

FOOD SYSTEMS 2030

A CHALLENGE FOR SOCIETY AND INDUSTRY

FEDIOL

Brussels
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Lebensmitteltechnik e.V. (DIL)

Overview

facts & figures

Founded	1983
Members	> 150
Employees	170
Locations	Quakenbrück (DE) Brussels (BE)
Legal status	registered association
Director	Dr. Volker Heinz
Mission	knowledge for superior foods'



Our experts

Diversity & know-how

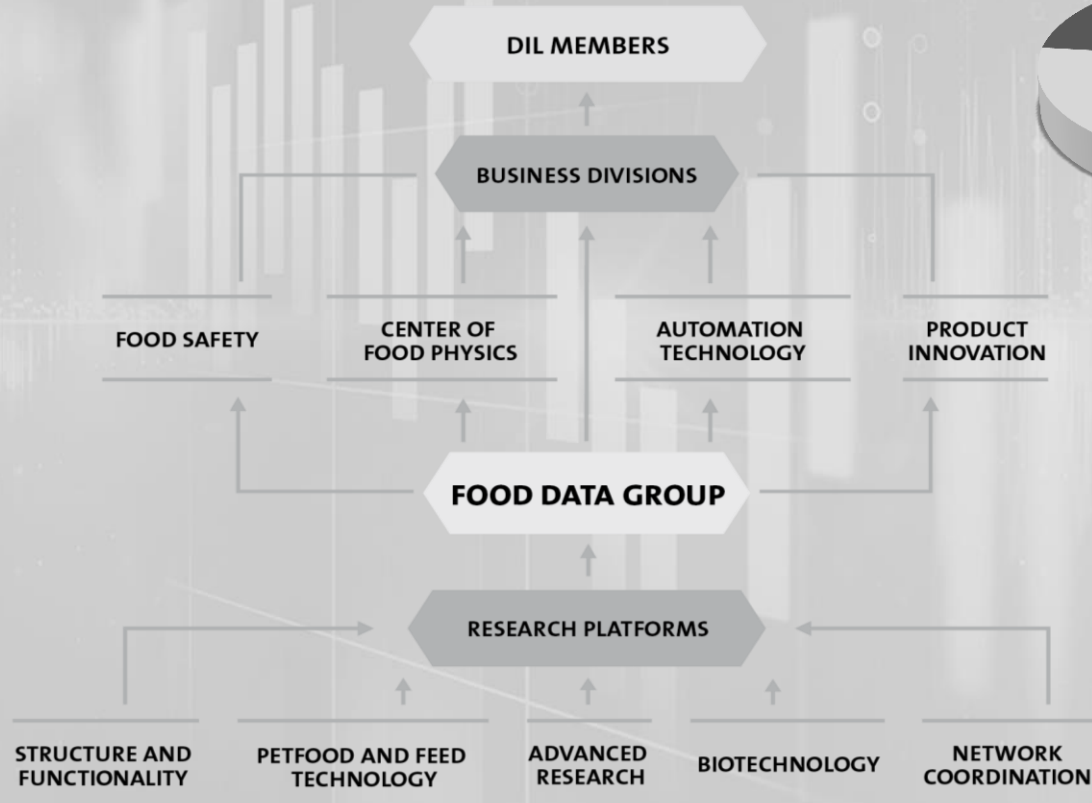
Outline

- Food technologists
- Engineers
- (Food) Chemists
- Biologists
- QM experts
- Nutritionist
- Economists
- Data scientists
- ...



Organization

Research & business divisions



3.2 m €
Public

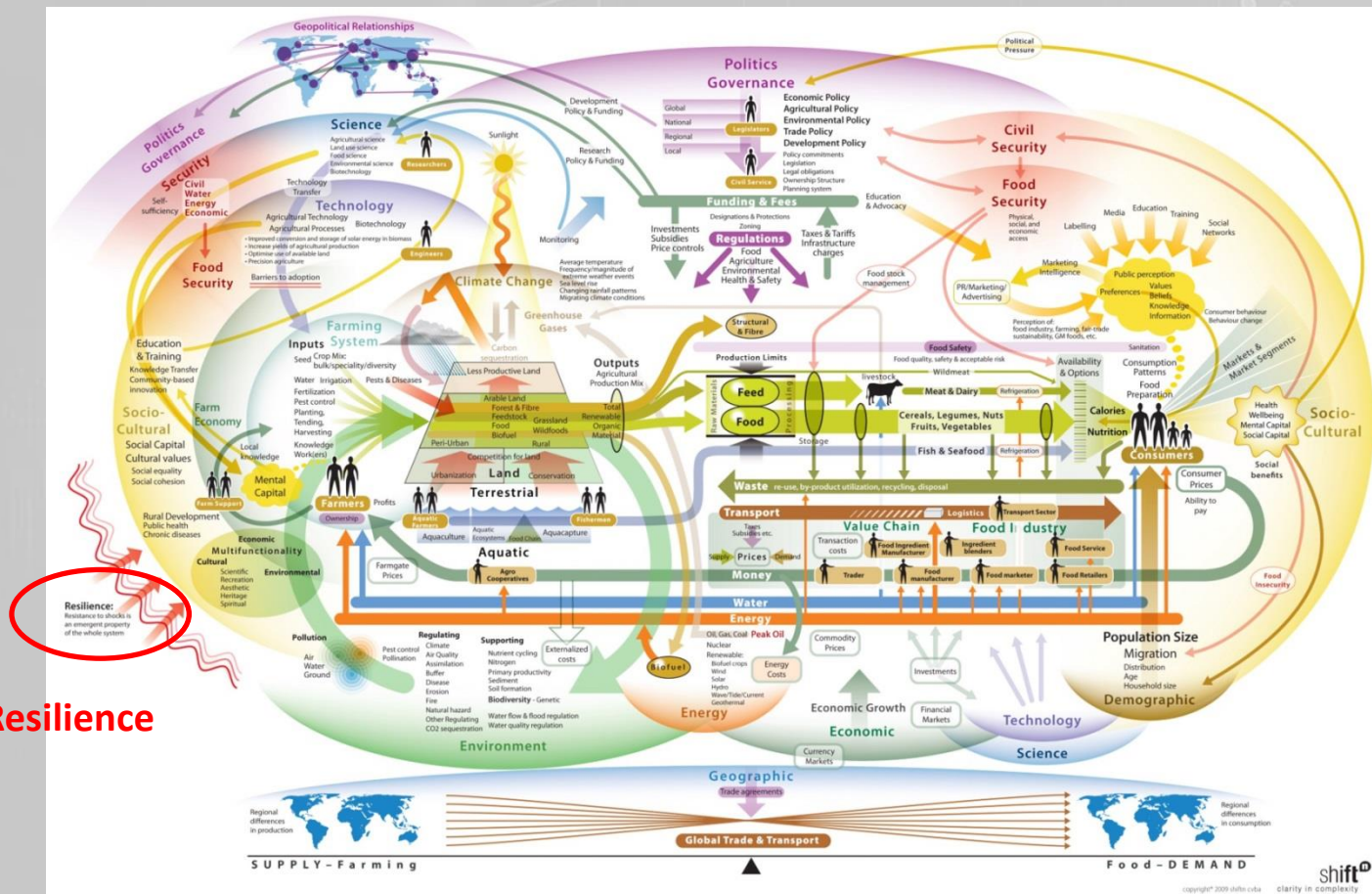
Income Share
14.2 m €



Sustainable Food Systems



- Climate change
- Resource scarcity
- Population growth
- Transboundary pests & diseases
- Urbanization
- Economic growth
- Geopolitical instability
- Etc.

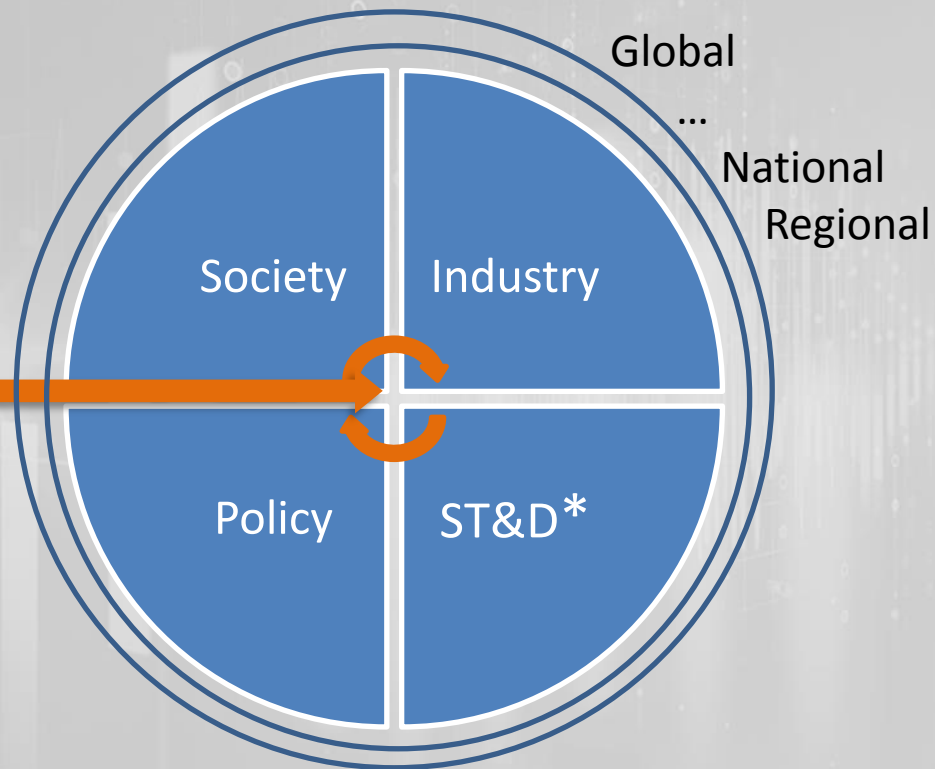


Resilience

Sustainable Food Systems

Major drivers of change in the 21st century

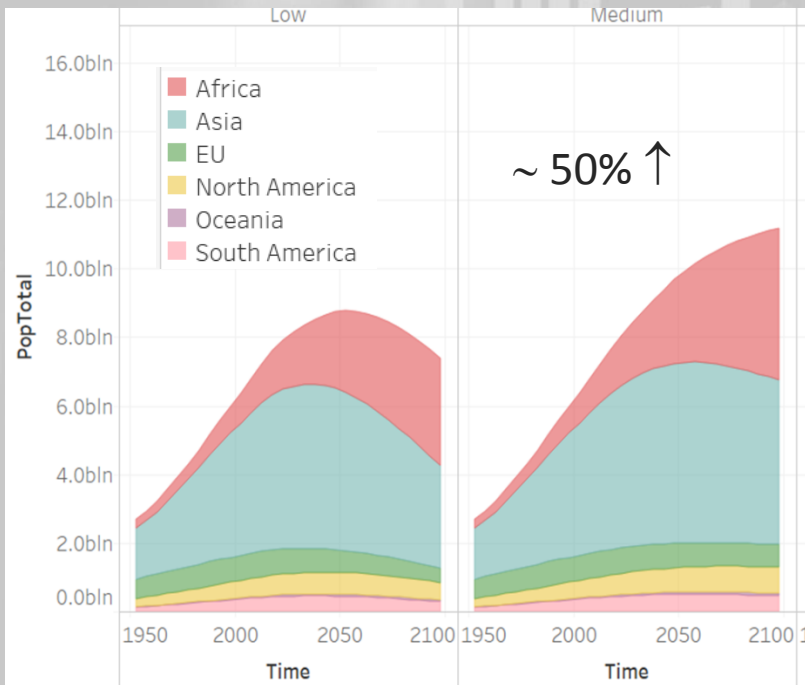
- 1 Population growth, urbanization and ageing
- 2 Global economic growth, investment and trade
- 3 Increasing competition for natural resources
- 4 Climate change
- 5 Agricultural productivity and innovation
- 6 Transboundary pests and diseases
- 7 Conflicts, crises and natural disasters
- 8 Poverty, inequality and food insecurity
- 9 Nutrition and health
- 10 Structural change and employment
- 11 Migration and agriculture
- 12 Changing food systems
- 13 Food losses and waste
- 14 Governance for food security and nutrition
- 15 Development finance



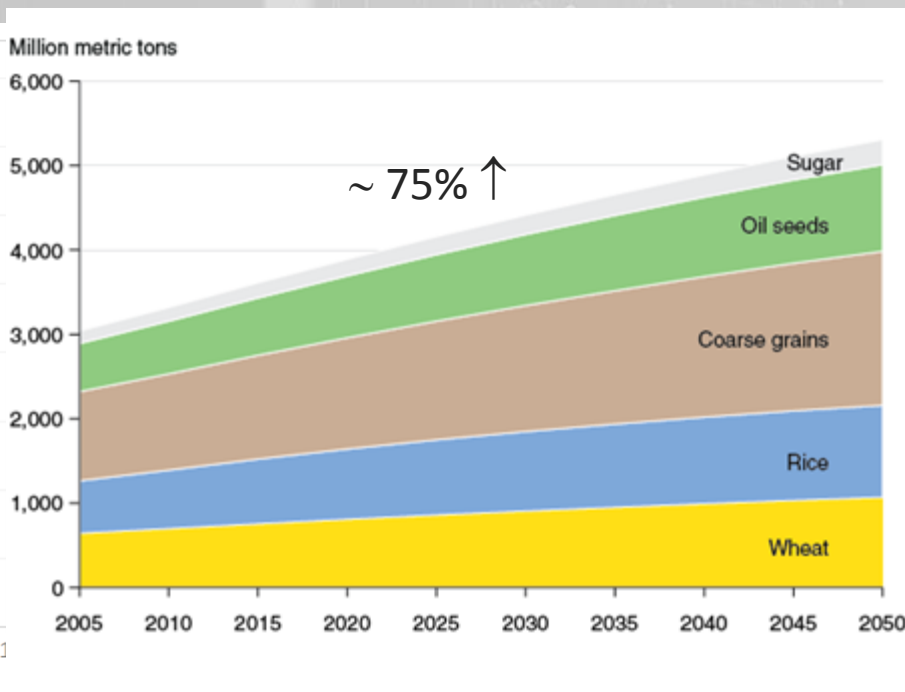
*Science, Technology & Development

Population development (-2050)

Growth



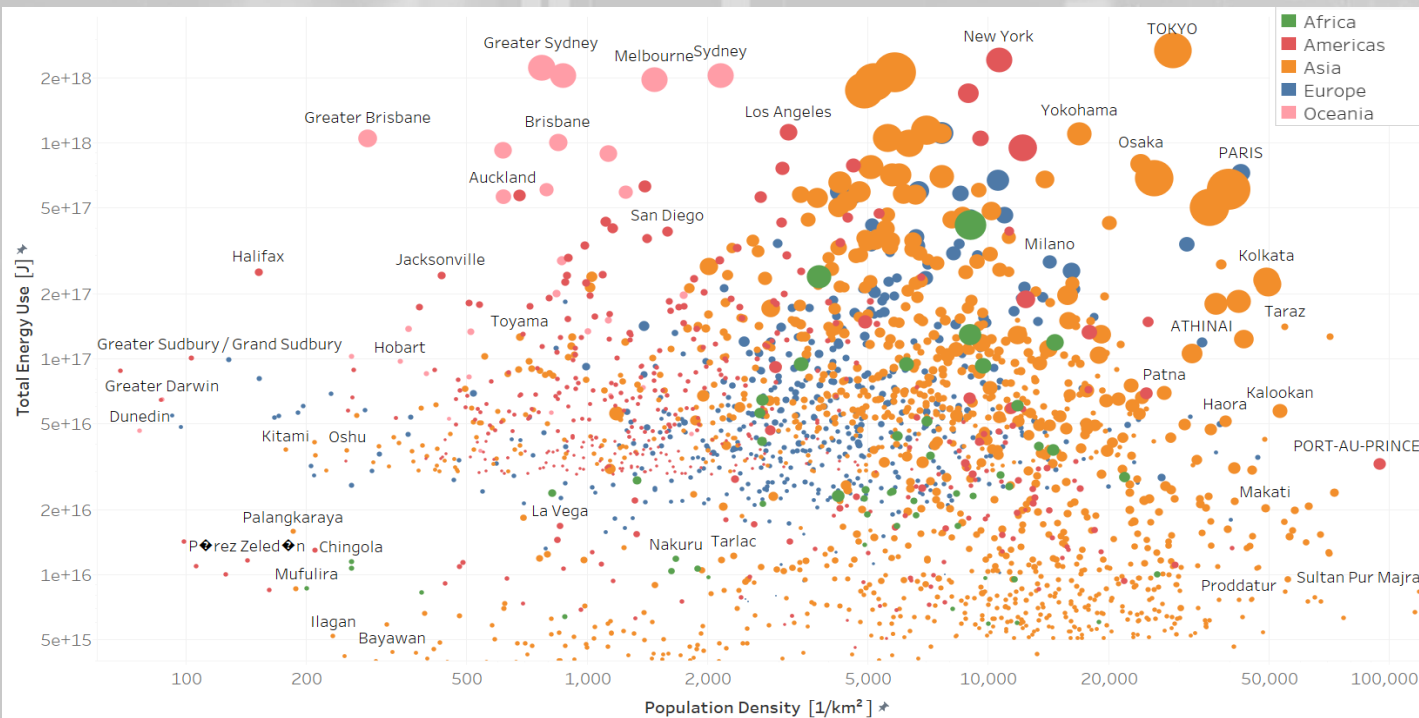
Food demand



Population development

Urbanization

2050:
2/3 urban
population



Mega-cities Top 100

Asien	55
Nordamerika	16
Afrika	10
Südamerika	10
Europa	7
Australien	2

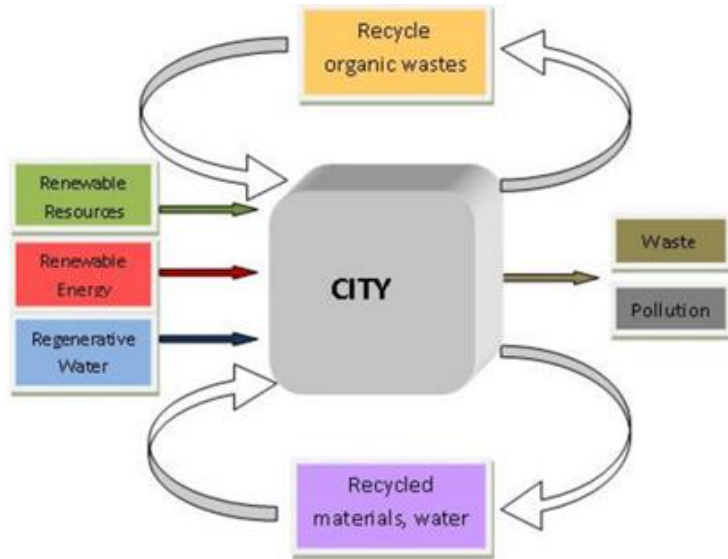
Source: World Urbanization
Prospects, UN, 2016

Source: UN City Census 2012

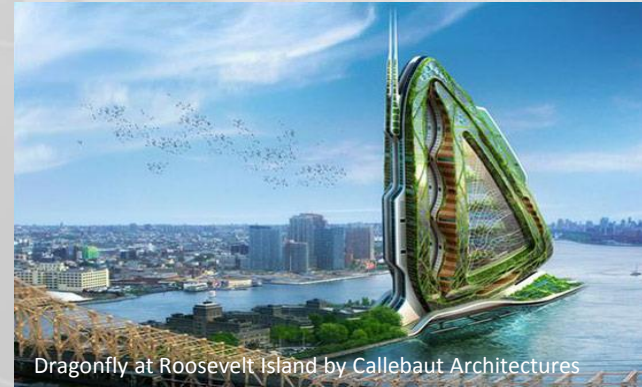
Population development

Urbanization

Agropolis > Petropolis > **ECOPOLIS**



According to Herbert Girardet



Biodiversity loss

Green pixels = at least 10km from the nearest road



Ecosystem
services
**16 - 64 billion
USD/a**

Source: Roadfree.org; According to study „A global map of roadless areas and their conservation status“, Ibisch, P.L., et. al., Science, Vol. 354, Issue 6318, pp. 1423-1427, 2016.

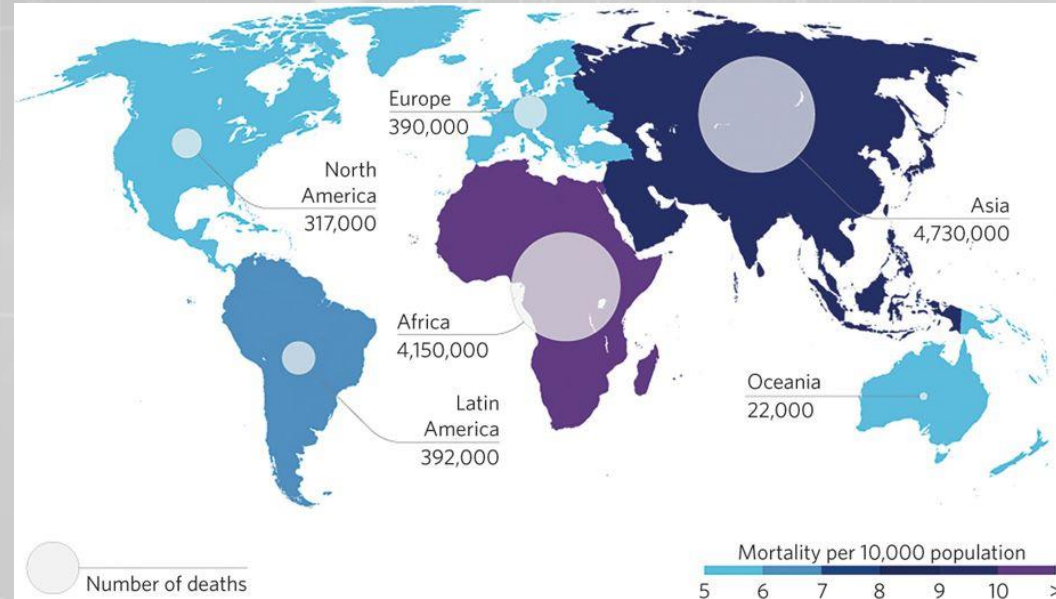
Pest & diseases – Resistance to antibiotika

Lost of
10% of global food production/a



Source: ah/Julius Kühnen Institut

Deaths attributable to AMR every year by 2050



Source: Nature.com adapted from „Combating antimicrobial resistance globally, Nature Microbiology, 2016

Resistance to antibiotica



Hog hotel Yaji Mountain, China



Photos: Reuters

	slaughtered weight (pigs & poultry) [1,000t]*	Antibiotica [t]**	Antibiotica/ slaughtered weight [t/1,000t]
China	75,500	84,000	1,1
U.S.	30,900	13,600	0,4
DE	7,400	800	0,1

* FAO, 2015

** 2013 by CAS, 2011 by FDA, 2015 by BMEL respectively

1/3 of global food is wasted (1.6 billion tonnes)

- 8% of global GHG emissions
- 25% of global fresh water use
- USD 1.2 trillion

Implications on food production

Exemplary...

- Scale of food production
- Meat substitutes
- Digitalization

Trend towards smaller scaled production systems



The Beer Trail: 8 New Microbreweries to Visit

By Mary Jane Weedman



Transmitter Brewing Photo: Miguel Rivas

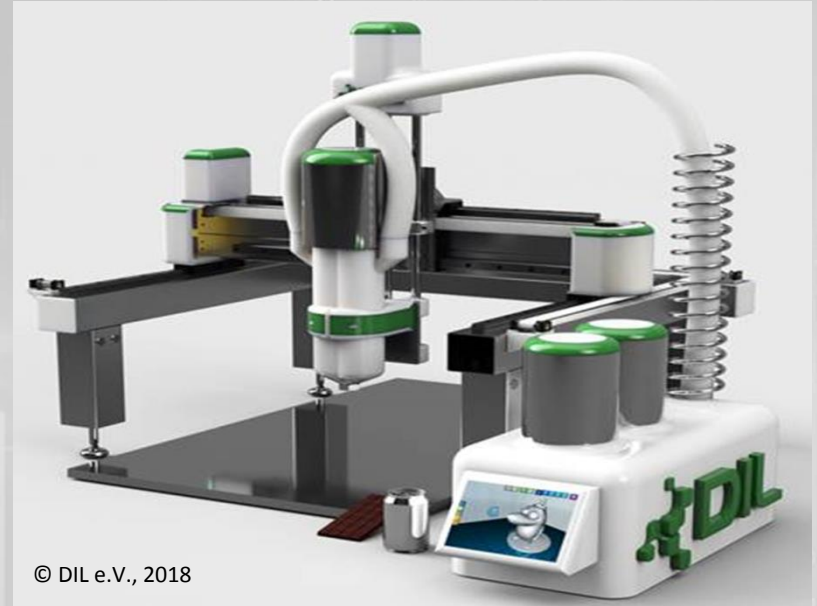
Brooklyn Brewery was just the beginning. Thanks to the rise of local microbreweries with on-site taprooms, its possible to embark on the hops-and-malt-driven equivalent of a wine-tasting weekend in Napa without ever leaving town.

Trend towards smaller scaled production systems



© DIL e.V., 2018

PEF (Pulsed electric field) systems
1t / hour

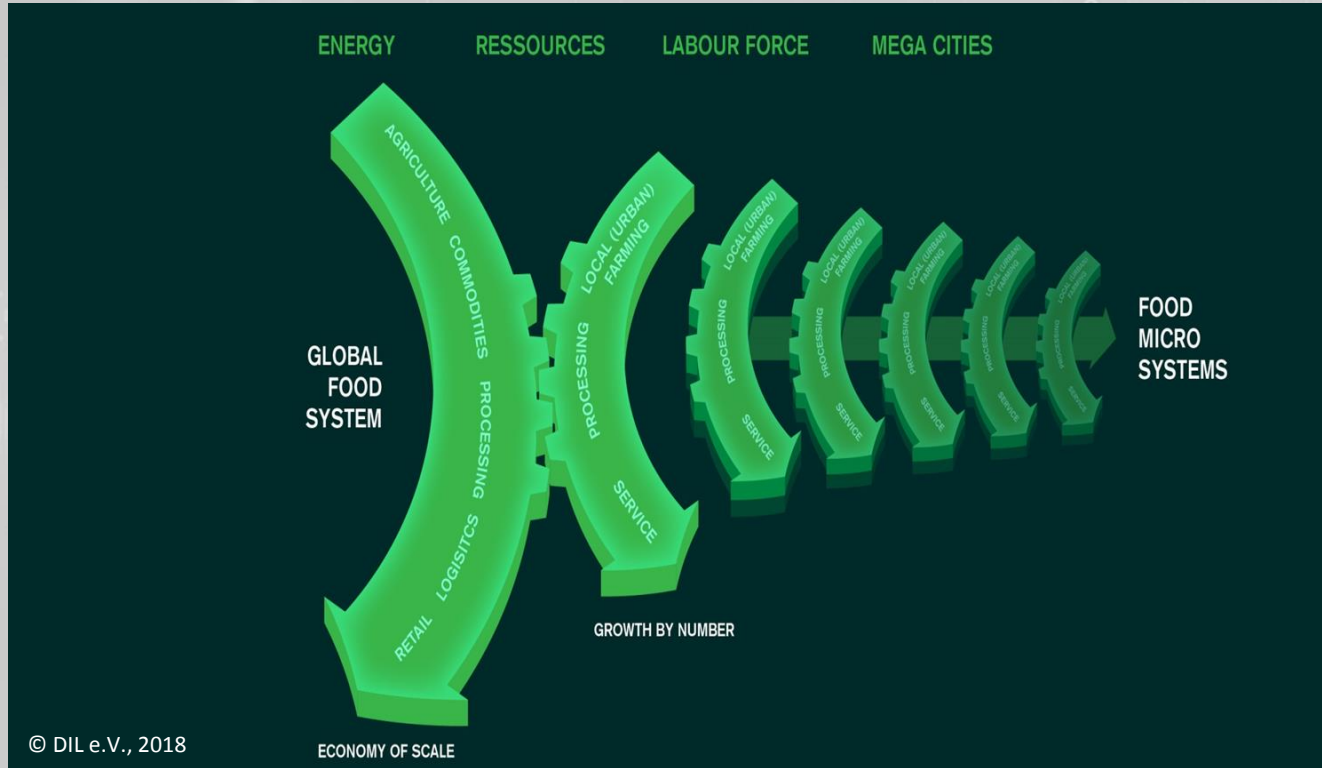


© DIL e.V., 2018

3-D printing – future food production?

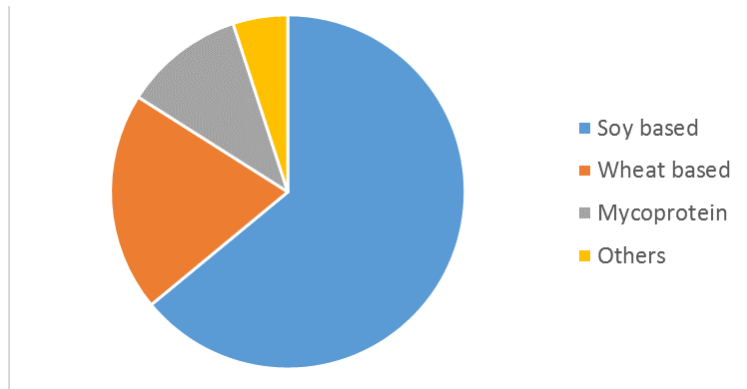
Food production

Coupling of food systems



Trend plant-based protein products

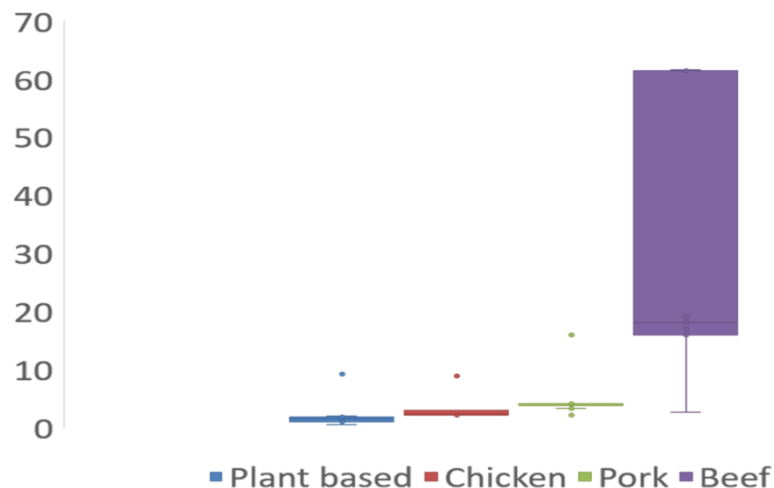
Global meat substitute market: Market share by source, 2017



Source: Modor Intelligence, Global meat substitute market, 2018

Market Size 2016:
USD 3.71 billion

Grounded meat (burger patty) kg CO2 eq./kg fresh weight



Smetana S. (DIL), 2017

Trend plant-based protein products



Durchschnittliche Nährwerte pro 100 g	
Energie	1337 kJ/320 kcal
Fett	18,0 g
davon gesättigte Fettsäuren	1,3 g
Kohlenhydrate	22,0 g
davon Zucker	3,7 g
Eiweiß	16,0 g
Salz	2,2 g

Protein

16,0 g

Fett

18,0 g

Energie

1.337 kJ

Preis/kg

9,25 €



100 g enthalten durchschnittlich:	
Brennwert	997 kJ (239 kcal)
Fett	15 g
davon gesättigte Fettsäuren	1,3 g
davon einfach ungesättigte Fettsäuren	9,6 g
davon mehrfach ungesättigte Fettsäuren	4,1 g
Kohlenhydrate	10 g
davon Zucker	3,5 g
davon Stärke	6,5 g
Eiweiß	16 g
Salz	2,3 g

16,0 g

15,0 g

997 kJ

16,91 €



Durchschnittliche Nährwerte pro 100 g	
Brennwert	1364 kJ 328 kcal
Fett	24 g
davon gesättigte Fettsäuren	8,5 g
Kohlenhydrate	15 g
davon Zucker	1,9 g
Eiweiß	13 g
Salz	2,1 g

13,0 g

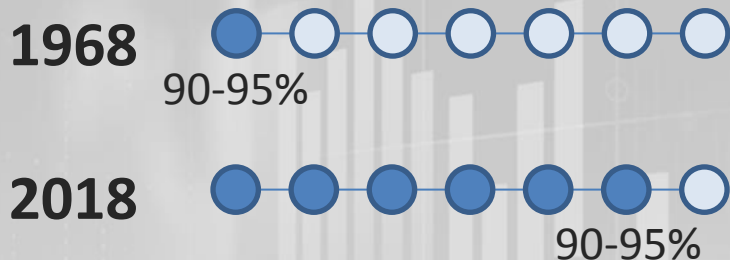
24,0 g

1.364 kJ

3,98 €

Digitalization

Accuracy wheater forecast (days)



Consumer convenience... photography

Roll film **1924**

Digital camera **1975**

> 90% digital cameras **2007**

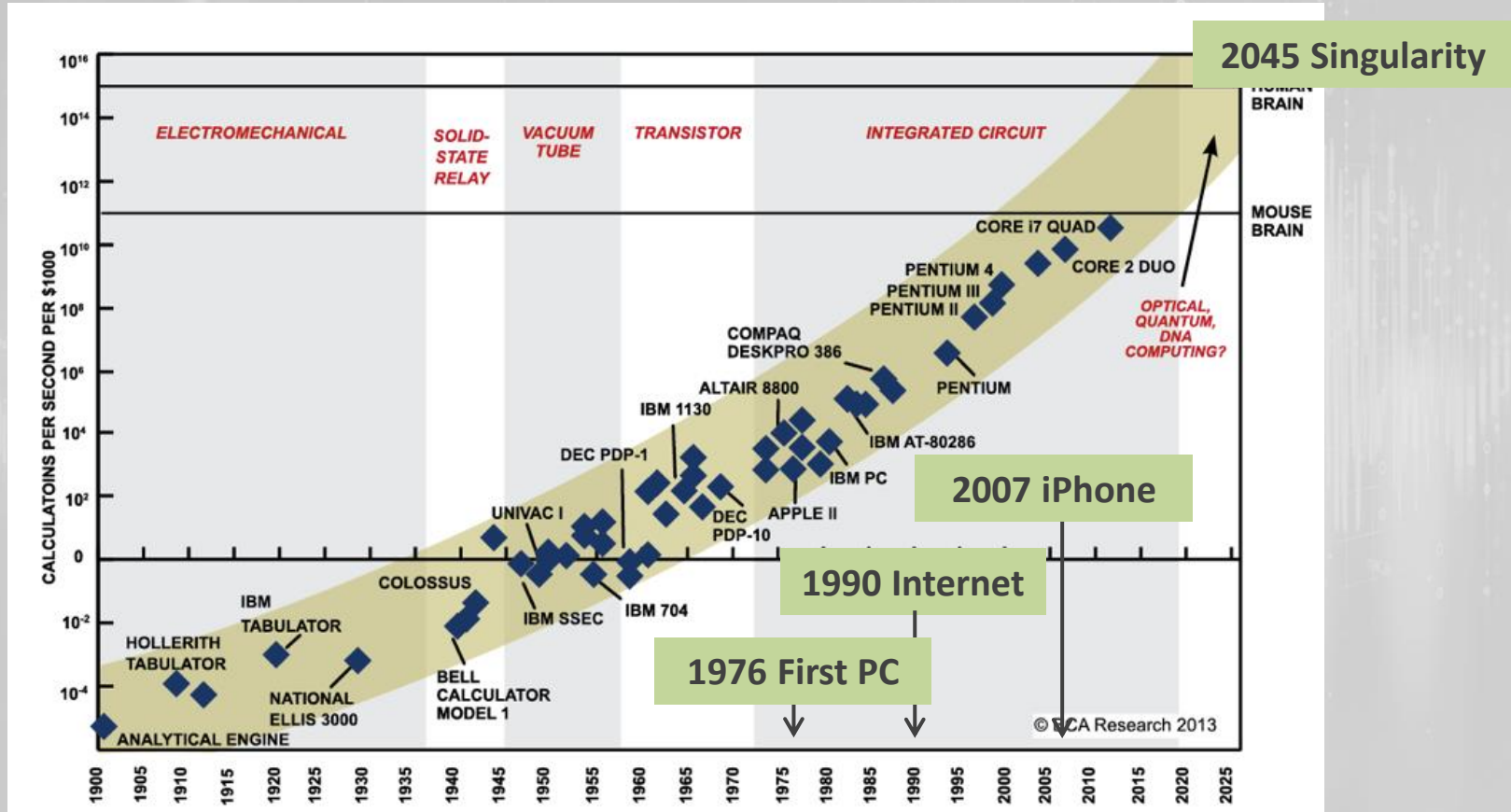
Action cameras **2018**



Digital revolution



Moore's law: integrated circuits would double in power every 18 months at constant price



Digital transformation



Blockchain

Transparency and Traceability

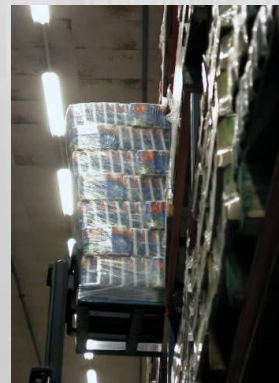


Data accuracy Supplier – retail

Depth 41%
Width 41%
Height 77%
Net Weight 37%
Gross Weight 11%



Study of GS1 Australia in
conjunction with IBM (> 3,000
products)
Photos: GSI Slovenia



Digital transformation

Digital Market Places

From E-commerce to Digital Ecosystems



Europe # 2 for grocery e-commerce

- 5.6% value share
- Top markets: UK, France, Czech Republic, Netherlands and Austria

Click & collect

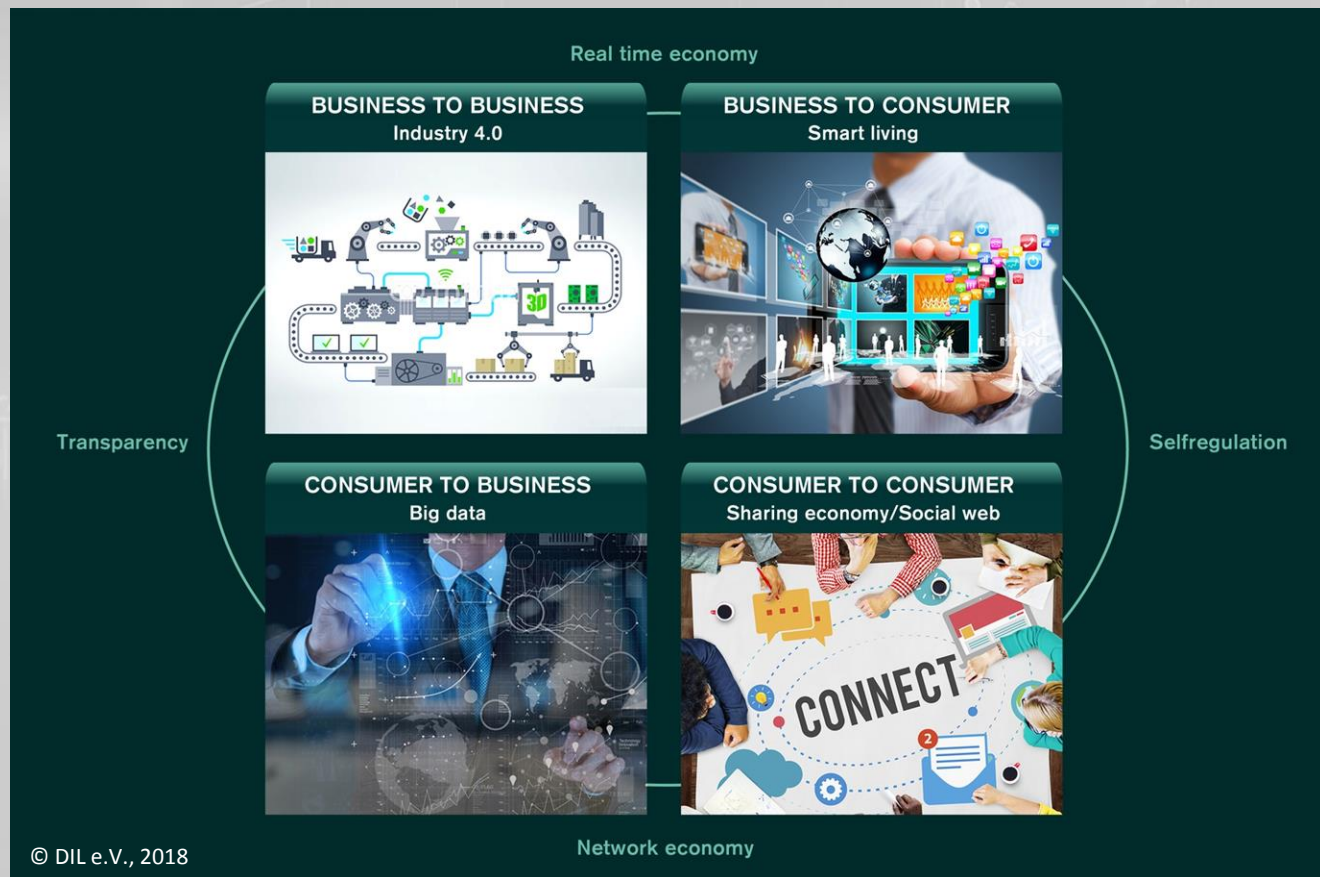


Source: Epta

Home delivery



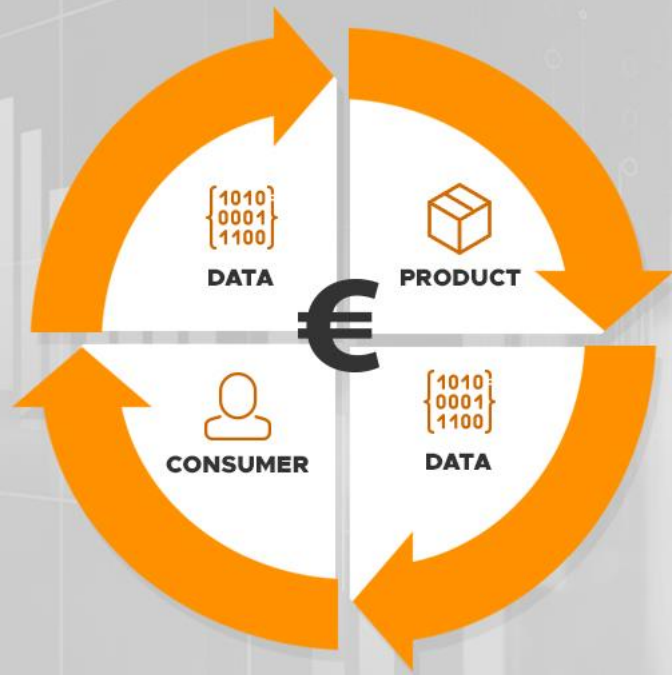
Digital transformation



Digital transformation



TODAY



2030

DISCOVERING MEGA TRENDS IN FOOD

NEXT IFOOD CONFERENCE

ANUGA, COLOGNE,
7 OCTOBER 2019

*"A HIGHLY REGARDED NETWORKING EVENT
FOR FOOD TECHNOLOGISTS, MANUFACTURERS
AND RETAILERS..."*



DIGITALISM



CHALLENGING
GLOBAL VALUE
CHAINS



SUSTOLOGY



INNOVATION
SCHEMES