Federated Innovation @MIND
Innovation Agenda

Agrifood Tech & Wellbeing

TRANSFORM TO SUSTAIN THE FUTURE cerealdocks GROUP

ESSELUNGA

PROMOCOOP LOMBARDIA

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Strategic Domains

Description of the Thematic Area and outline of the Strategic Domains of focus for the Thematic Area are outlined, these represent the area of focus over which the TA will build their Agenda.

Description of Thematic Area

Food supply chains are the backbone of economic and human wellbeing. Population increase, climate change and the ageing of societies will stress the ecological boundary of Earth. Thus, producing more with less should go together with eating better and healthier food.

Strategic Domains

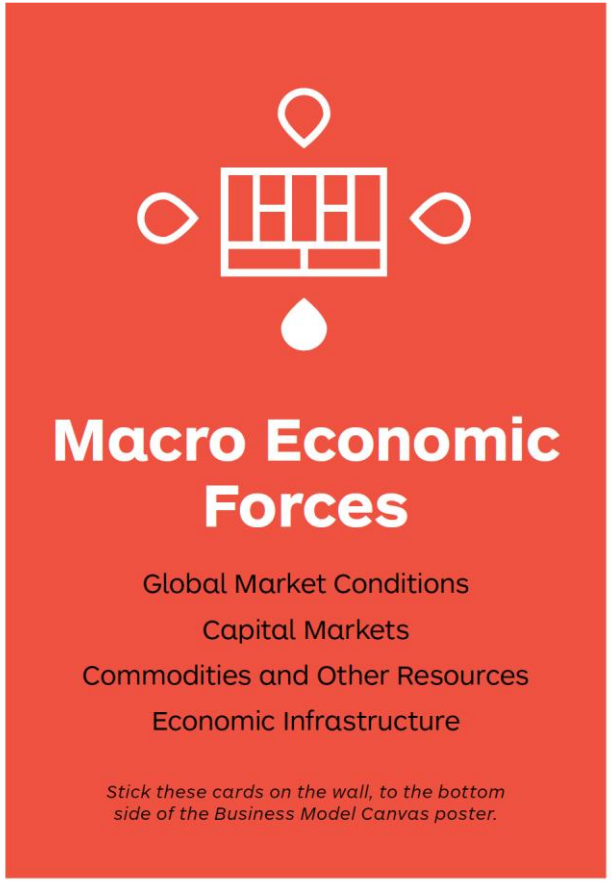
- **Agrifood 4.0**
- **Food quality and nutrition**
- **Sustainable and resilient food systems**
- **Personalized nutrition**

Trends and Scenarios – Business Environment – Market Forces

- Increase demand for **Good-For-You product and services**
- **Flexitarian and Fresh Food** are the new black
- Emergence of Ultra-Niches
- **Empowered consumers** (compare prices, nutritional table, personal style etc.)
- A **clean label** is a competitive advantage
- Increasing **consumer desire to prioritize health and wellness**
- Demand for plant-based product is globally raising
- Demand for **super food nutritional properties**
- Need of rendering **sustainable choices more accessible** and affordable
- Customer asking for **reusable and biodegradables packaging**

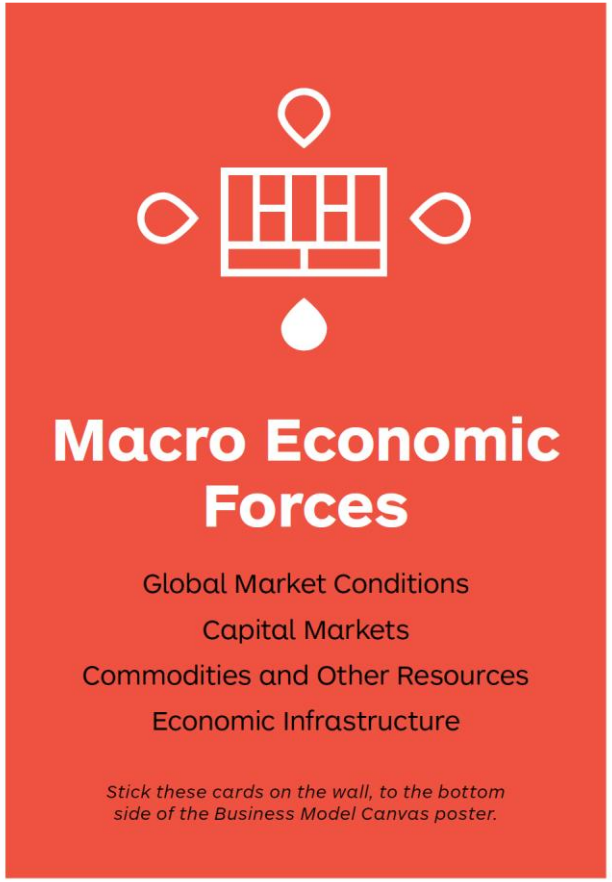
Trends and Scenarios – Business Environment – Macro Economic Forces

- **Vertical/Indoor farms**, reducing time-to-store and provide the true farm-to-table experience
- **Advanced analytics** can more accurately predict future demand, reduce waste, and maximize sales
- The importance of **Private Label** as lower price and high-quality alternative
- **E-commerce** expand market share by far and has an impact / opportunity on the agri-food system
- **Automation and machines era** is knocking at the door
- Edge and quantum computing are becoming “popular”
- Growing demand for a **traceable and transparent value chain**
- Raising of technology applications that present emerging opportunities to improve consumer nutrition
- Surpassing the **Take-Make-Waste food economy**. Waste as a design flaw, so it is a design problem: Food by-product vs. Food by-design. There is a need of shifting to regenerative food systems. Waste can be fuel / food for other systems (everything is food for something else)
- **Population growth (not in Italy),** urbanization is challenging the food systems
- Beginning of the **Silver Tsunami asking new services and new profiling**



Trends and Scenarios – Business Environment – Macro Economic Forces

- Middle class is falling in mature markets and **hyper expanding in dynamic and emerging economie**
- **Global pressure on raw materials** (agriculture, meat etc.) as **global wealth increase**
- Raw material and commodities prices are constantly fluctuating
- The global eco-systems and bio-diversity is threaten by **climate changes**
- The pandemic hit social and economic stability
- We are between a global recession and a possible new consumer boom driven by excess savings (post pandemic)
- **New "Marshall" plans** are at the door
- **New life organization** will move traditional spending towards new products
- Expenditures on services is overcoming that on products
- Population ageing is transforming money spending



Trends and Scenarios – Business Environment – Industry Forces

- **Agrifood Tech Gap**: the food and agriculture sectors were slow to adopt technologies driving the Fourth Industrial Revolution
- There is a **space for a sustainable food & consumption leadership** (improve capacity for farmers, changing consumer behavior and improving resource management)
- There is a **need (and a demand) for an agri-food inclusivity** (smallholder farmers, women and young people)
- More **investments for changing from consumption to circular economy** (in production system and in product for sale)
- Land, soil and other resources (like water etc.) are scarce and under constant threats
- The ability to experiment with, and pilot **new ideas based on a data driven innovation paradigm** is a competitive advantage

Strategy – Challenges, Opportunities and Strategic Implications

Agrifood 4.0

Challenges	Opportunities	Strategic implications
• **Climate change & sustainability** (natural resources, inclusivity, CO2 emissions, circular economy, food waste) • **Audience changing** (growing population, aware population) • **Tech influence everything** (Agritech, digitalization, IoT, AI, Big Data, traceability, e-commerce)	• **Precision agriculture** can offer solid contribution to change the food systems by making them more resilient, reducing emissions, better use of natural recourses • **Industry 4.0**: Agritech to be fully implemented, the agrifood sector is still behind in efficient use of technology • Further **investments for changing from consumption and waste to circular economy** (National and EU level) • Awareness raising among the population: demands for **more transparent information on products and processes** • **National (PNRR) and International** (EU Multiannual Financial Framework 2021 – 2027) • **New industrial process** (e.g. emerging proteins) and circular economy	***How do we:*** Build new and more efficient Agrifood system, more digital, more connected more industry 4.0?

Strategy – Challenges, Opportunities and Strategic Implications

Food quality and nutrition

Challenges	Opportunities	Strategic implications
• **Climate change & sustainability** (biodiversity, natural resources, land, CO2 emissions) • **Audience changing** (urban population, ageing population, aware population, health and nutrition) • **Tech influence everything** (IoT, AI, Big Data, traceability)	• **Super foods and new ingredients** provide nutritious and healthy alternatives to traditional ones' while tackling emissions and preserving biodiversity • Ageing as a new market force; **costumer looking for more accessible and affordable nutritious** and healthy food • Raising of **technology applications** that present emerging opportunities to **improve consumer nutrition standards** and cross industry shared services (e.g. Life Science) • **New domains to full exploit** (vertical, indoor, urban farming**) capable of reducing time-to store, saving natural resource, control & enhance nutritional properties** and providing true farm-to table experience • Regulations in constant evolution • **New food habits** and emerging proteins	***How do we:*** Enhance nutritional properties and food quality?

Strategy – Challenges, Opportunities and Strategic Implications

Sustainable and resilient food systems

Challenges	Opportunities	Strategic implications
• **Climate change & sustainability** (biodiversity, natural resources, inclusivity, land, CO2 emissions, circular economy, food waste) • **Audience changing** (urban population, growing population, aware population) • **Tech influence everything** (Agritech, digitalization, IoT, AI, Big Data, traceability, e-commerce)	• **Agrifood inclusivity** (smallholder farmers, women, young people) • **Circular economy** still to be fully implemented at local and international level. • Technology as a tool to **increase transparency and traceability**, making distribution more efficient, preserving water and tackling food waste • New regulations and protocols to **support sustainable farming** (including opportunities within EU CAP and IT PNRR) • Growing **demand for reusable and biodegradables packaging**	***How do we:*** Make farming, food manufacturing and distribution sustainable and resilient?

Strategy – Challenges, Opportunities and Strategic Implications

Personalized nutrition

Challenges	Opportunities	Strategic implications
• **Climate change & sustainability** (inclusivity, health and nutrition) • **Audience changing** (urban population, growing population, aware population) • **Tech influence everything** (IoT, AI, Big Data)	• **E-Health shared services** and data to implement and develop a new platform, proving rapid and trusted feedback to a demanding population • **Increasing research for functional foods** and ingredients able to improving wellbeing • **New IoT applications for consumer** (wearables, smart homes etc.) • **New working habits and life organization**	***How do we:*** Lead the change from good products to good for you products and connect in one journey health, food and nutrition?

Strategy – Draft Master Plan – Objectives, Key Results and Initiatives

Agrifood 4.0

Objectives	Key Results	Initiatives
SHORT TERM (2021 – 2022) a) Building an integrated data platform which can incorporate data analytics (also coming from precision agriculture), transforming the farm-to-fork strategy into a data driven supply chain, completely transparent for every customer **LONG TERM (post 2022)** a) Testing and piloting innovative infrastructures which can retrofit farming processes and increment productivity, food quality and sustainability, with the aim of setting up a farm model / protocol for the future b) Exploring the use of digital twins (AI powered) in agriculture and farming c) Understanding the potential of data behind the microbiome in animals, insects etc. for farming monitoring (including prevention in disease, spillover), predictive models and for food enhancement	• Design a prototype able to define a concept for integrated data analytics system • Identify a number of startups (5 to 6) capable of bringing innovation into integrated data analytics systems	• Co-design the scope and value proposition of the data platform • Design and develop a call for startup on data analytic in agrifood tech • Develop/integrate a prototype

Strategy – Draft Master Plan – Objectives, Key Results and Initiatives

Food quality and nutrition

Objectives	Key Results	Initiatives
SHORT TERM (2021 – 2022) a) Develop deep tech research initiatives in alternative proteins with an open innovation approach b) Experimenting indoor farming/micro greens and the distribution of indoor farming products c) Exploring sources and production models of (super)functional ingredients (both plant and animal based) **LONG TERM (post 2022)** a) Developing a food pairing system based on functional properties linked to biome and genetics data (evaluate the involvement of HT and or Life Science Thematic Area) b) Developing a home test kit for personalized food (goals: wellbeing, cure and prevention) and integrating the use of IoT potentials c) Integrating big data research of HT and Life Science companies in order to address functional food / ingredients R&D	• Develop a food tech lab within MIND leveraging all the asset of the ecosystem • Realize ingredients specifically targeted	• Map existing capabilities worldwide to build a network able to provide input for a future national food tech lab in alternative proteins and super functional ingredients. • Develop shared research platforms/labs for alternative proteins and super functional ingredients (plant&animal-based proteins), integrating ingredients production and evaluation with their applications in final products (including formulations studies and sensory approaches). This might be implemented in collaboration with one or more "Anchors". • Experimenting indoor farming/micro greens and the distribution of indoor farming products.

Strategy – Draft Master Plan – Objectives, Key Results and Initiatives

Sustainable and resilient food systems

Objectives	Key Results	Initiatives
SHORT TERM (2021 – 2022) a) Mapping potential components of a circular design approach / system where all the actors (farmer, manufacturer and distributor) share a circular by design approach, a sort of certified protocol, including financial methods intended for CO2 compensation (e.g., CO2 credits distribution system, et cetera). b) Experimenting sustainable industrial process technique in the food manufacturing industries c) Experimenting food properties enhancement processes in food manufacturing/transformation **LONG TERM (post 2022)** a) Building a CO2 compensation circular model using cultivation technique to fix CO2 (e.g. microalgae ecc.) and exchange extra compensation capacity	• Understanding the key trends affecting the food systems sustainability and resilience • Define the implication of key trends on food manufacturing processing • Launch a call to identify a number of startups (5 to 6) capable of bringing innovation to circular design system	• Co-design the scope of the circular design system • Map existing capabilities worldwide to build a network able to provide input for a future national agrifood lab in industrial process technique • Launch an international call for startups • Develop shared research platforms/labs in industrial process technique. This might be implemented in collaboration with one or more "Anchors".

Strategy – Draft Master Plan – Objectives, Key Results and Initiatives

Personalized nutrition

Objectives	Key Results	Initiatives
• **Experimenting with food and health service integration** (e.g., testing consumers' empowerment APP) • **Understanding the opportunity and feasibility of a citizens data agency** exchange platform • **Exploring the potential of wearable and smart home in connecting food and health** and coaching people • **Food and health services** integrated for a personalized nutrition	• **Mapping all possible interaction within other TA areas** • **Exploring health and food** in **innovative business models**	• Launch an **interfuctional TA group within MIND** (for example: Life Sciences, Urban Digital Tech, Mobility and Logistics)

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