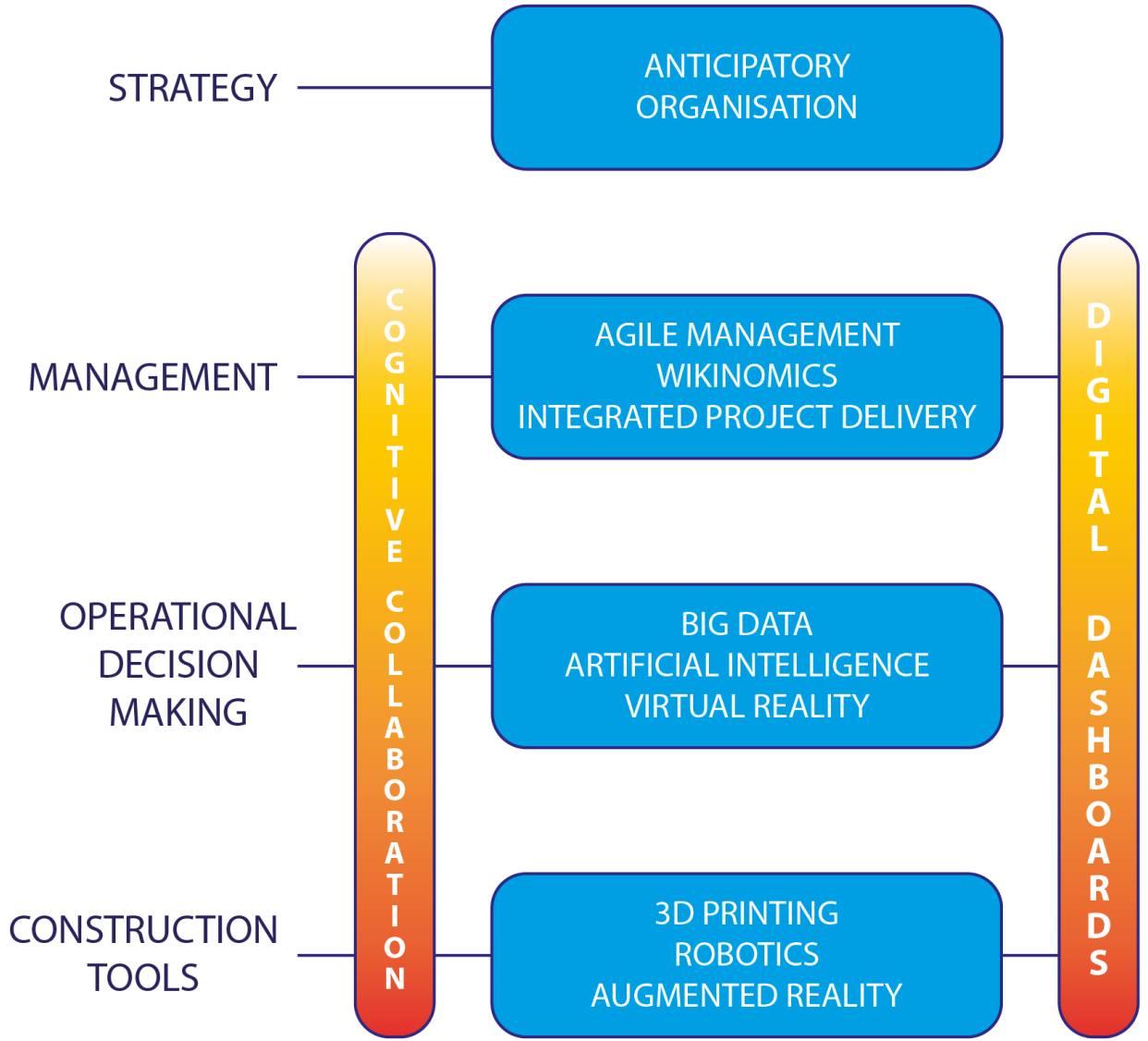
Sunil Gupta - Driving Digital strategy

DIGITAL DASHBOARDS

- Visual presentation of performance measures
- Ability to make more informed decisions based on data collected
- Gain total visibility of all systems instantly
- Fast identification of data outliers and correlations



COGNITIVE ENGINEERING



SCORE

SMART COLLABORATIVE ENGINEERING

SMART COLLABORATIVE ENGINEERING

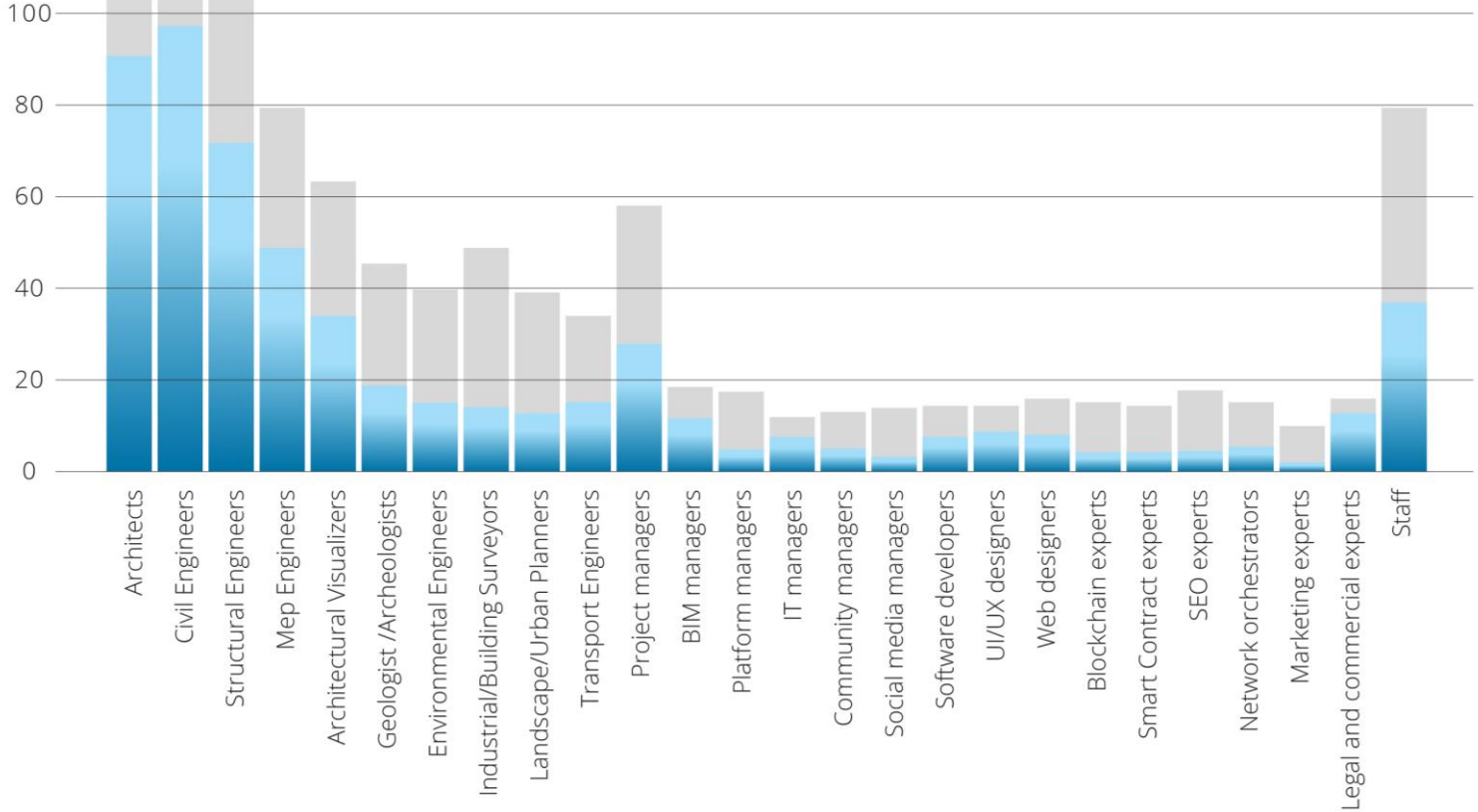
BLOCKCHAIN BASED


TE.X
Home
Chi Siamo
Servizi
Contatti
EXPONENTIAL
ENGINEERING
Collaborative Engineering,
a revolution for the benefit of humanity

EXAMPLE: NETWORK - CENTRIC ENGINEERING ORGANIZATION

15
AGILE CORE TEAM

600
EQUIVALENT



USER RATING

lowest — highest

600
active users

1300
total subscribers

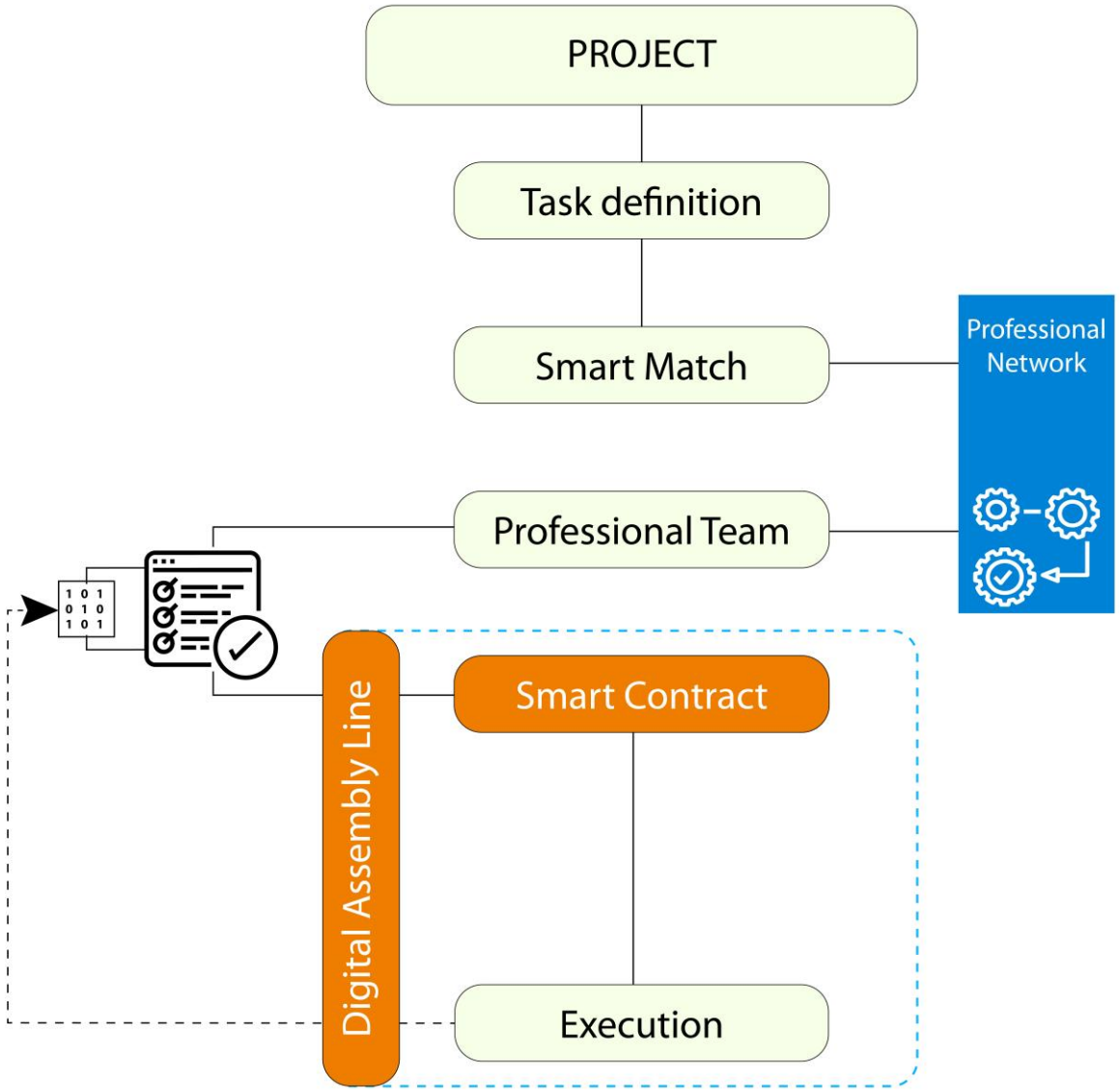
www.collengworld.com

How to make collaboration smart

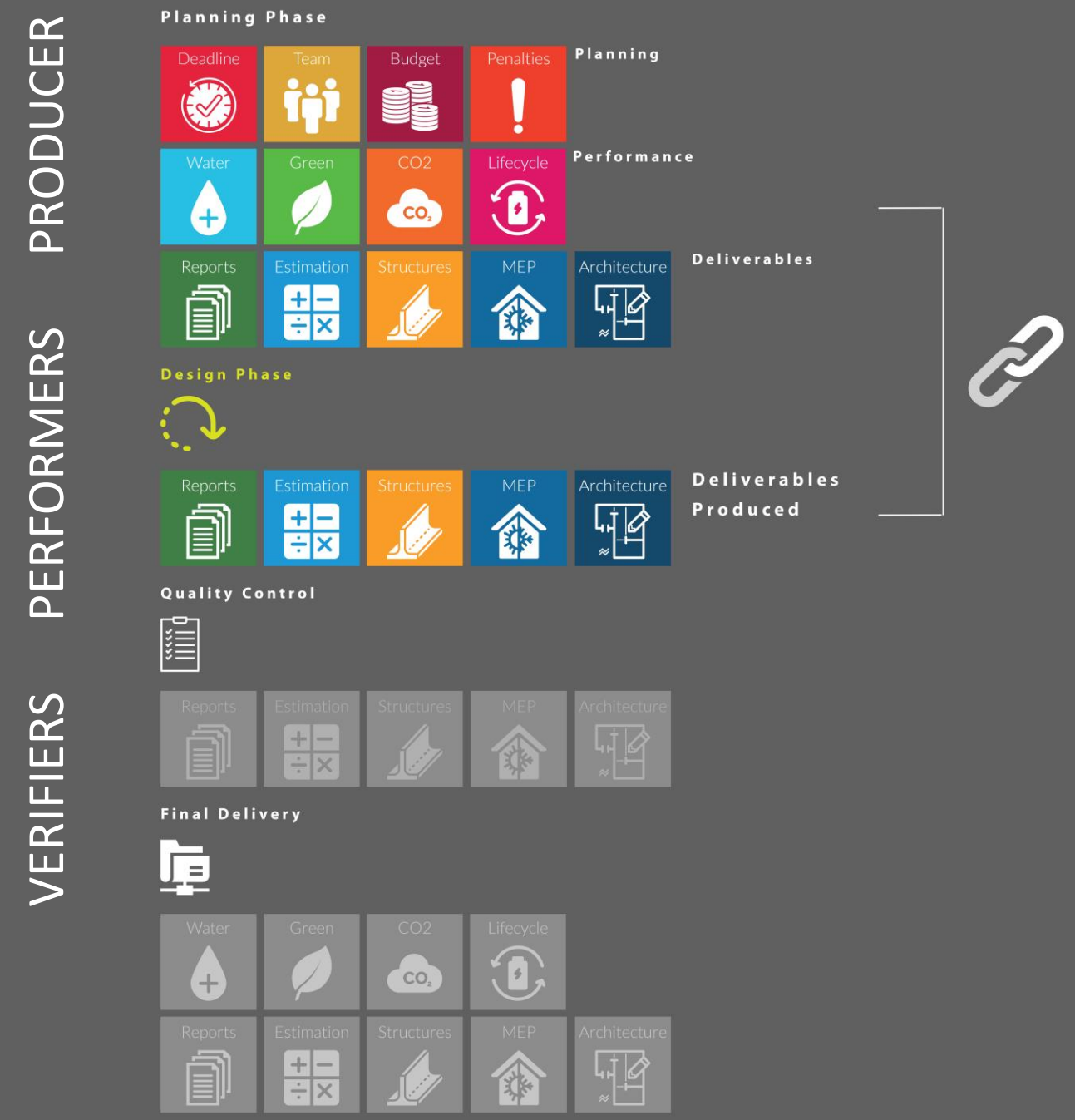
- Optimising **research and information costs.**
  Using match algorithms

- By reducing the costs necessary to reach, draft and **manage contractual agreements**
  Using Smart Contracts

- Through the **management of the reliability** of the parties involved
  Using an effective reputation measurement system

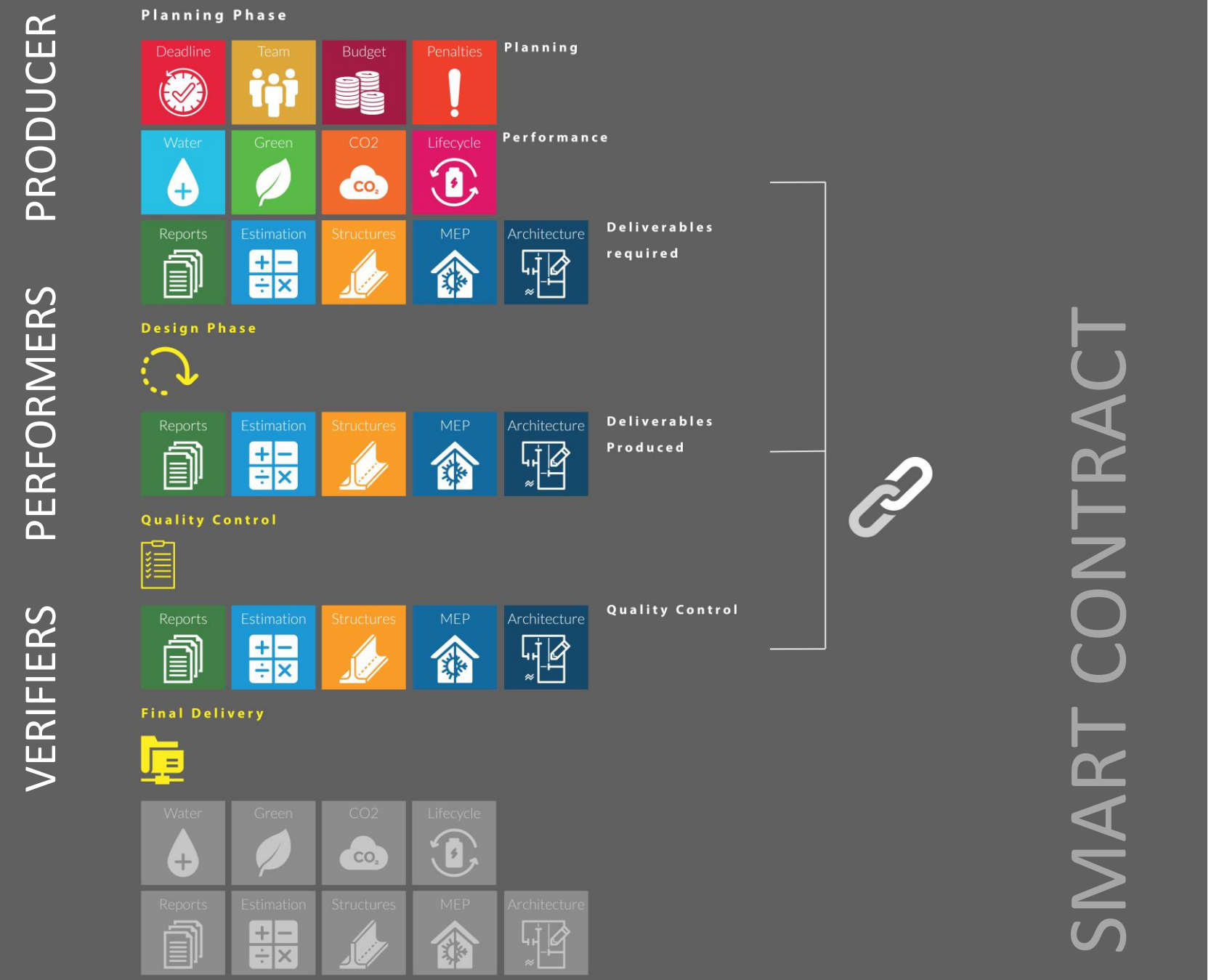

PROJECT
Task definition
Smart Match
Professional Network
Professional Team
Digital Assembly Line
Smart Contract
Execution

a. Defining project goals



a. Defining project goals

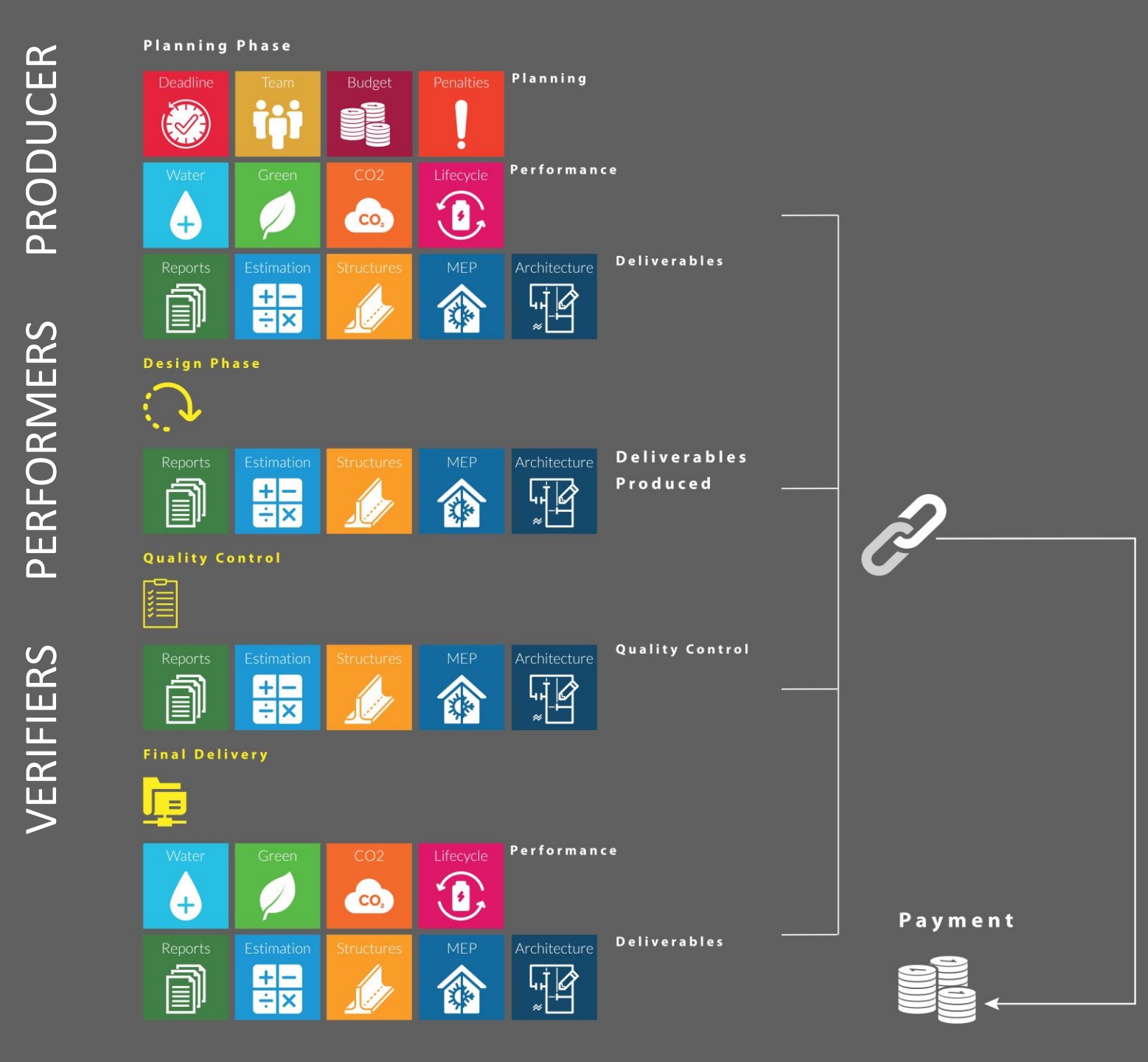
b. Service development



a. Defining project goals

b. Service development

c. Quality control



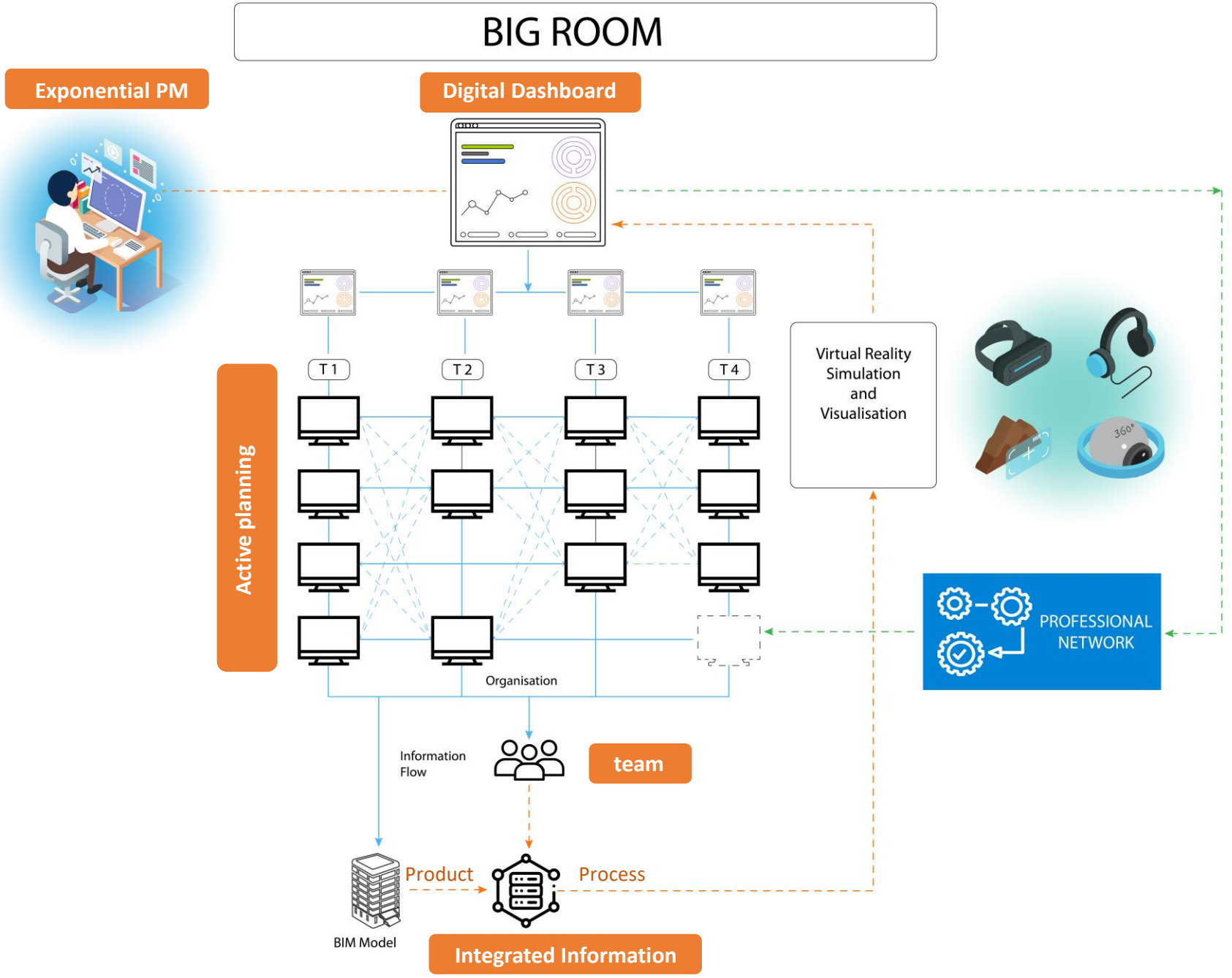
a. Defining project goals

b. Service development

c. Quality control

d. Final delivery and fee payment

DIGITAL ASSEMBLY LINE



OPORTO, PORTUGAL - October 17-18th

FUTURE TRENDS IN THE CONSULTING ENGINEERING INDUSTRY

COGNITIVE ENGINEERING

MAURIZIO BOI

The EFCA Future Trends booklet 2018 and 2019 are available on
www.efcanet.org

THANK YOU FOR YOUR ATTENTION