EDUCATION, TRAINING, SKILLS AND COMPETENCES REQUIRED FOR FOOD ENGINEERS

Gerhard Schleining

BOKU - University of Natural Resources and Life Sciences, Vienna Department of Food Science and Technology, Vienna, Austria

Poala Pittia

University of Teramo Department of Food Science and Technology, Teramo, IT

ISEKI-Food Association, c/o Department of Food Science and Technology office@iseki-food.net, https://www.iseki-food.net

Alliance for Skills and Knowledge to Widen Food Sector-related Open Innovation, Optimization and Development

Germana di Falco
Cassiopea, IT

LAYOUT

- Trends and Challenges of the Food Industry
- What is a food engineer?
- Current Situation of university degree programmes
- What skills and competences are required?
- How can required skills and competences been identified and achieved?

        ISEKI-Food Association and ASKFOOD project

          Forecastaggregator

            Interactive Training Gap Identifier
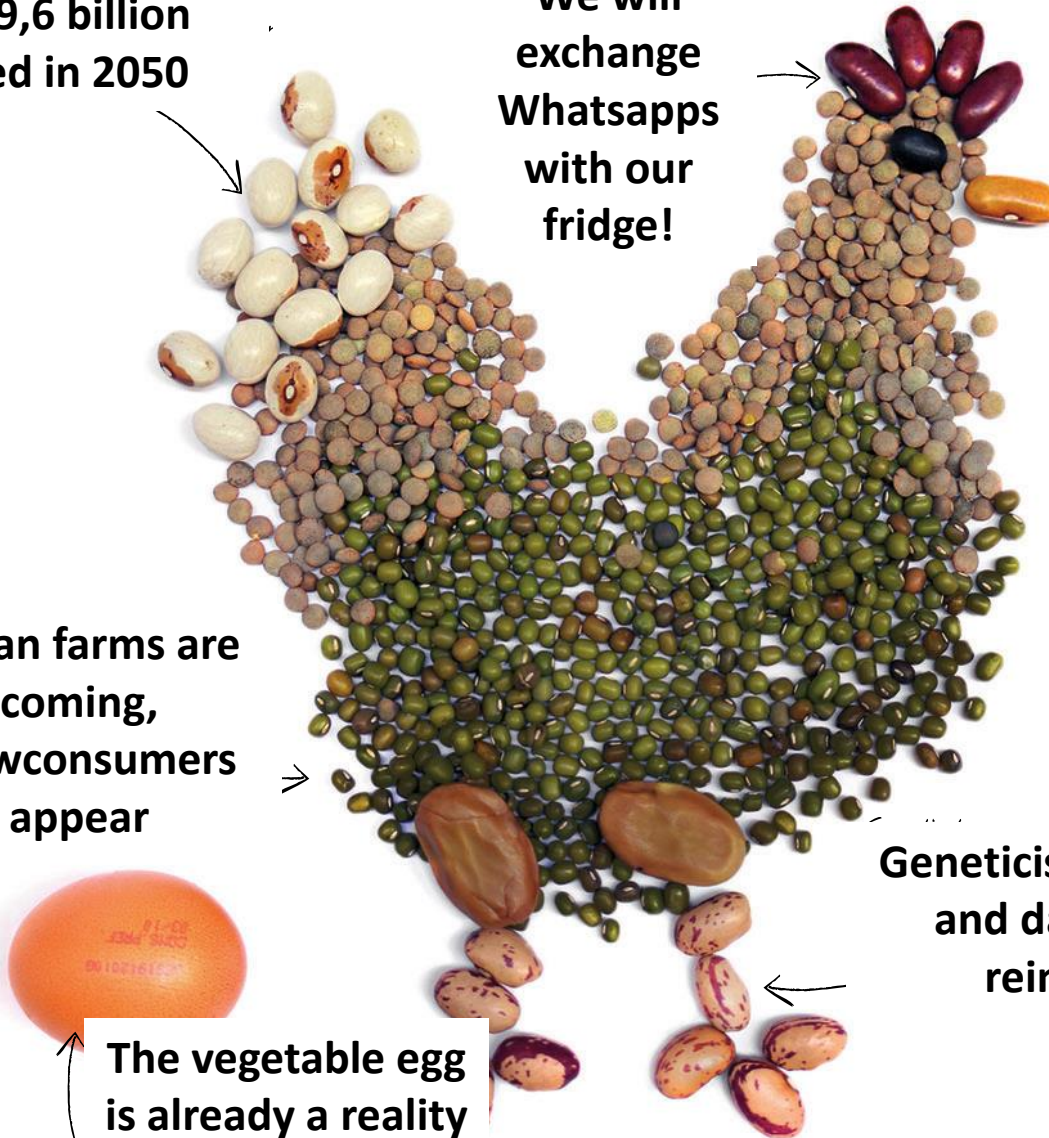
            Permanent Observatory

New Future Scenarios

New Future Scenarios

Environment & Society

Science & Technology

CHALLENGE:

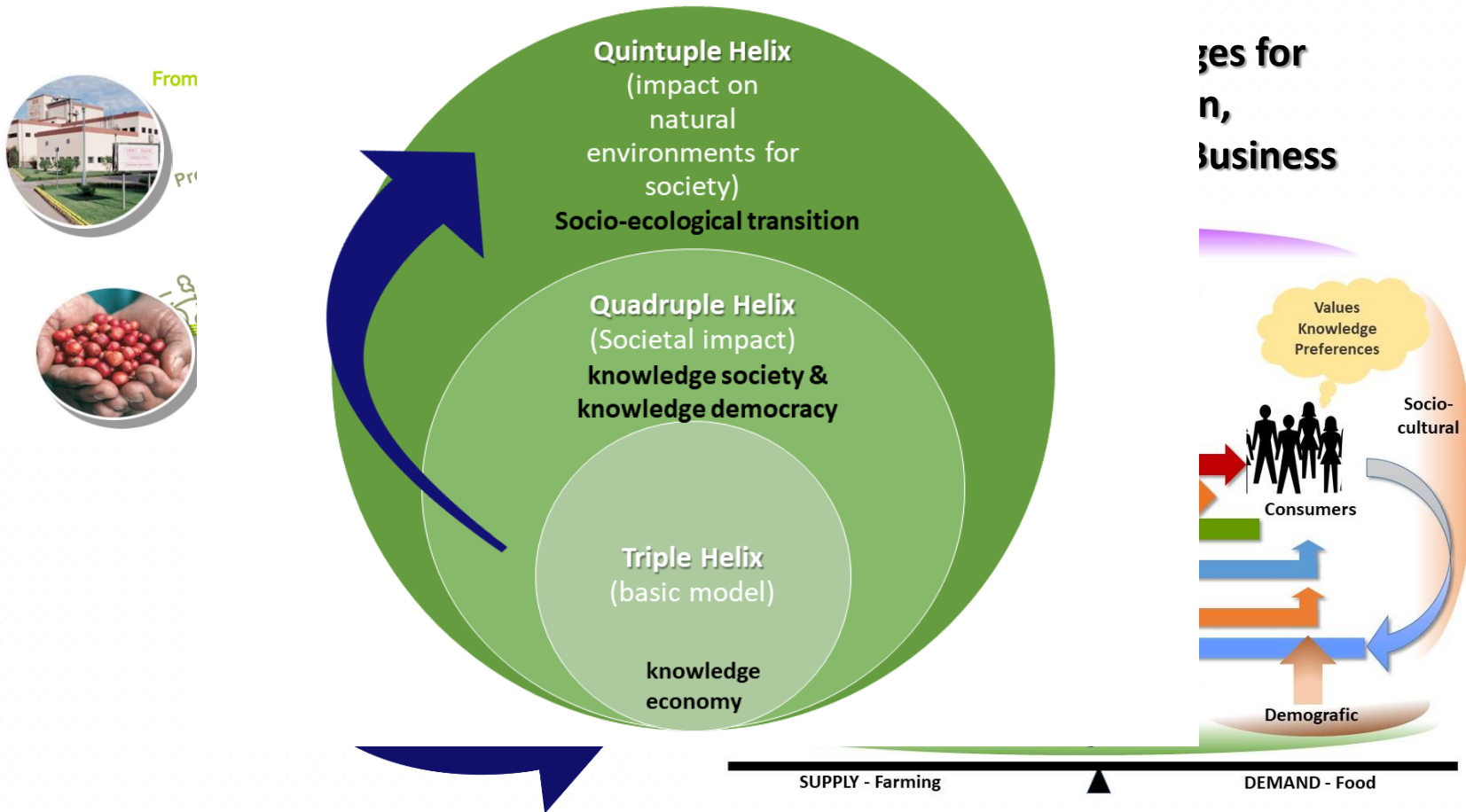**MODERNIZATION OF EDUCATIONAL METHODOLOGIES IN FOOD-RELATED SECTORS**

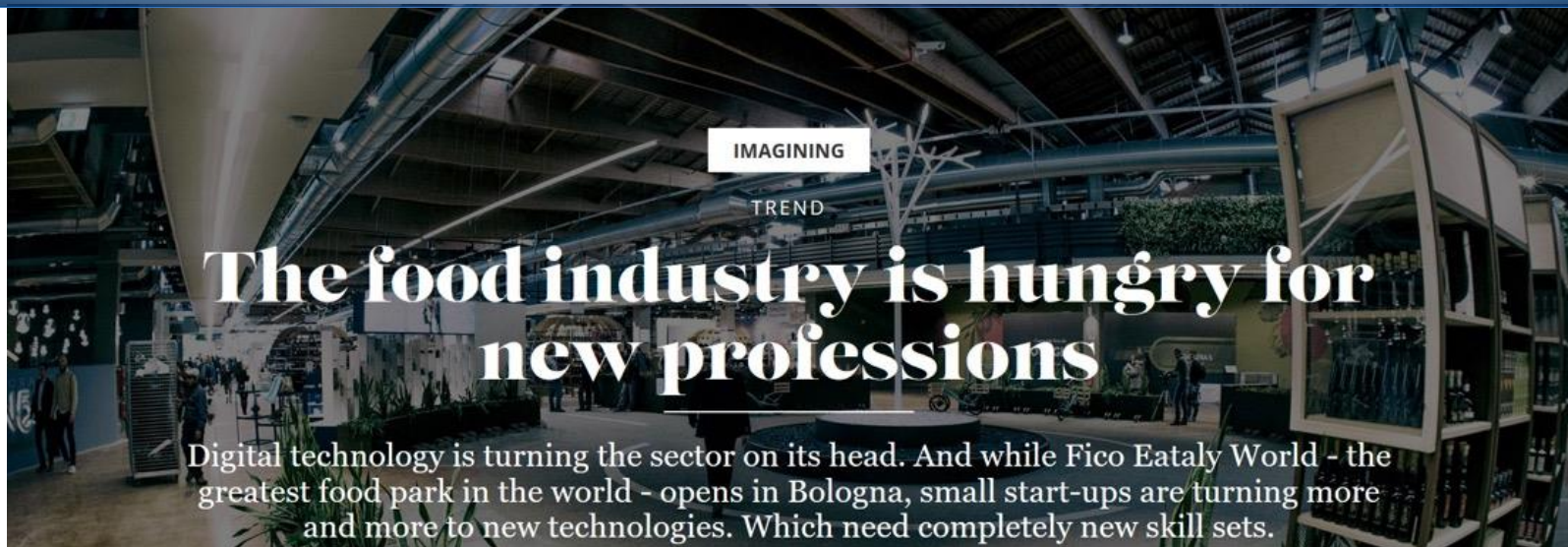**Digitalisation New interfaces with non-food sciences**

End-users (students/trainees)

Food System & Innovation

Quintuple Helix (impact on natural environments for society)
Socio-ecological transition

Quadruple Helix (Societal impact)
knowledge society & knowledge democracy

Triple Helix (basic model)

knowledge economy

From

Pr

...ges for
...n,
...Business

Values Knowledge Preferences

Socio-cultural

Consumers

Demografic

SUPPLY - Farming   DEMAND - Food

CHALLENGE:
IMPROVEMENT OF ACADEMIA-BUSINESS AND STAKEHOLDERS INTERACTION

New, future «food related» professions

IMAGING
TREND

The food industry is hungry for new professions

Digital technology is turning the sector on its head. And while Fico Eataly World - the greatest food park in the world - opens in Bologna, small start-ups are turning more and more to new technologies. Which need completely new skill sets.

GUIDING

TREND
Data Analyst, the most in-demand job of the coming years

IMAGINING

TREND
How digital innovation is changing the face of business

WHAT IS FOOD BLOGGING AND HOW TO BECOME A FOOD BLOGGER?

CHALLENGE

LEVERAGE OF INNOVATIVE AND ENTREPRENEURIAL MINDSET OF THE FUTURE GENERATION OF GRADUATES OF FOOD (RELATED) STUDIES

What is a food engineer?

- **Food engineering** is a multidisciplinary field which combines **microbiology**, applied **physics**, **chemistry** and **engineering** for food and related industries. ….

- Food engineers provide the **technological knowledge transfer** essential to the **cost-effective** production and commercialization of food products and services.

  https://en.wikipedia.org/wiki/Food_engineering

- ….

Is that sufficient for the future?

What will be the requirements for future food ?

precision cooker, a "sous vide" cooking system controlled by "Smart devices"

What will be the requirements for future food ?

Food Telling
Supersense
Slowcal
Here&Now
Eater_tainment
MadeSimple
MyHealth
EgoFood

How will the future working place of food engineers look like ?

Current Situation of university degree programmes

- the development of skills during the university degree programmes are **not sufficiently** focused on the improvement of those that are actually required in the workplace

- a **lack of practical experience** results in difficulties for understanding the problems of a modern manufacturing and processing workplace as well as to develop basic intrapreneurial skills

- **education methods** are too often **outdated**, less effective and sometimes using obsolete tools and equipment

What skills and competences are required?

Several studies and projects have analysed the needs of possible employers, identifying

technical competences also e.g. in food **legislation** and control, food **safety** management, etc., and

soft skills including **communicating**, **critical thinking** and problem solving, product development, etc.
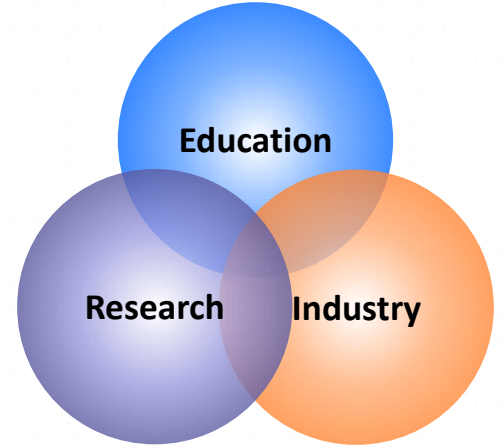
How can required skills and competences been

1. Identified ?

2. Achieved ?

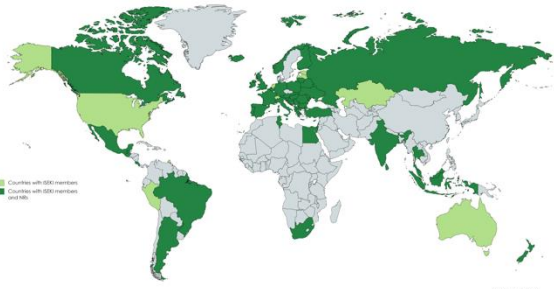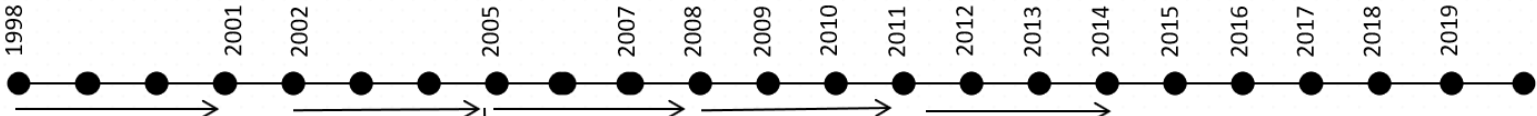Independent non-profit scientific organisation since 2005

bridging

Education

Research   Industry

in the food chain

ISEKI - Food Association

www.iseki-food.net

Universities

NETWORK

Research Institutions

Companies

Associations

Platform for
Teachers, students, trainers, food professionals

Countries with ISEKI members
Countries with ISEKI members and NBs

Members and experts from 53 countries worldwide

1998 2001 2002 2005 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

FOODNET

ISEKI_Food 3

ISEKI - Food 2

ISEKI - Food 3

ISEKI Food 4

56 universities
28 companies
27 countries

90 partners
29 countries (EU+)

113 partners
25 countries (EU+)

97 partners
30 countries (EU+)

89 partners
27 EU countries
3 non-EU countries

Education and Culture DG
Lifelong Learning Programme

ISEKI_Mundus

ISEKI_Mundus 2

+37 partners
+24 countries
(5 continents)

+53 partners
+30 countries
(5 continents)

ISEKI Food Association

track_fast

food careers

27 partners
16 countries

SEVENTH FRAMEWORK PROGRAMME

Action FA 1001
food STRUCTURE
68 partners
28 countries

Erasmus+

European FooD-STA

Knowledge Alliance

SEA-ABT (South East Asian-Academy for Beverage Technology)

Capacity Building

EXAIRDEC

SIXTH FRAMEWORK PROGRAMME

trafoon

SEVENTH FRAMEWORK PROGRAMME

askfood

SDGs Labs
Making the SDGs our business

Next FOOD

FOOD AWARE

SMARTCHAIN
SMART SOLUTIONS IN SHORT FOOD SUPPLY CHAINS

PHP

FIELDS

FNS-Cloud

European Commission | Horizon 2020
European Union funding
for Research & Innovation

INTERNATIONAL, SUBJECT SPECIFIC ACCREDITATION of FOOD STUDY PROGRAMMES

CERTIFICATION OF DEGREE PROGRAMMES

ISEKI - Food Association
EQAS-Food Award

EUROPEAN QUALITY ASSURANCE FOR STUDY PROGRAMMES IN FOOD SCIENCE AND TECHNOLOGY

https://www.iseki-food.net/accredidation

STANDARD ROUTE	EXTENDED ROUTE
DOCUMENTATION FROM PRIOR REVIEW	**SELF-ASSESSMENT REPO (SAR)**
SAR and audit reports must be included. Additional information on the alignment to the EQAS learning outcomes must be provided. Can include a single programme or group of programmes.	Framework supporting documentation provide by EQAS. Can include a single programme or group of programmes.
ASSESSOR REVIEW	
Documentation shared with assessors. No audit. Team composed of teachers, industry specialists.	Documentation shared with assessors. Two days audit for a sing programme. Team composed of teachers, industry specialists and senior student.
DECISION ON THE AWARD	
Based on information provided in the documentation. Decision by IFA Accreditation Commission.	Based on self-assessmen and audit reports. Decision by IFA Accreditation Commissi

CERTIFICATION of SHORT COURSES

a) Certificate of Attendance of an EQAS certified course
b) Certificate of successful Completion of an EQAS certified course after a voluntary assessment

ERASMUS+ Knowledge Alliance project

Alliance for Skills and Knowledge to Widen Food Sector-related Open Innovation, Optimization and Development

Paola Pittia (coordinator)

University of Teramo (Italy)

ppittia@unite.it

New skills for new jobs

The Forecast Aggregator (TEMPESTS model)

Interactive Gap identifier (under construction)

ASKFOOD FORECAST AGGREGATOR and Future Skills Map

The tool collects, connects, ranks and explains, emerging future trends that will produce significant challenges for future skills required by the food sector

https://www.askfood.eu/tools/forecast/

8 **power-breaking forces** (**T**echnology, **E**conomics, **M**arket habits, **P**olicy and regulatory framework, **E**nvironment, **S**cience, **T**ransformative industry, **S**ocial issues) were identified that will shape the competitive scenario and demand of skills and jobs in the next years.

Technology
Self-aware data (AI); Invisible Technology (IOT); Debunking the Fabricated; Robot renaissance; F&D App-ification

Social Issues
Side quirks and tribes; Mainstream Mindfulness; Touchworthy food; Food Equality and Food Equity; Social Innovation

Tranformative Industry
Disruptive logistics, Retail theaters, Peer-to-peer networks via blockchain. Remixing standardization to personalized offers

Science
Foodomics; Nanotech accidents; Nutrigenetics and Nutrigenomic; Lab/Home Grown Food; Frozen Food Fontiers

Economics
Trade Threats; Cryptocurrencies, Crowdfunding and Innovative Finance

Market
Food co-curation; Essential Integration; Desperate Detox; Outrageous outsiders; Instant Entrepreneurs; Enlighted Consumption

Environment
Climate change and biological networks; Food as a landscape/endangered species; Biosensors; Proteins for food, Eco-processing, LCA and re-use/re-cycle/re-manufacturing; From Intensive to Low Impact and Precision Farming

Policy and regulation
Ethics for food; Predictive protection for Golden Silvers; Brand Youth as politics; Malnutrition and Nourished Planet

TEMPESTS

For each power-breaking force (TEMPESTS):

- **5 trends**
- **10 signals**

have been described and included in the website

TRENDS

- Each trend is completed by a description of emerging, missing and confirmed **skills** (generic, technical and soft) and **jobs**.
- Skills and jobs are described according to the ESCO (European Skills, Competences, Qualifications and Occupations) classification https://ec.europa.eu/esco/portal

Technology

Economics

Market habits

Policy and
regulatory
framework

AMPLIFIED INTERSECTIONS

Different Mixtures Are Changing The Way To Think About The Food Sector: It's A New Game-Set, A Different Web Altering The Usual Ways We Consider The Value Chains.

Trends are "profits waiting to happen", as Chris Sanderson from the Future Laboratory uses to say. In the business world, "transformational change" involves a company making a radical change in

its business model, often requiring changes in company structure, culture and management. "Transformational industry" means that, over the next two decades, the traditional food value chains (agriculture and stewardship; manufacturing and branding; distribution and logistics; retail and information; consumption and taste; disposal and renewal) will be reshaped by a totally new set of complex relationships, that is re-arranging the value-chains from efficiency to flexibility and include more and more daily and disruptive intersections with other industries.

Trends are "profits waiting to happen", as Chris Sanderson from the Future Laboratory uses to say. In the business world, "transformational change" involves a company making a **radical change in its business model**, often requiring changes in company structure, culture and management. "**Transformational industry**" means that, over the next two decades, the **traditional food value chains** (agriculture and stewardship; manufacturing and branding; distribution and logistics; retail and information; consumption and taste; disposal and renewal) will be reshaped by a totally **new set of complex relationships**, that is re-arranging the value-chains from **efficiency to flexibility** and include more and more daily and disruptive **intersections with other industries.**

TRENDS

HYBRIDIZATION

Cross-sector comparison is not anymore limited to get some inspiring insights on innovation trends. Now it's sectors, by using food as driver for a new multi-sector convergence.

Read More

BLOCKCHAIN-BASED NETWORKS AND TRUST

The blockchain is pretty technical at its core, but basically it's a way for digital information to be stored and di peer-to-peer network.

Read More

REMIXING STANDARDIZATION

A new era in personalization is dawning due to the expansion of online and mobile food shopping. Food safe new model of standardization emerge.

Read More

BLOCKCHAIN-BASED NETWORKS AND TRUST

Affected skills:

Technical skills (i.e. Software development; Food production; Food distribution; Blockchain Developer; Development of interactive front-end designs for apps; Backend development pertaining to Blockchain; Supervision of the entire stack running their apps)

General skills (Perform detailed processing operations; Coding; Development of Smart Contracts)

Soft skills (Flexibility; Stay relevant; Intuition of decentralization potential)

Future jobs:

Core Blockchain developer;
Blockchain software developer

SIGNALS

downloadable documents, links, examples or early indicators, of the changes described by the trends: analogies, reports, data, and explicit stories

Transformative industry

The Big Gamble

Open Source Sustainability For A New Industrial (R)Evolution

Glocal Micro Systems

Productive Production

Reinassance In Food Processing And Handling

- **Value-chain squeezing through innovation in food processing and handling** ….
- **Emerging market growth, urbanization, and rising living standards**. **Steady growth in emerging markets, urbanization, and rising living standards are causing a dietary shift to higher-value-added produc**t, …
- **Changing consumer preferences.** An increasing **focus on health** (organic and healthier food) is driving product and menu expansion and the need for **higher standards** and **traceability**. ….
- **Increased demand for convenience food**. … is driving innovation in **flexible packaging**.
- **Operational challenges and cost pressures**. Customers are demanding machines that improve operational efficiency, reduce costs, and increase uptimes, leading to **new requirements for automation, energy efficiency,** and integrated solutions. ….

The Forecast Aggregator (TEMPESTS model)

Interactive Gap identifier
(under construction)

ASKFOOD Interactive Training Gap Identifier

A interactive repository of tools for self-assessing the existing skills and identify the gap between the actual and the emerging skills.

The tool collects a list of **Jobs** with related **Competencies** and **Skills** and will have an **Interactive tool to self assess** personal profile.

This can help:

a) individuals who have to define their personal learning strategies

b) food companies that have to set hiring requirements

c) training providers to deliver effective trainings

3 Group of Professional profiles :

A. related to Food Services

B. related to Food Quality Assurance

C. related to Food Research and Development

Identified according to ESCO analysis (ESCO, multilingual classification of European Skills, Competences, Qualifications and Occupations, as part of the Europe 2020 strategy)

ASKFOOD PERMANENT OBSERVATORY

Digital Business Ecosystem

Digital Training ecosystem

Knowledge Cluster

**ASKFOOD PERMANENT OBSERVATORY
on innovations in food & education**

SUMMARY

- **Innovative education & training** targeted towards the needs of the industry is a key for the success of the industry
- **Rapid developments in technology and educational methodology require:**
  - a **permanent monitoring** of the needs
  - a **flexible demand driven** innovative **education** and **continual professional development** for **food professionals** and **teachers/trainers**

Thank you for your attention
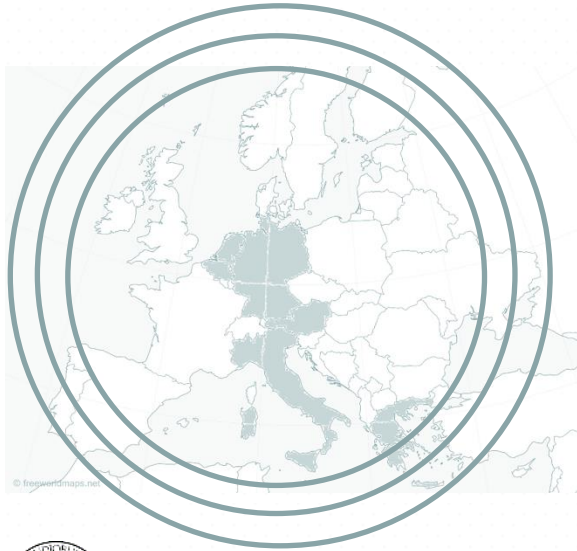
From EU to an international dimension

www.askfood.eu