



# Boosting sustainable digitalisation in agriculture, forestry and rural areas by 2040

30 June 2021 @ 10:00 - 12:30

## Digitalisation of Agriculture Discussion Group

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# Our work today...

- What are the **current challenges & opportunities** these sectors [agriculture] are experiencing regarding digital transformation?
- What **policy support** is needed on the ground to ensure sustainable digitalisation?

- **Cátedra (Chair) COEXPHAL-UAL in Agriculture, Cooperative Studies and Sustainable Development** acts as a bridge between academia and agricultural sector. COEXPHAL is an association of producer organisations-80 coops-15,000 farmers. Leverages research to resolve sector challenges in co-creation process.
- **University of Almería, Spain.** Full service university with specialisation in agriculture. Ranked 1<sup>st</sup> in Spain in intensive agriculture and related technologies.



# Selected Research Projects of Cátedra COEXPHAL-UAL

Why? “...co-produce the suite of technological, social and institutional innovations that are co-shaping transformation...coordinate innovation activities with the objective of developing a coherent set of technological, institutional and behavioural solutions as coupled innovations...”

- IoF2020 Internet of Food and Farm



- SmartAgriHubs (Digital Innovation Hubs - EU Network)



- NEFERTITI & IPMWorks (peer to peer/networks of knowledge)

- FairShare (digital tools for farm advisors)



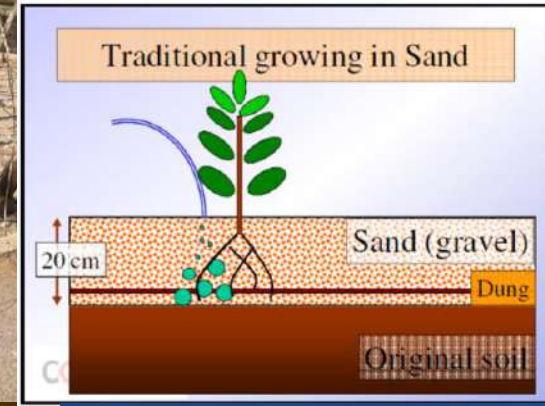
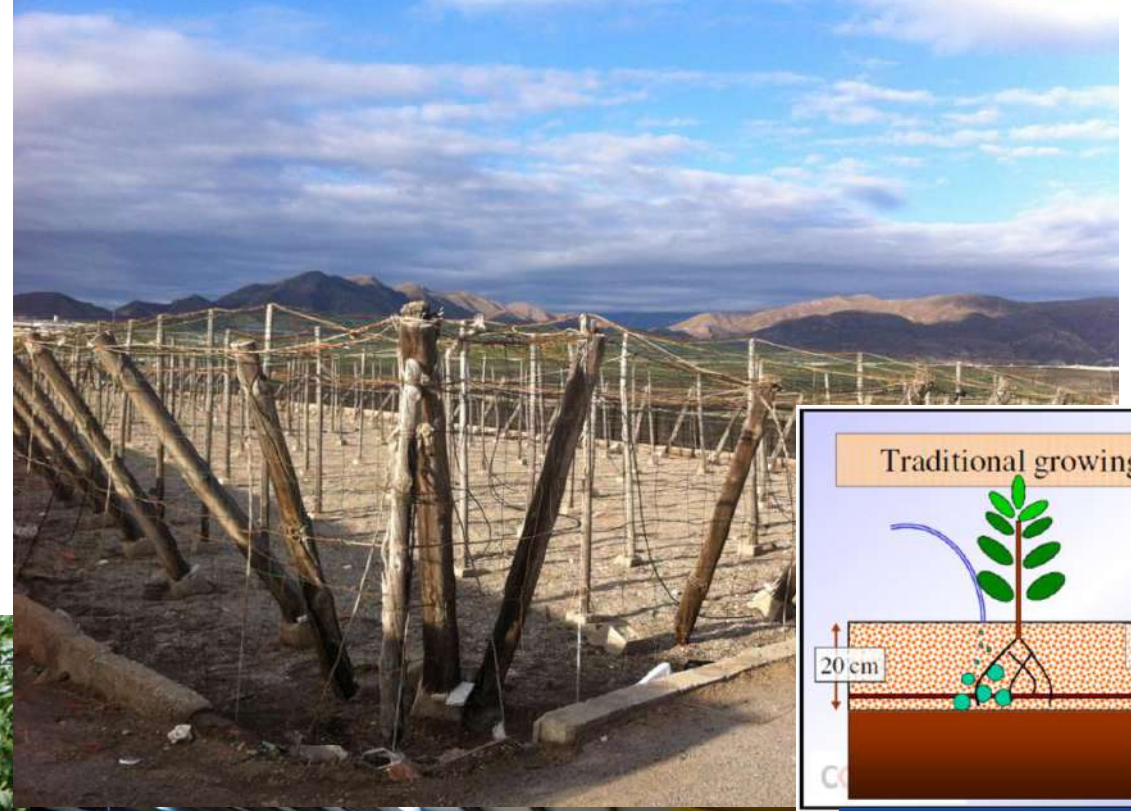
- “CO-creating sustainable and competitive **FRuits and vEgetableS**’ value **cHains** in Europe”

- Plus a wide array of **OPERATING GROUPS** (regional and national)

- **ALMERÍA AGROECOLOGY LIVING LAB**

- **DIH – Almería SmartAgriHub**





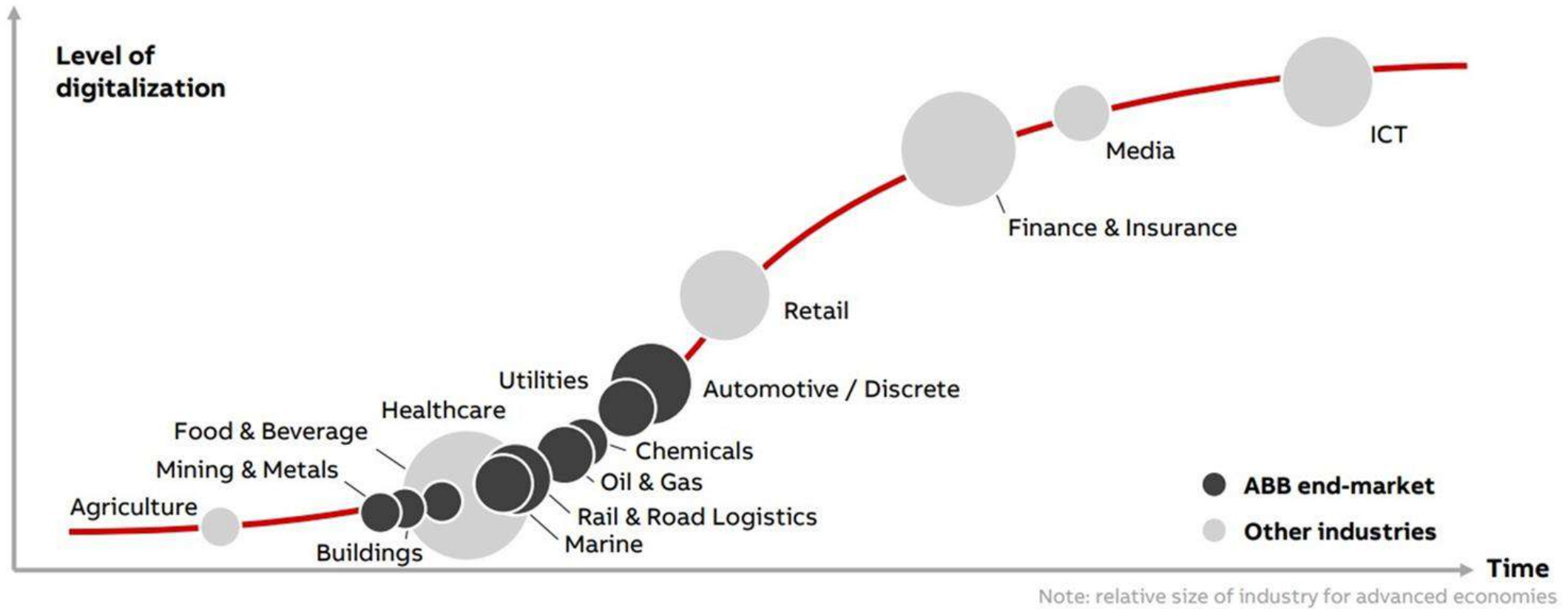
Cajamar (man with water, greenhouse structure, man with beehive); Francisco Bonilla for COEXPHAL (greenhouse interior, packing plant, insects); C.Giagnocavo (old exterior greenhouse);





ALMERÍA  
SMART  
AGRI  
HUB

# Agriculture and level of digitalisation



Digital technology	Example in agriculture	Expected positive impact
<b>Social media and social network &amp; web-based technology</b>	Access to online services and connection with the market	Access to information; Access to consumers for farmers; Peer-to-peer learning
<b>Cloud / edge computing</b>	Field-level storage and computing data	Provision of remotely deployed services; better support to real-time sensitive scenarios
<b>Local and remote sensing</b>	Advanced monitoring capabilities applied to crops and livestock to increase the production, assess health status, and other	Better knowledge of the farm agro-ecosystem
<b>Distributed ledger (in some cases also referred to as blockchain)</b>	Traceability and smart contracts; insurances	Reduction of transaction costs; creation of trust in the value chain
<b>Data analytics</b>	Information from sensed data to support decision-making. Physiological, and phenotype modelling	Higher productivity; reduction of losses; reduction of inputs
<b>Augmented reality / virtual reality (AR/VR)</b>	Education and training tools; decision support systems	Better knowledge of the farm agro-ecosystem
<b>3D printing</b>	Design and printing of custom parts and small equipment	Decentralisation of technology; Easier access to small farmers
<b>Artificial intelligence (narrow AI: including machine learning and machine vision techniques, Natural Language Processing (NLP), robotic automation)</b>	Decision support and management system; planning and simulation; Image recognition (pest diseases)	Higher productivity; reduction of losses; reduction of inputs
<b>Autonomous systems and robotics (integrated systems using several technologies together)</b>	Semi and fully autonomous systems for data collection and agricultural practices	Improved knowledge of the Farm agro-ecosystem; reduction of labour costs; replacement of unpleasant or dangerous work

Table 3. Ideas of actions to operationalise the guiding principles for digitalisation of agriculture

Guiding principles for digitalisation	Key rural development domains		
	Human capital	Innovation	Investments
<b>Creating the basic conditions for digitalisation</b>	Education & training for basic digital skills	Encouraging peer-to-peer networking	Public support infrastructures
<b>Anchoring digitalisation to sustainable development</b>	Raising awareness; Education & training for above basic-level skills; Training of ARKIS agents.	Digitalise ARKIS and aligning it with Responsible Research Innovation (RRI)	Linking investments & projects to sustainability goals
<b>Adapting digitalisation to different contexts</b>	Profiling digitalisation users according to skills and needs	Encourage interactive innovation	Align support investments with local strategies
<b>Favouring digital inclusion</b>	Mapping vulnerable groups	Encouraging peer-to-peer networking	Support to vulnerable groups
<b>Developing digital ecosystems</b>	Training and digitalisation brokers	Encourage Living Lab approaches. Peer learning among digitalisation brokers (within ARKIS) and align them to RRI	Prioritise support based on cooperation and multi-actor projects
<b>Developing adaptive governance models</b>	Planning, coordination and networking among rural digitalisation agencies, Smart Villages, Digital Innovation Hubs, Fab labs, etc.		
<b>Designing policy tools for sustainable digitalisation</b>	Develop fast and flexible supporting mechanism or policy instruments to support local/regional multi-actor cooperation processes for digitalisation. Support should be provided for all preparatory work around digitalisation such as animating stakeholders, facilitating engagement processes, feasibility assessments, prototype and project development, etc.		

Source: Adapted from Bacco *et al.* 2020



# Error of technology-centric approach (or the “top 10” syndrome...)

- Digital transformation success within businesses: the need to operate at three levels (at once) —governance, management and implementation
- Need for coherence between levels
- ...and that is only when we consider “the business”...(more on this later...)

# The business school view...

- A recent [survey of directors, CEOs, and senior executives](#) found that digital transformation (DT) risk was their #1 concern in 2019.
- Yet [70% of all DT initiatives did not reach their goals](#). Of the \$1.3 trillion that was spent on DT in last year, \$900 billion went to waste.
- Why do some DT efforts succeed and others fail?
- Fundamentally, it's because **most digital technologies provide possibilities** for efficiency gains and customer intimacy.
- But if people lack the right mindset to change and the current organizational practices are flawed, **DT will simply magnify those flaws**.
- <https://hbr.org/2019/03/digital-transformation-is-not-about-technology>

# The pursuit of innovative “business models” and added value:



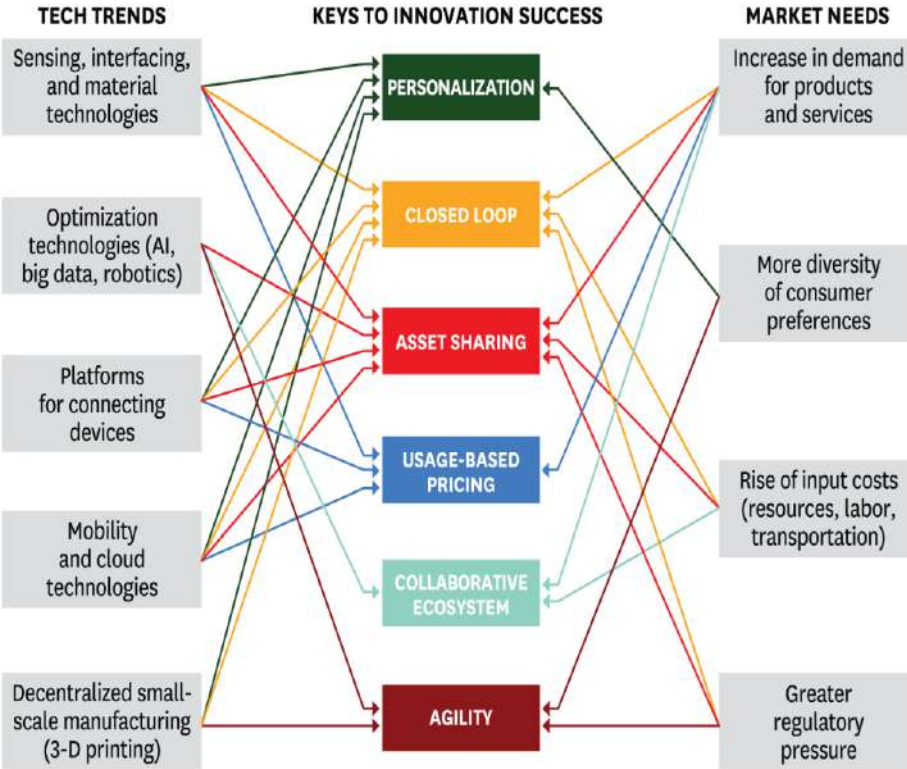
- Pay per use/performance/output
- Subscription model
- Asset sharing model
- Door opener model
- Data & knowledge monetization
- Model as a service



Others?? Platforms, Collaborative, Commons, and Cooperative, Social Enterprise, etc.

## Linking Technology and the Market

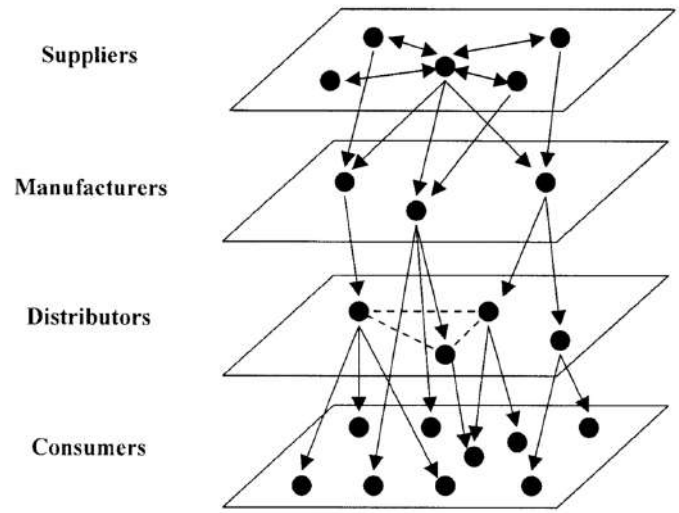
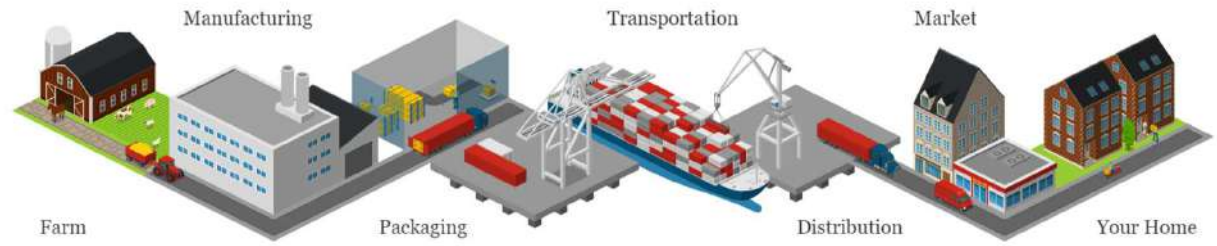
The six features that characterize successful innovation all link a recognized technology trend and a recognized market need. Trends were identified by an analysis of regularly published industry reports from think tanks and consulting companies such as the McKinsey Global Institute, PwC, and the Economist Intelligence Unit.



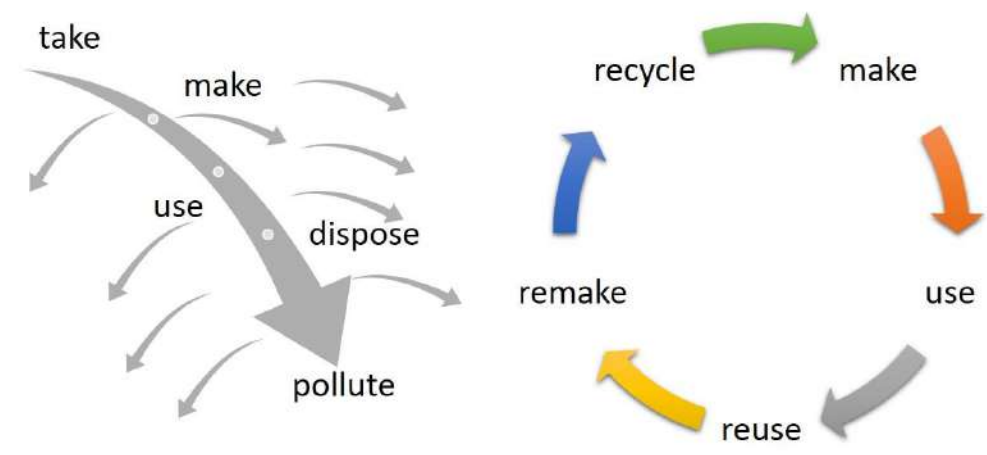
SOURCE STELIOS KAVADIAS, KOSTAS LADAS, AND CHRISTOPH LOCH FROM "THE TRANSFORMATIVE BUSINESS MODEL," OCTOBER 2016

# Beyond the firm: Supply chains/netchains/ value chains? Chains at all?

## The Food Production Chain

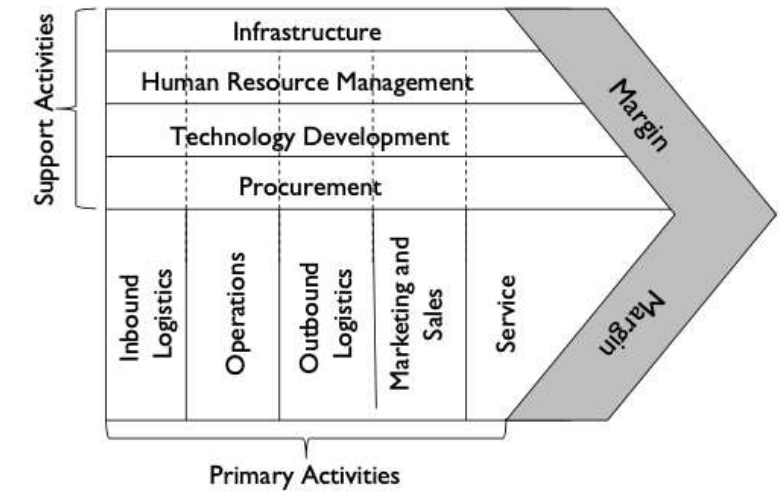


Lazzarini, et al, 2001

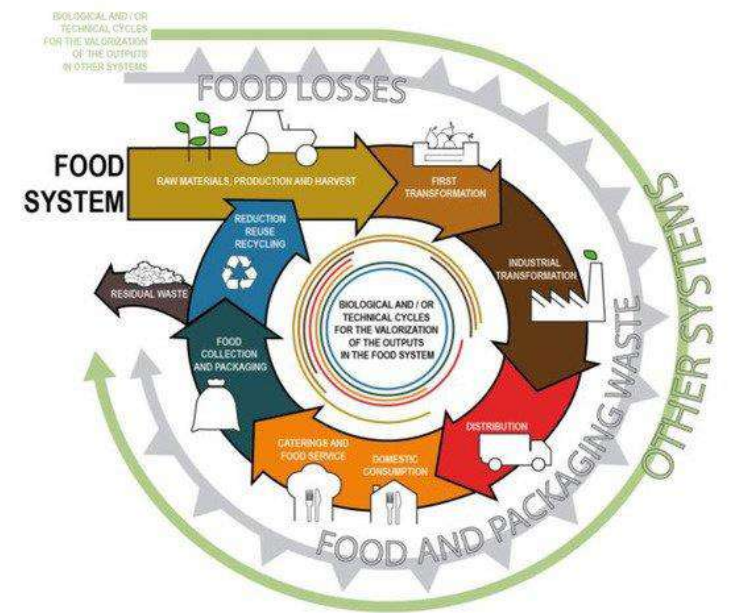


CC 3.0 Catherine Weetman 2016

## Michael Porter Value Chain Analysis



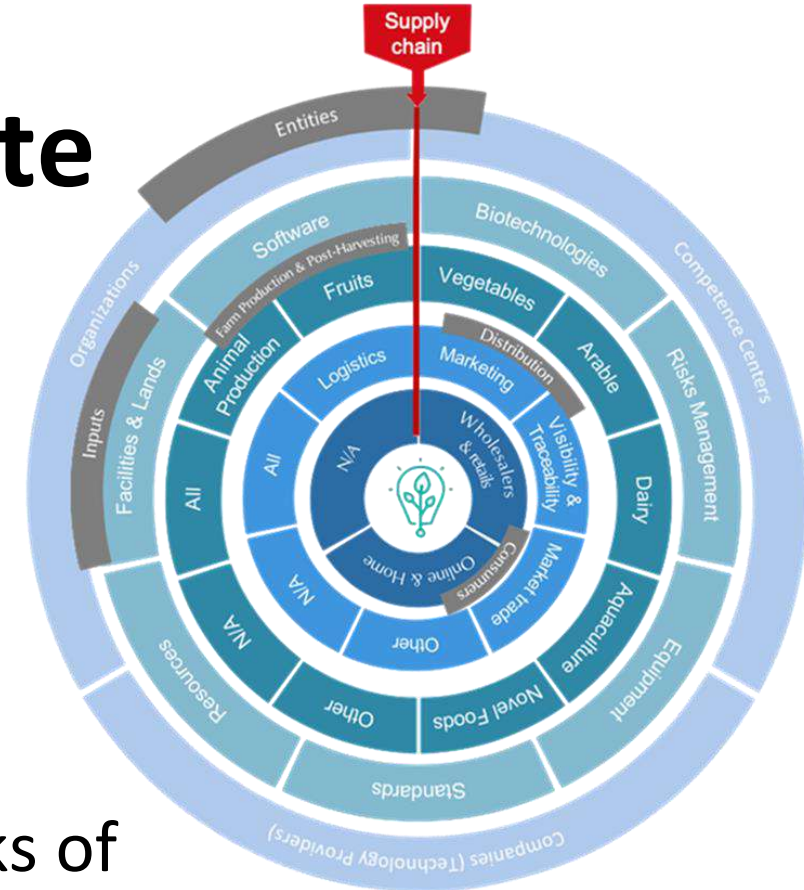
Michael E. Porter "Competitive Strategy: Techniques for Analyzing Industries and Competitors" 1980



Fassio & Tecco Systems 2019, 7(3), 43; <https://doi.org/10.3390/systems7030043>

# Value chains and networks compete

SmartAgriHubs: Potential applications of digital technologies (agri/non-agri) in agriculture.  
Importance of integration of data in business model/value chain.



**However... different supply and value chains/networks of relationships/knowledge flows and management will compete**

**Competition is not just between products, services, and technologies. It depends on strength of “ecosystem” not just on individual firms.**



Eco system

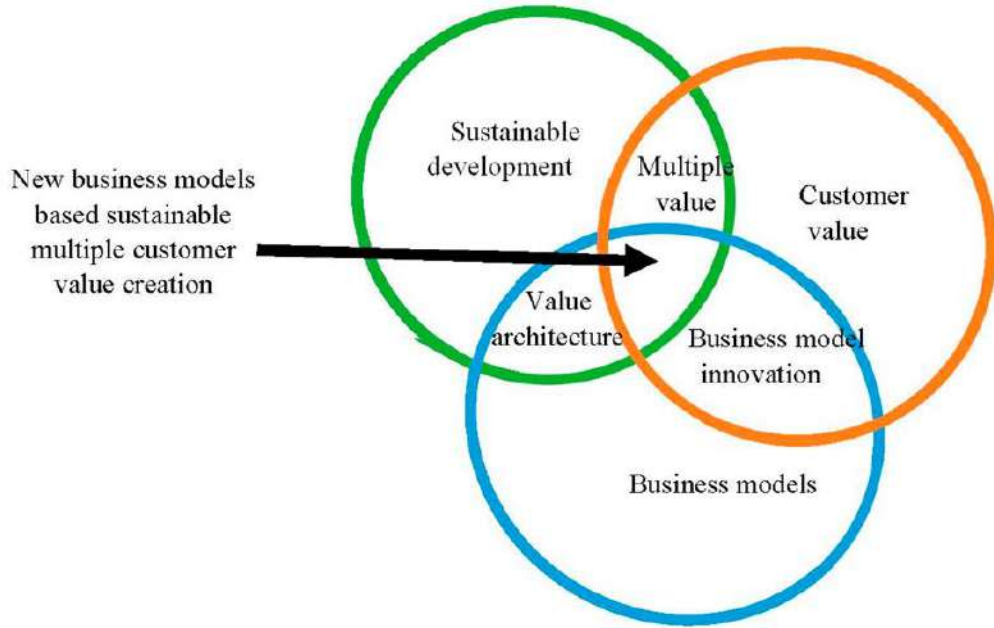


Technology



Business

# Sustainability?



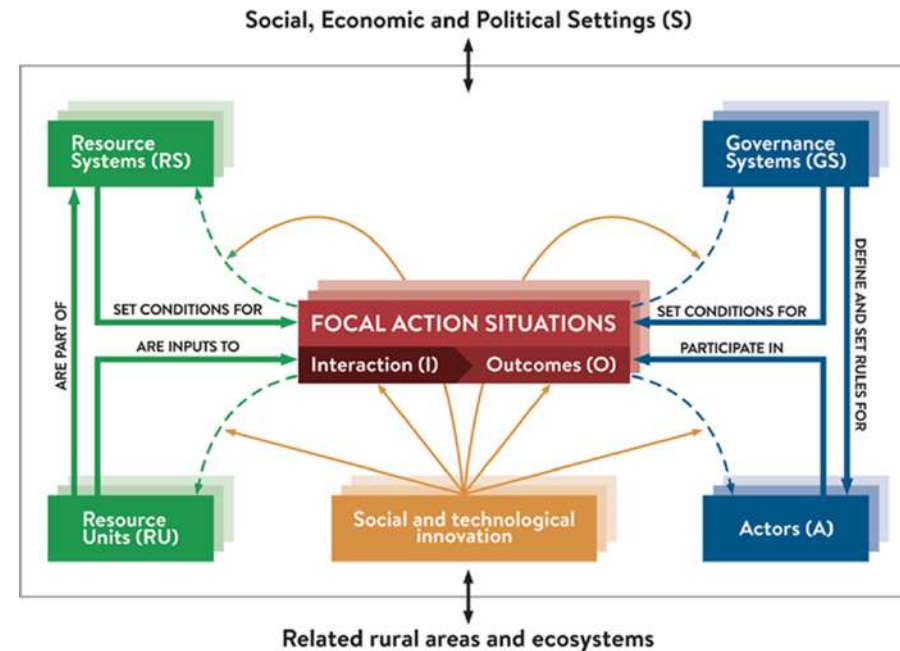
A)



B)



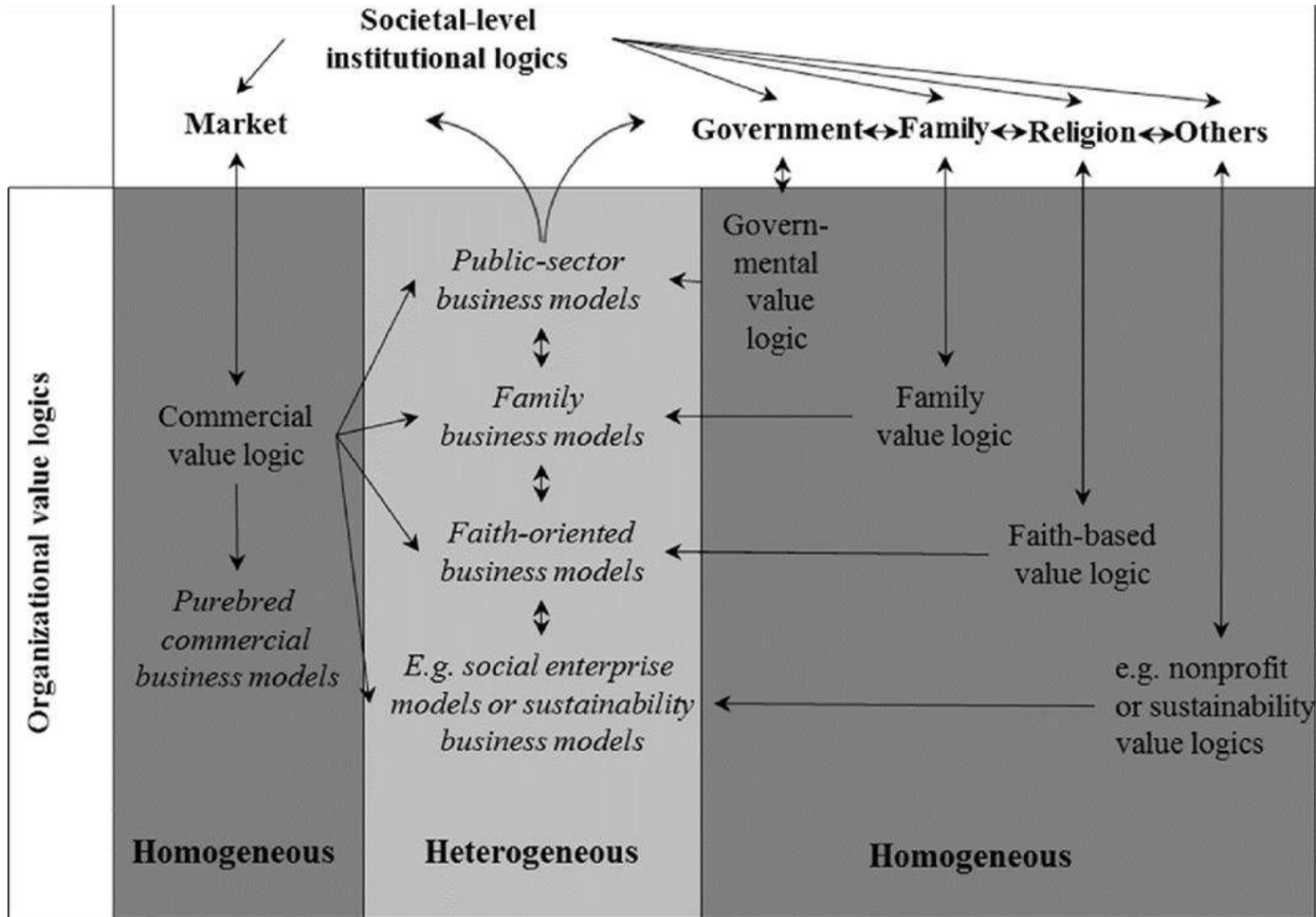
**How we govern exchange of value matters too:** e.g.: Ostrom's Social Ecological Systems or the set of rules for Common Pool Resources



# Plural Value Dimensions

- Complex realities resulting from balancing costs, benefits and trade-offs among social, economic and environmental dimensions that need to be analyzed with appropriate methods.
- Trade-offs are not straight forward
- Plural value-dimensions are present in carrying out analysis of the challenges that face the sustainability of agricultural sector.

# Organisational Value Logics



The business model has been conceived as a commercial logic of value proposition, creation, exchange/deliver and capture.

-But:

-what value is offered, and to whom in the value proposition?

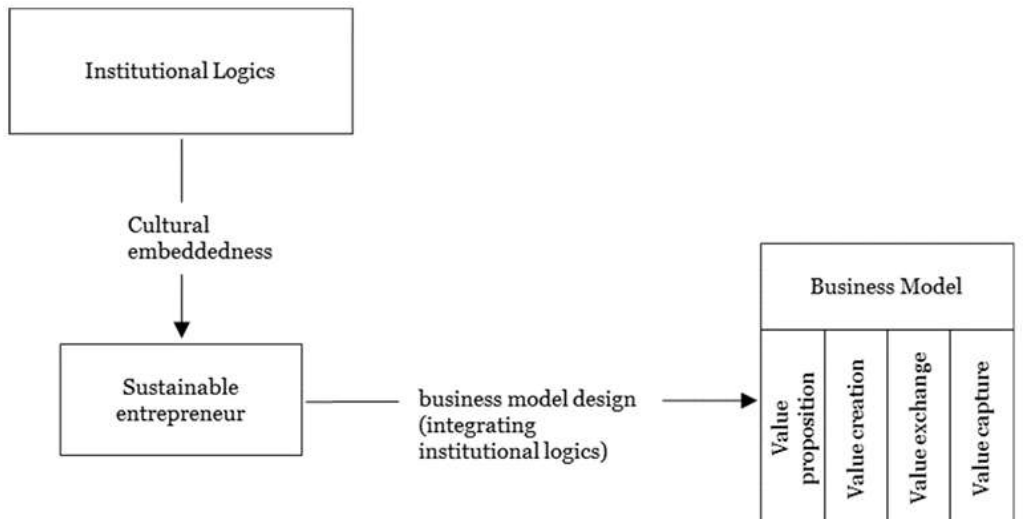
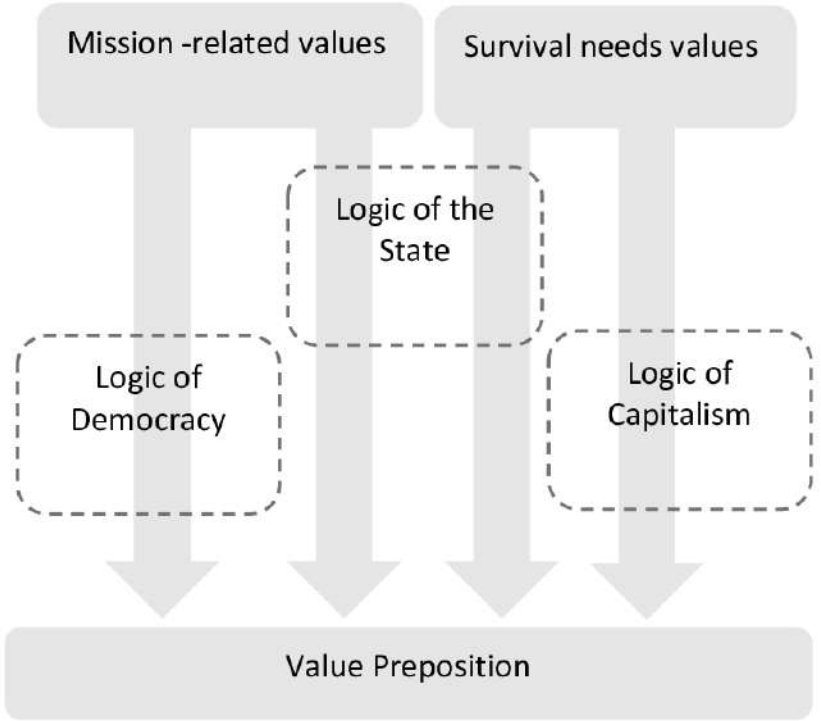
-valuation method matters: what is valued, how, and by/for whom?

**-the business model is embedded in organizations and systems.**

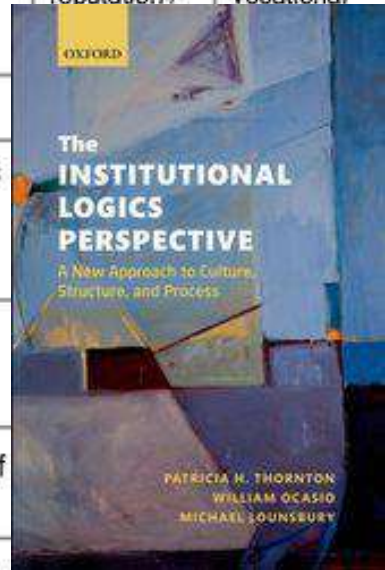
**Homogeneous and heterogeneous organizational value logics are shaped by a variety of institutional logics.**



# Different institutional logics – delicate balance of policy



Feature	Market	Corporations	Professions	State	Families	Religions
<b>Economic system</b>	Investor Capitalism	Managerial capitalism	Personal capitalism	Collective welfare capitalism	Personal capitalism	Western capitalism
<b>Effect of symbolic analogy</b>	Market as transaction	Hierarchy as a corporation	Professions as a relational network	State as a redistribution mechanism	Family as firm	Temple as ba
<b>Sources of identity</b>	Faceless	Bureaucratic roles / quantity production	Personal reputation / quality of innovation	Political ideology of social class	Family reputation /	Occupational vocational
<b>Sources of legitimacy</b>	Share price	Market position of the firm	Specialization staff	Democratic Participation		
<b>Sources of authority</b>	Shareholder activism	Board of directors / management	Professional associations	Bureaucratic domination / political parties		
<b>Base of strategies: increase of...</b>	Efficiency of transactions	Size and diversification of the firm	Reputation / quality of craft	Collective good		
<b>Informal mechanisms of control</b>	Analysis of the industrial segment	Organizational culture	Professional celebrity	Backstage of politicking		
<b>Formal mechanisms of control</b>	Imposition of regulation	Authority of board and management	Internal / external supervision	Enforcement of legislation	inheritance and succession	Rationalization usury / tabo standard
<b>Organizational form</b>	Market	M-Form	Network organization	Legal Bureaucracy	Family Partnership	Religious congregation
<b>Investment logic</b>	Capital committed to capital market	Capital committed to corporation	Capital committed to the bond of relationship	Capital committed to public policy	Capital committed to home	Capital comm to salvation



# The future?

- Contested institutional logics regarding the impact of digitalization on the sustainable organization of value will have to be resolved – and should ensure social/environmental/economic sustainability
- Business models and institutional logics that most equitably deal with digital transformation should be crafted, not bent into submission to fit other dominant institutional logics
- Policy should not put burden and risk of resolving incompatible logics concerning digitalisation on farmers (e.g. Environment v. Market/Growth) or other stakeholders who provide non-monetised benefits



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# THANK YOU



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