

Futuring European Industry



Circular Economy and the Digitization of Industry: the FUTURING project

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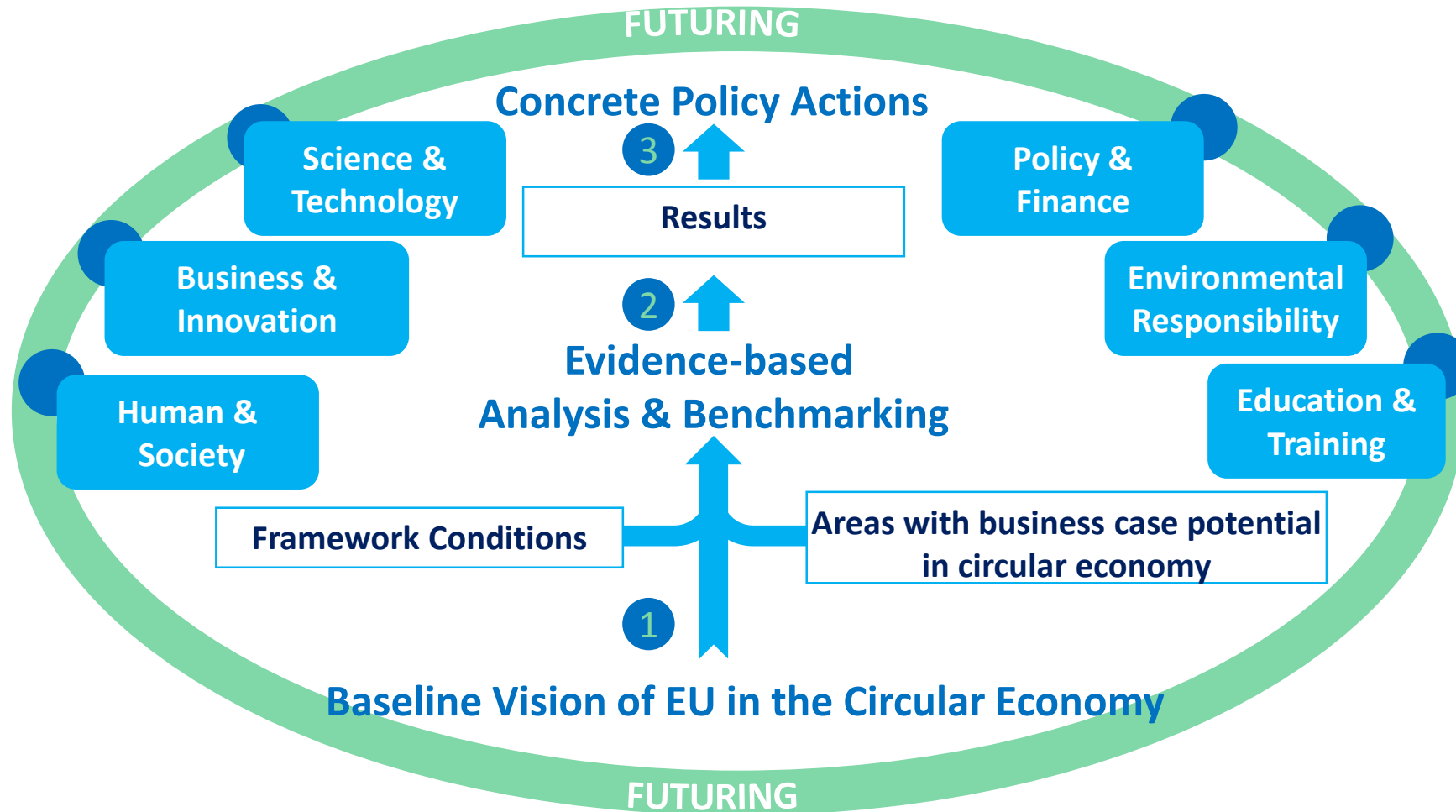
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FUTURING aims to define a strategy for Europe's Circular Economy in the context also of digitizing manufacturing

- *Vision for a Smart, Clean, Human-Centred EU Industry.*
 - *Definition of relevant building blocks.*
 - *Policy support and recommendations.*

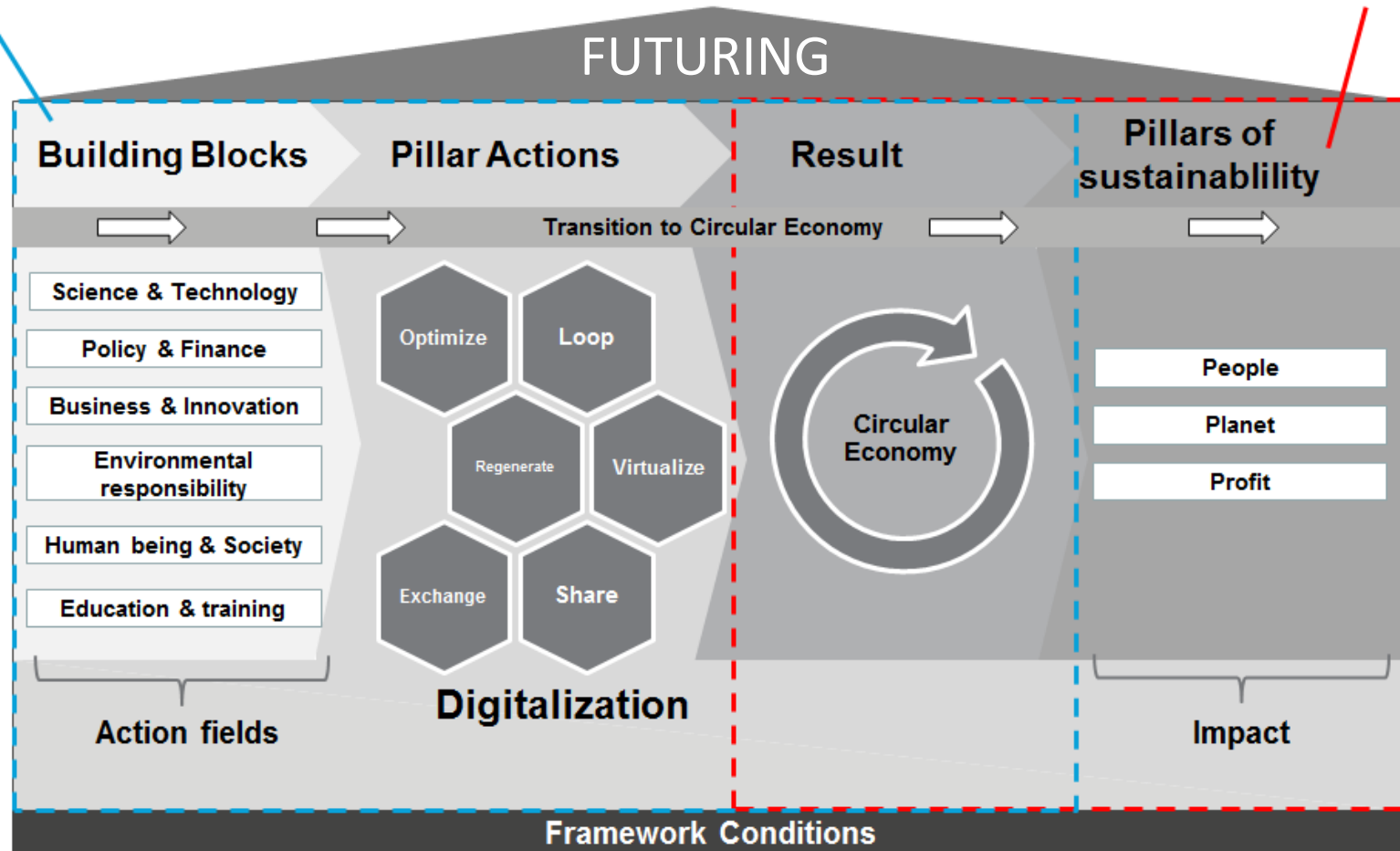


Structuring Impact



Part 1

Part 2



Research questions of transition-oriented analysis to Circular Economy



FUTURING's Building Blocks

Research questions

Science & Technology

What **digital technologies** support the transition to a circular economy?

Business & Innovation

What **digital business models** support the transition to a circular economy?

Policy & Finance

How can **policy and finance** ensure the transition to a digital circular economy?

Human & Society

How can **individuals and society** as a system support the transition to a digital circular economy?

Environmental sustainability

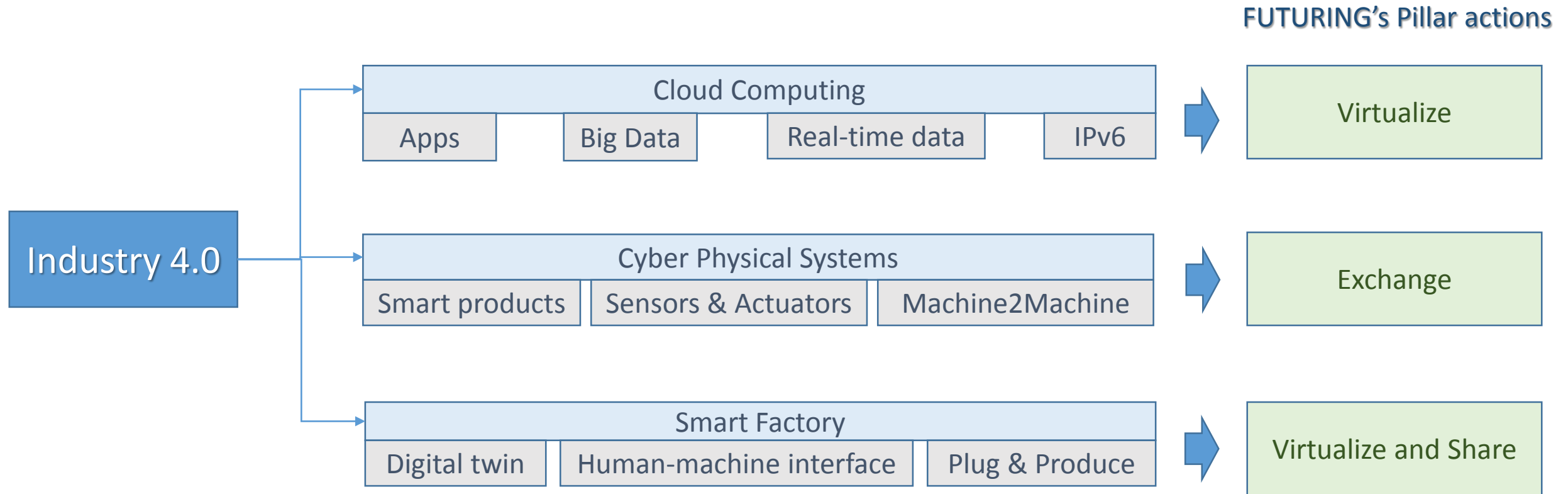
How can the **environment be sustained** by the transition to a digital circular economy?

Education & Training

How can **education and training** support the transition to a digital circular economy?

Enablers of digitization in circular economy

Science & Technology

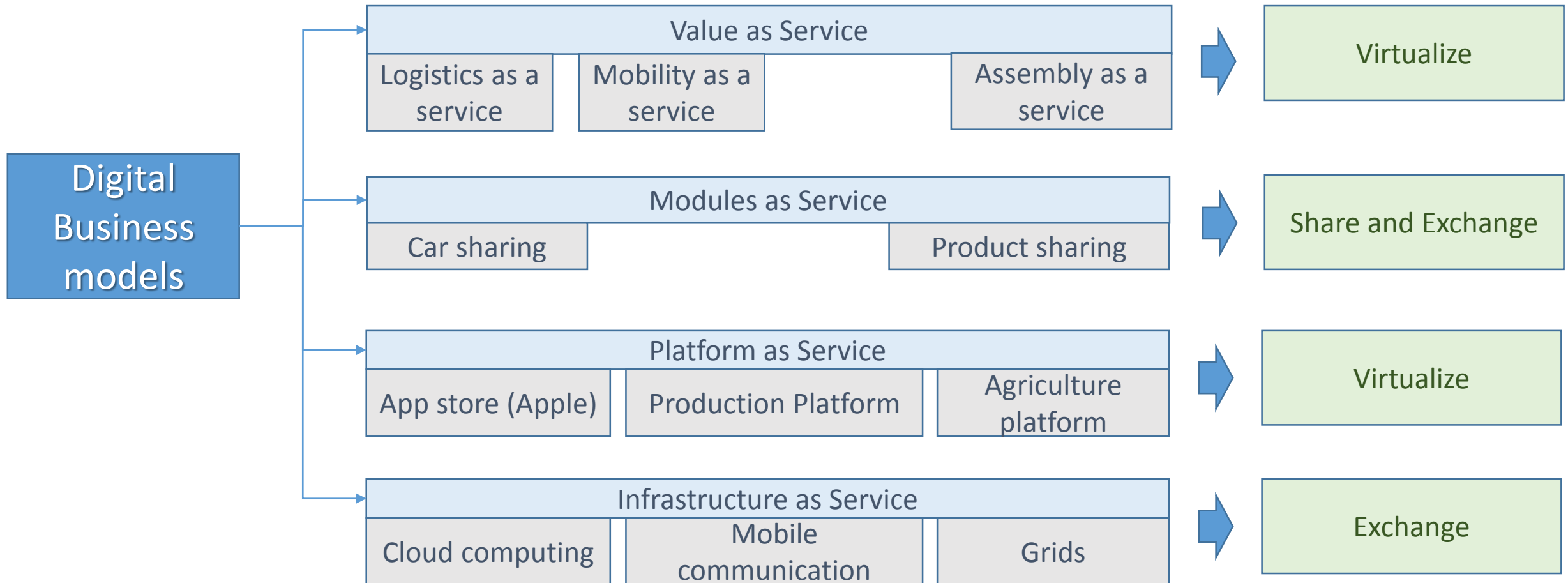


Enablers of digitization in circular economy

Business & Innovation

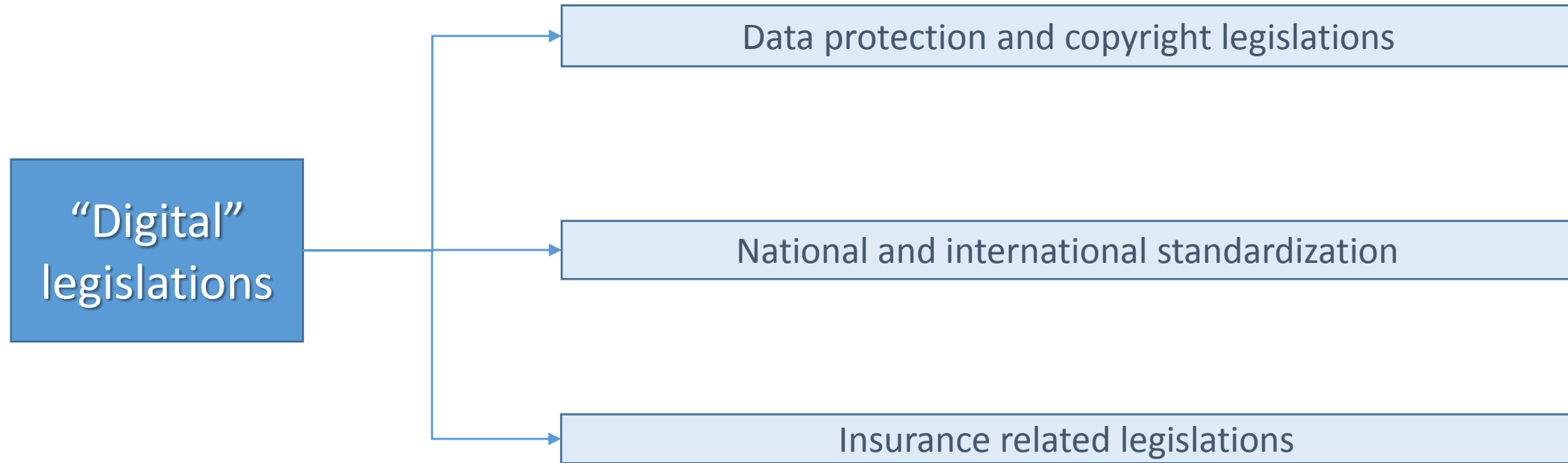


FUTURING's Pillar actions



Enablers of digitization in circular economy

Policy & Finance

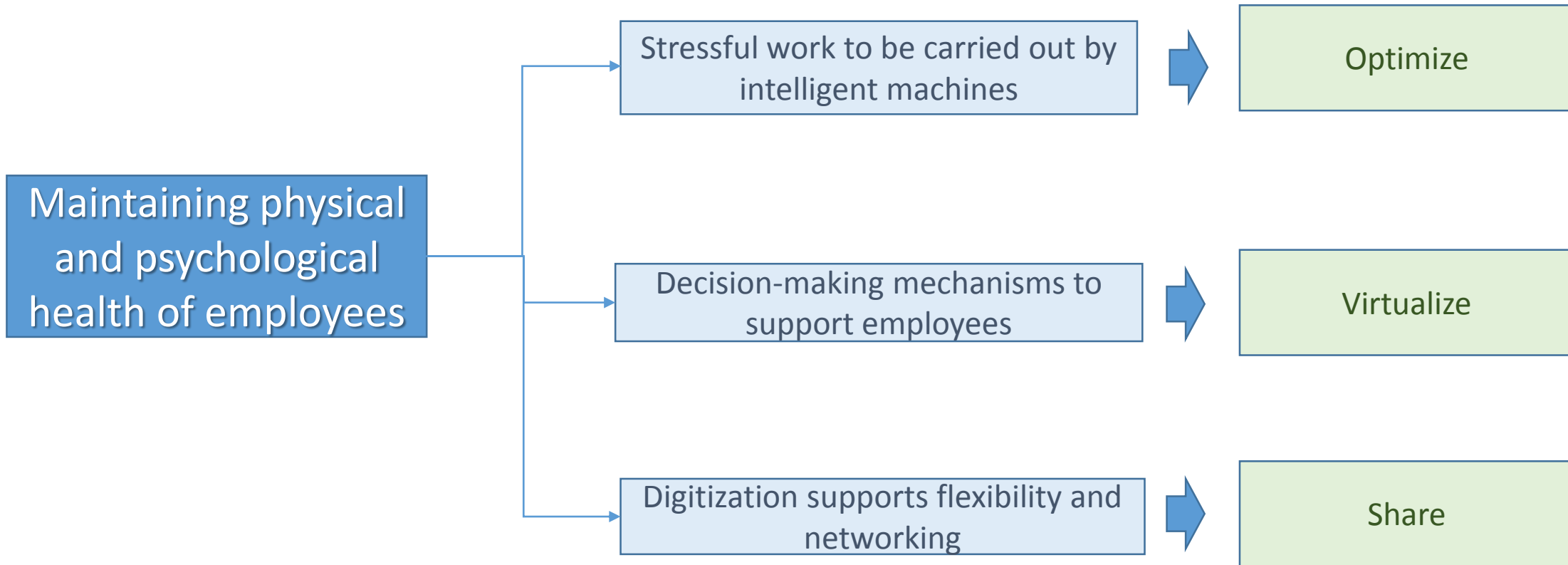


Enablers of digitization in circular economy

Human & Society



FUTURING's Pillar actions



Enablers of digitization in circular economy

Environmental responsibility



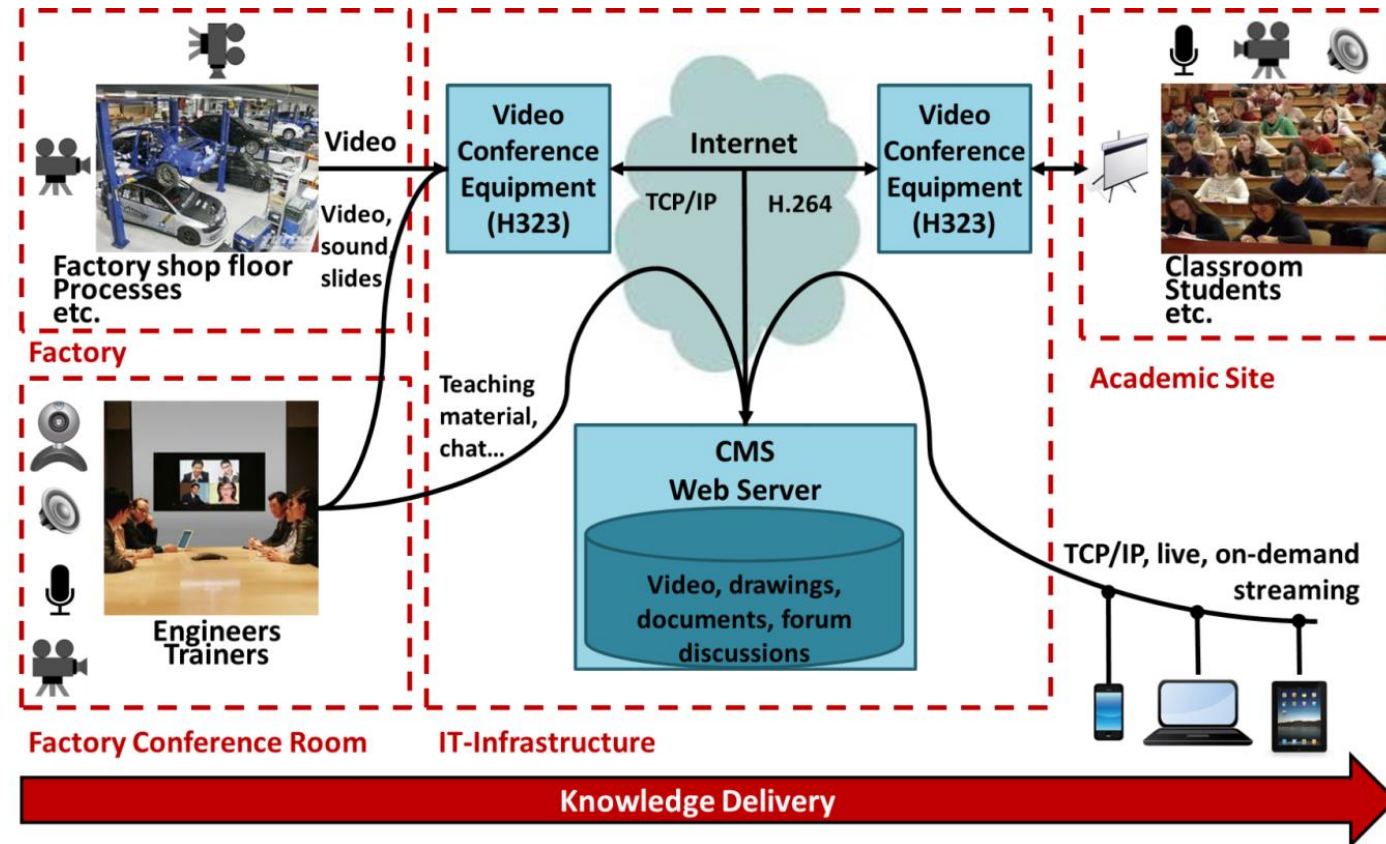
Enabling technologies	Circularity criteria							
	Energy Efficiency	Material efficiency	Less waste	Less emissions	More safety	Higher flexibility	Sustainable product	Customizable product
Technologies for “self-assembly”	••	••	•			•••	••	•••
Innovative micro/nano-manufacturing processes	•••	•••	••		••	•••	•••	•••
Additive manufacturing	•	•••	•••		•	•••	••	•••
Flexible Sheet-to-Sheet (S2S) and Roll-to-Roll (R2R)	••	••	•••	••	••	•••	••	••
Innovative physical, chemical and physicochemical processes	•••	•••	••			•••	•••	•••
Integration of non-conventional technologies and conventional technologies	•••	•••	••			•••	•••	•••
Methods for handling of parts, metrology and inspection	•••	•••	••			•••	•••	•••
Photonics-based materials processing technologies	•••	•••	•••	••	••	•••	•••	•••
Collecting, dismantling, sorting and recycling processes	•••	•••	•••	•••	•••	•••	•••	•••
Shaping technology for difficult to shape materials	•••	•••	•••	•••	••	•••	••	•••
ICT solutions for factory floor and physical world inclusion	•••	•••	•••	•••	•••	•••	•••	•••
ICT solutions for modelling, simulation and management tools	•••	•••	•••	•••	•••	•••	•••	•••
Control technologies, Robots and Automation	•••	•••	•••	•••	•••	•••	•••	•••

Enablers of digitization in circular economy

Education & Training



Use of advanced ICT in the Teaching Factory paradigm



Biological materials

Farming/collection¹

Restoration

Biosphere

Biogas

Anaerobic digestion/composting²

Extraction of biochemical feedstock²

Cascades

Energy recovery

Landfill

Technical materials

Mining/materials manufacturing

Parts manufacturer

Product manufacturer

Service provider

User

Maintenance

Reuse/redistribute

Refurbish/remanufacture

Recycle

Leakage—to be minimized

Civil society

Sources:

- Ellen MacArthur Foundation; Drawing Environment; LMS, FESTO
- ELITURING Consortium

¹ Hunting and fishing
² Can take both postharvest and postconsumer waste as an input

- Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Baumgart & McDonough, Cradle to Cradle (C2)
- LMS, FESTO
- FUTURING Consortium



Thank you for your attention!



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FUTURING Website:
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