

# Managing complexity with RRI and system thinking

**Is Responsible Research and Innovation enough?**

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Co-coordinator of the Barcelona "la Caixa" Living Lab

Cherries, December 2020

# Our model of civilization is mainly defined by R&I

...and it is not sustainable



# Respond to persistent & complex societal challenges



## SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



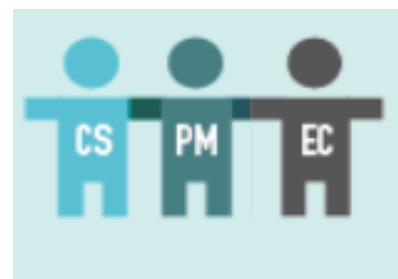
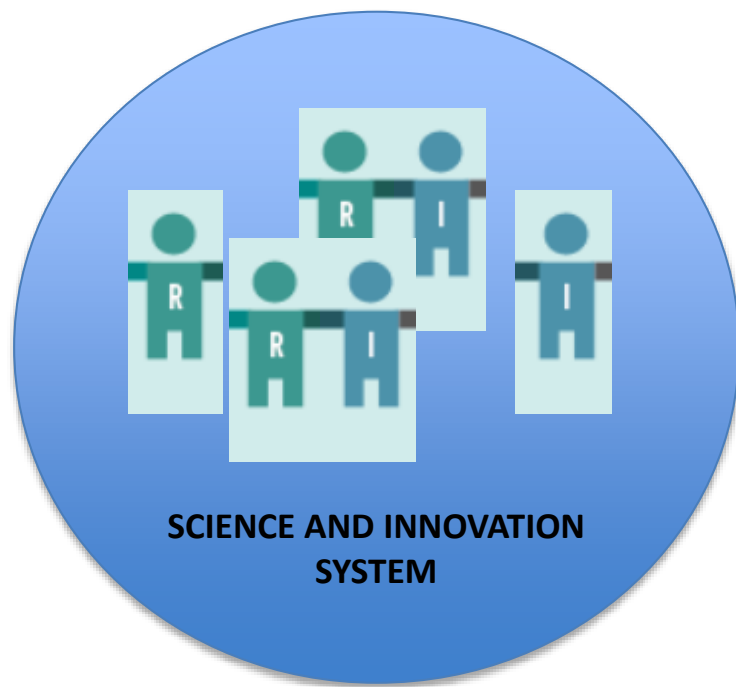
- Different solutions, different definitions of problem
- Involve different disciplines and stakeholders
- At local and global level
- Complexity at c-t level vs at c-t & social

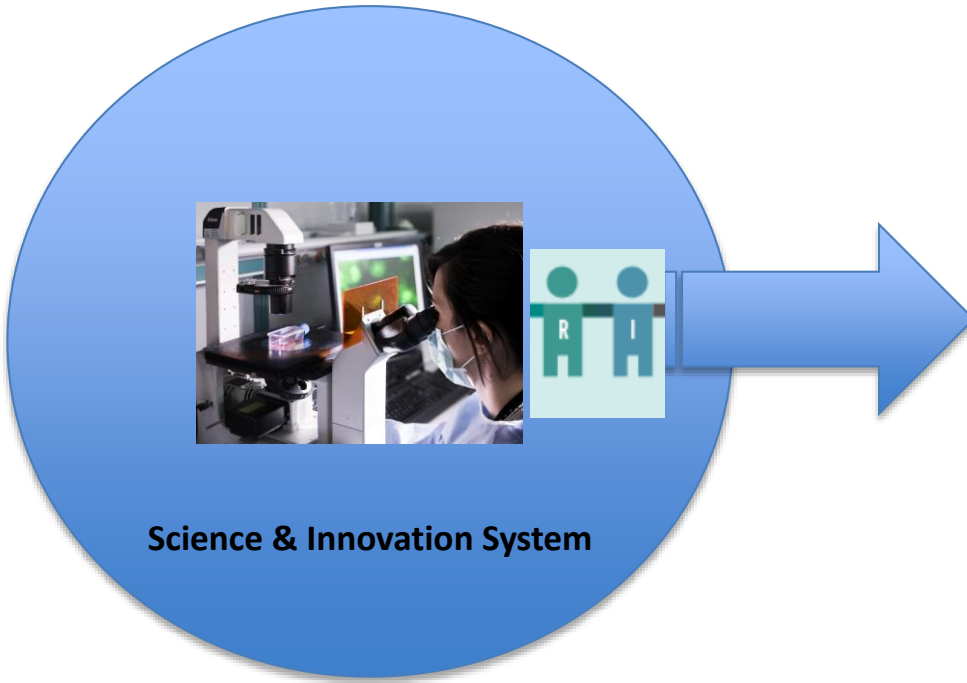
# CHANGE

New form of problem solving

# New model of relationship between R&I and stakeholders

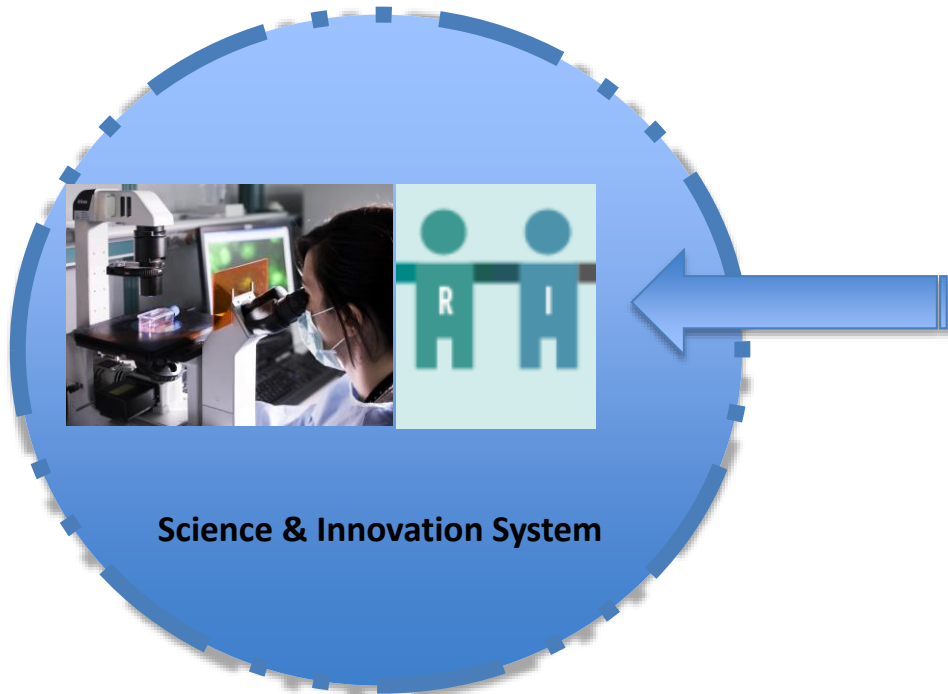
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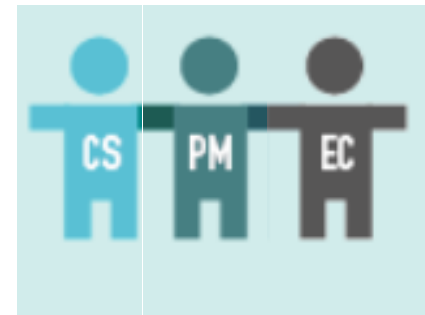


# Responsible Research and Innovation

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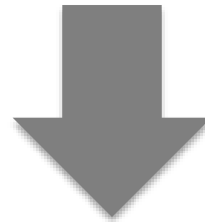
**Science & Innovation System**



**SHARED RESPONSIBILITY  
DURING THE R&I PROCESS  
(DIALOGUE FOR HIGHER IMPACT)**

Impact towards different stakeholders not only patients or citizens!

# Intermediary structures between R&I and society



## Social Impact





## **Patient Experience**

Patient and Public Involvement in R&I (PPI)

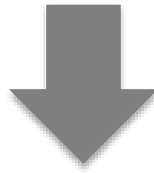
User engagement    Transdisciplinary research

## **Open Science & Open Innovation**

Science in Transition    Community Based Participatory Research

Responsible Research & Innovation    Design oriented research

Design thinking



## **Social Impact**

# DEFICIT MODEL

**“We have efficacy at individual level and  
inefficacy at system level”**

René Von Schomberg, EC, Bdebate, October 2018

# RRI definition

"Responsible Research and Innovation is a transparent, interactive process

...by which societal actors and innovators become mutually responsive to each other

...with a view to the (ethical) acceptability, sustainability, and societal desirability of the innovation process and its marketable products

...(in order to allow a proper embedding of scientific and technological advances in our society)"

Von Schomberg definition, 2011



**RRI Tools:**  
towards RRI in action  
[www.rri-tools.eu](http://www.rri-tools.eu)

**RRI Tools. Fostering Responsible Research and Innovation**

FP7-project RRI Tools will develop a Training and Dissemination Toolkit for fostering Responsible Research and Innovation. The EC has identified seven so-called Grand Challenges society is facing today, and research and innovation are expected to significantly contribute to meeting these challenges. However, research and innovation practices themselves require modifications, for instance because they often fail to address societal needs, have open implementation gaps, or spark controversy. Thus, the EC has put forward the notion of Responsible Research and Innovation, or RRI, to simultaneously address both society's Grand Challenges and shortcomings existing in research and innovation practices. This policy brief provides a working definition of RRI and reports on the state of the art in responsible research and innovation.

**RRI Tools – background and aims**

Science and technology have proven to be transformative forces throughout history. Today they have granted humans the capacity to alter ecosystems and the Earth's climate and even to manipulate the building blocks of life itself. Research and innovation have changed our world and our lives, and will continue to do so. However parallel to the large positive impacts on human welfare and wellbeing that science and technology have had and probably will have, they also create new risks and ethical dilemmas, do not always succeed in solving the problems they are meant to, and sometimes spark controversy.

Over the last few decades many experiments have been done that aimed at decreasing the distance between science and society. For instance, in various public engagement exercises the public has been involved in discussions and policy decisions regarding science; collaborations between sciences, ethics and social sciences have been set up; experiments have been done with open source research data, user-driven innovation, citizen science, and much more besides.

These efforts have led to a European-wide approach in Horizon 2020 called Responsible Research and Innovation. RRI seeks to bring issues related to research and innovation into the open, to anticipate the consequences of research and innovation, and to involve society in discussing how science and technology can help create the kind of world and the kind of society we want for generations to come.

In five years time RRI Tools will develop a Training and Dissemination Toolkit concerning responsible research and innovation and put it to use through a Community of Practice. The toolkit will consist of a set of tools intended for a variety of users: raising awareness about RRI and raising, implementing and disseminating RRI in Europe. A multi-stakeholder consortium with 26 partners operating in 30 European countries will develop and continuously optimize the toolkit. RRI Tools will educate policymakers, researchers, life sciences industries, civil society organizations (CSOs), and science educators at national and regional levels, spreading RRI throughout society.

**FACTS ON RRI TOOLS - Fostering Responsible Research and Innovation**

**GOAL**  
Propagating 'responsibility' in the governance of science and technology, ethics and privacy, by making and disseminating a free Toolkit for policymakers, researchers, innovative industries, CSOs and educators.

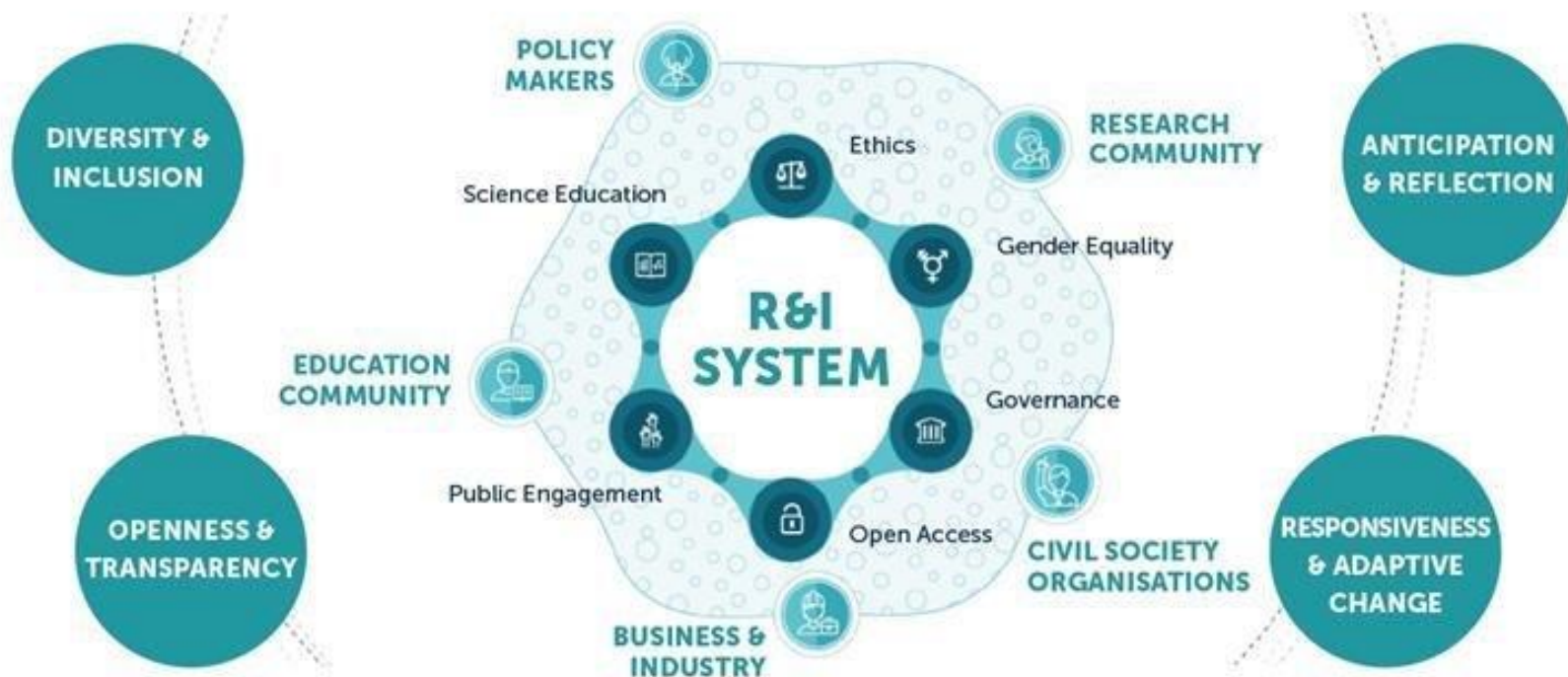
**COORDINATION**  
'La Caixa' Foundation

**PARTNERS**  
26 institutions, active in 30 European countries

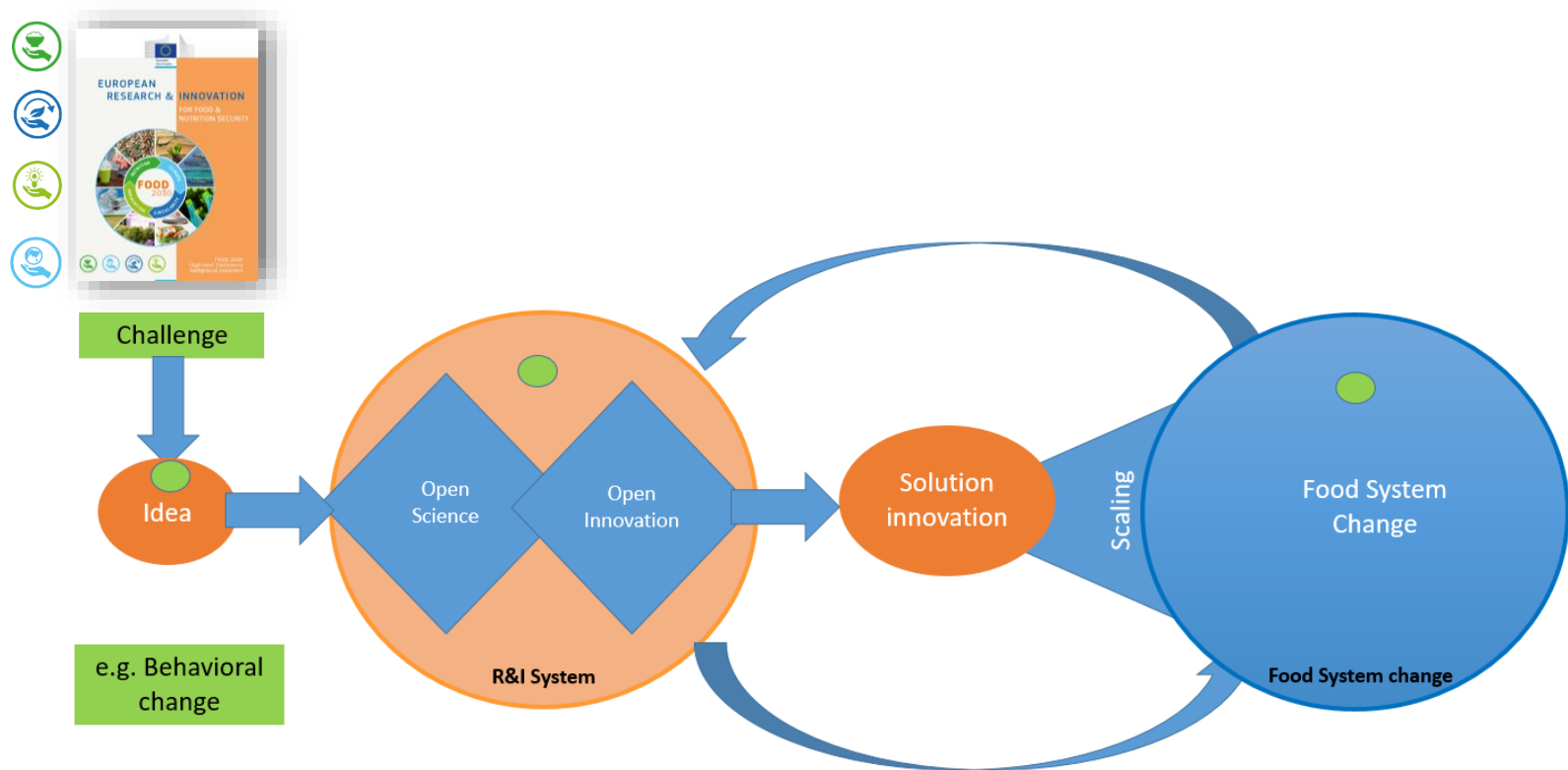
**DURATION**  
5 years (01/2014 - 12/2018)

**BUDGET**  
€ 9 million

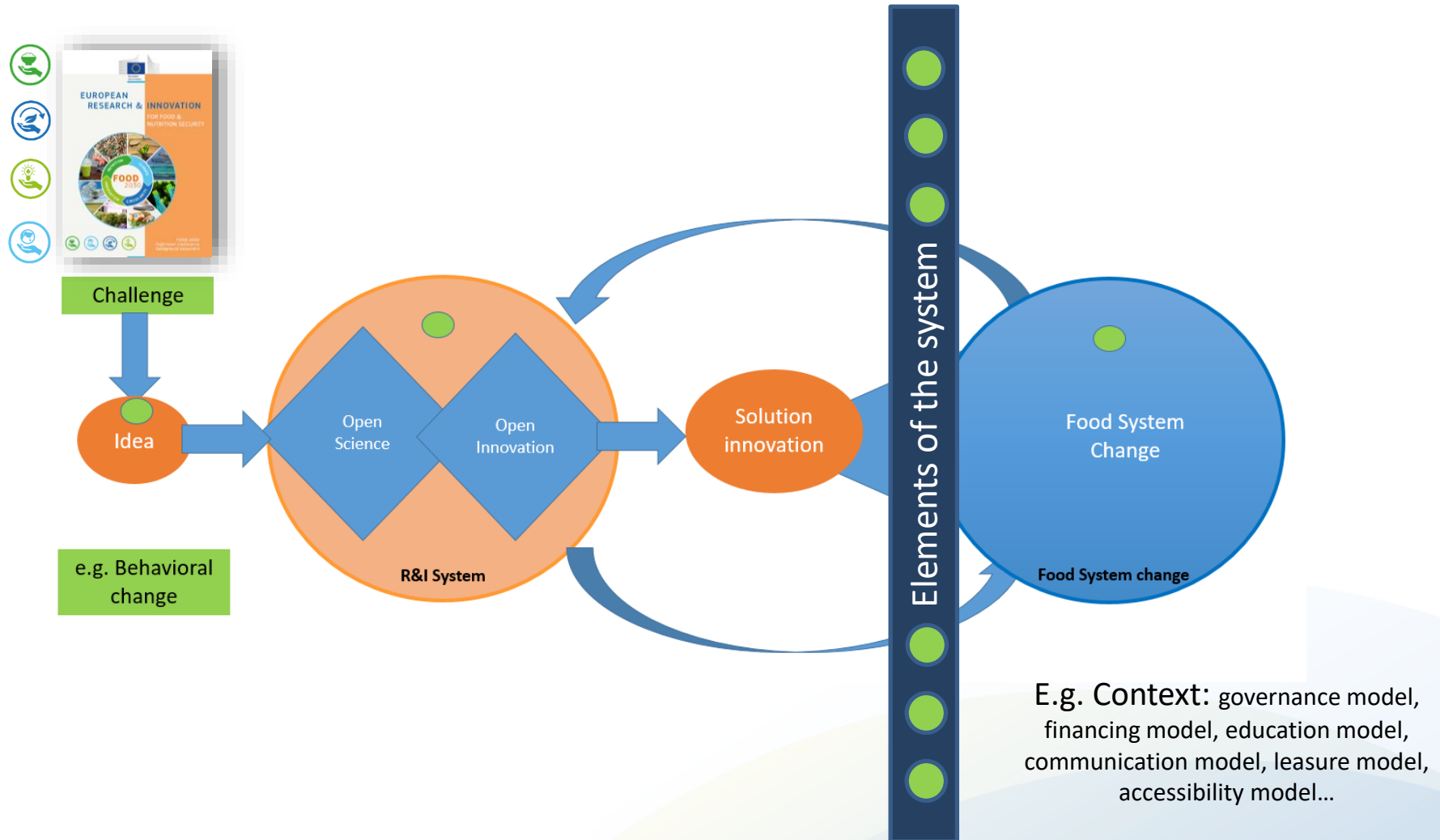




# The current paradigm: R&I with and for society

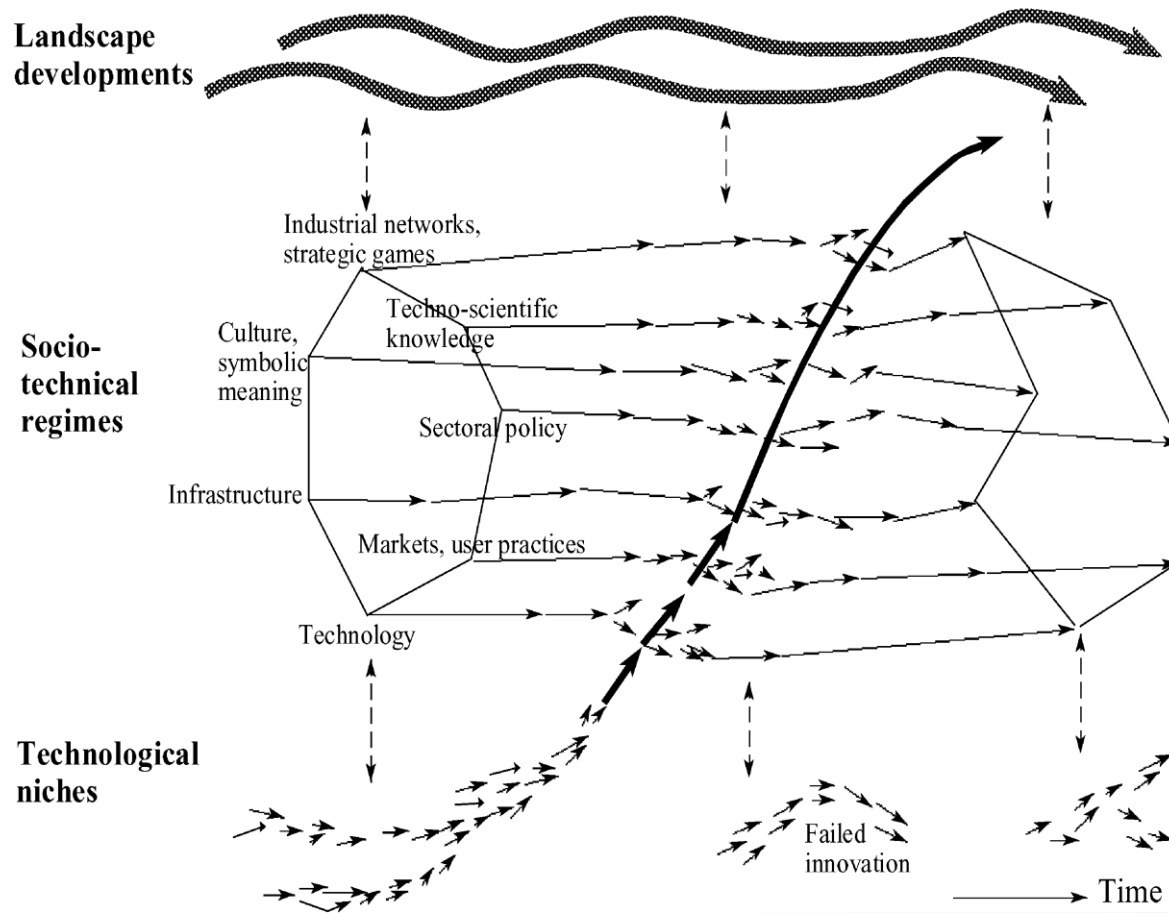


# The current paradigm: R&I with and for society



# MULTI-LEVEL PERSPECTIVE IN TECHNOLOGICAL TRANSITIONS

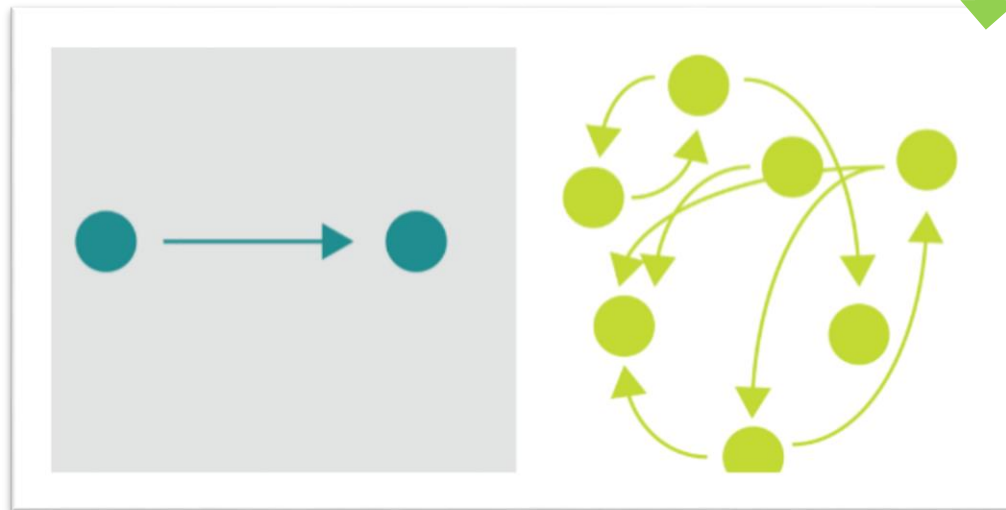
## Transdisciplinary complexity





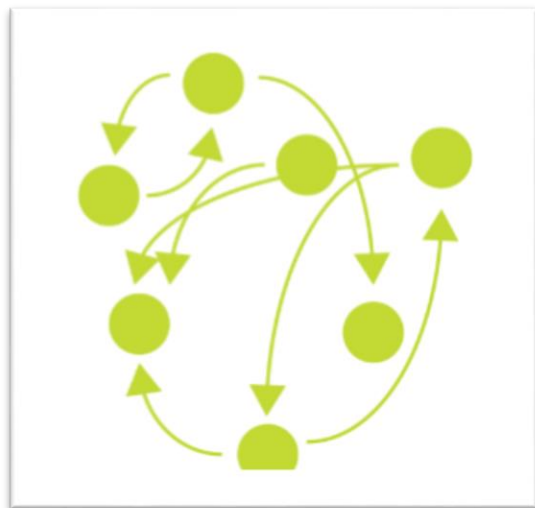


# Complicated vs complex



Elements of the system

# Complexity of the system



1.Challenges

2.Areas and phases

3.Geographical levels

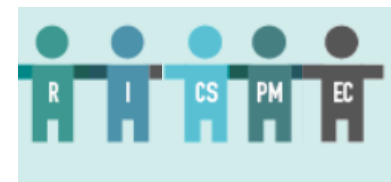
4. Organizational levels

5.Academic disciplines & R&I lines



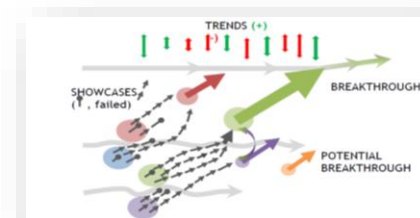
Stakeholders

Solutions



Change:

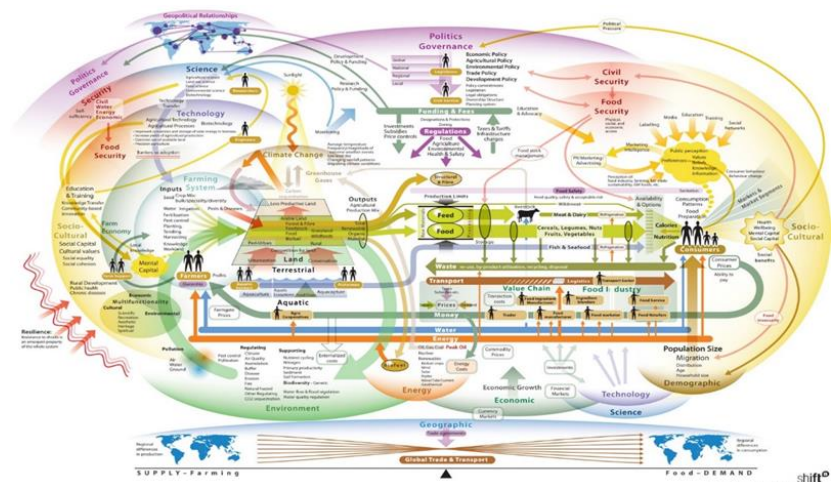
- Trends
- Showcases
- R&I



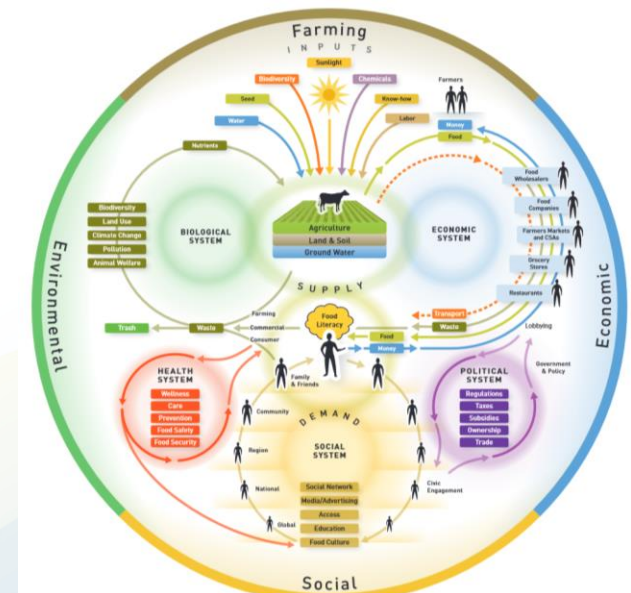
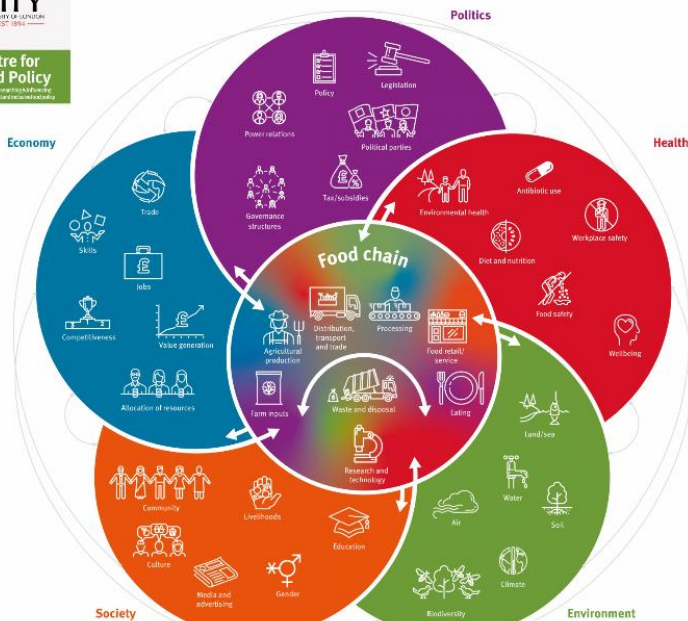
# How can we manage complexity?



# How can we explain complexity?



## The food system

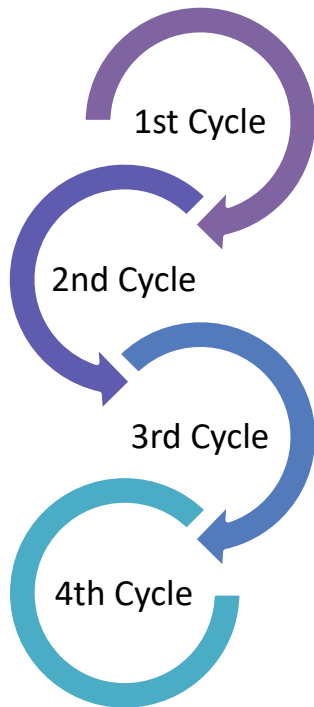




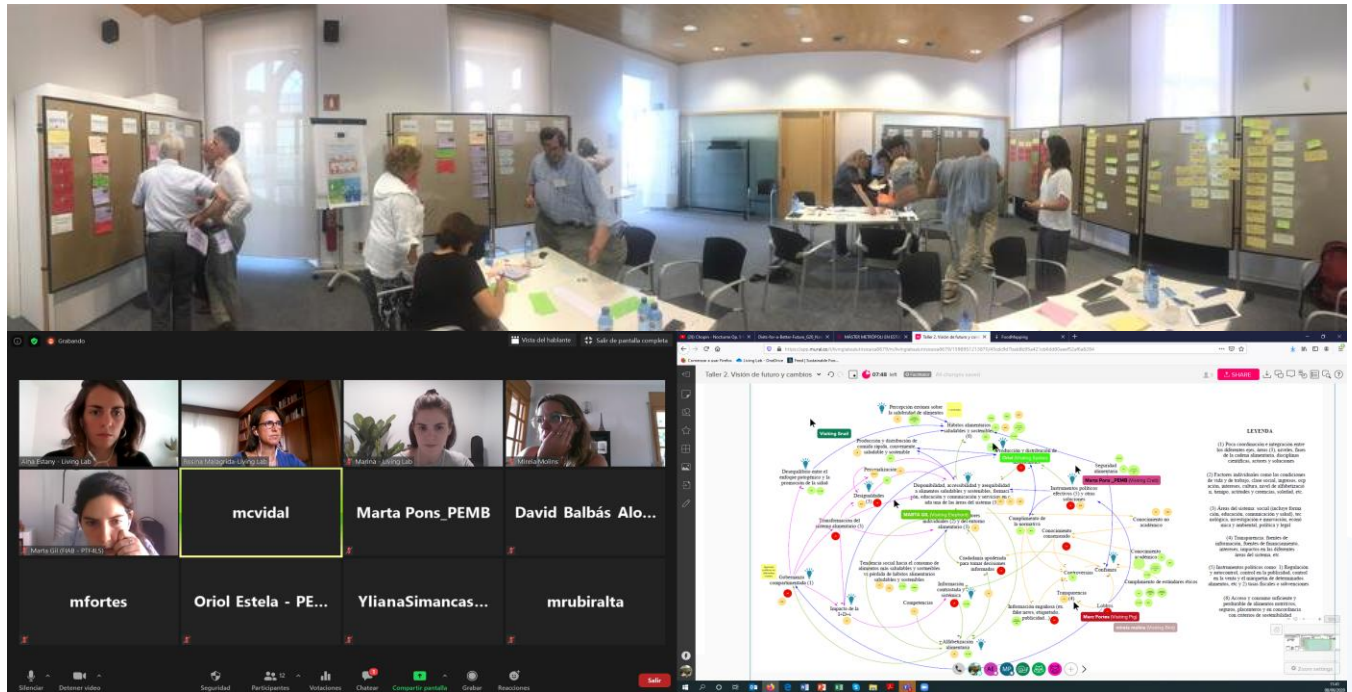
# CHANGE

New ways of problem solving

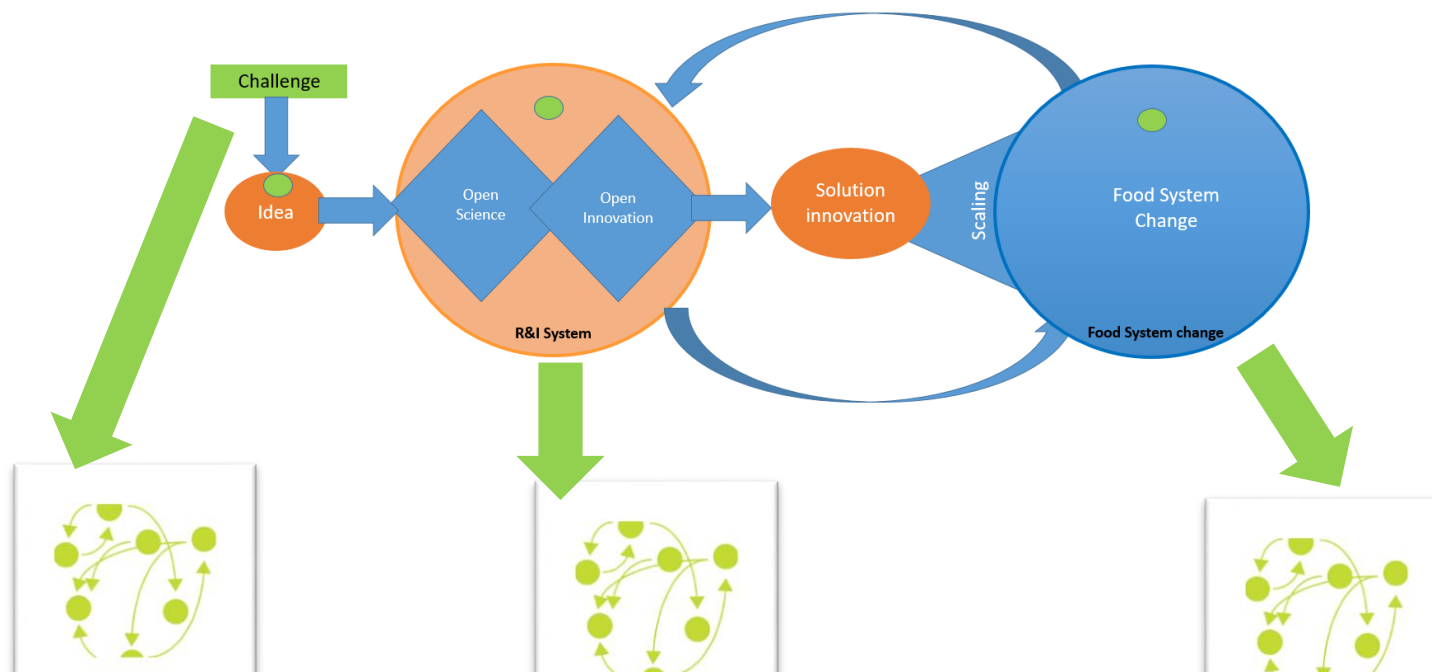
## COMMUNITY OF PRACTICE



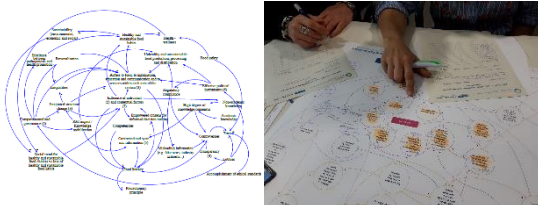
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1. **Process:** dynamic, iterative, mutual learning around complexity
2. **Strategic reflection** at organizational and collective level
3. **Focus on systemic change:** Changes in strategies of organizations and collective strategies with more **systemic solutions**



## System knowledge



**1. Why is it so difficult to solve the challenge?**

Key factors and dynamics that hinder change

## Transformation knowledge



**3. Where is it necessary to promote change? How is change happening?**

Changes in current strategies and collective strategies

## Target knowledge



**2. What do we want to achieve?**

Future shared vision

# SYSTEMIC INNOVATION



Nutritional  
interventions i.e.  
by pediatrics

Feeding  
centre

Communication  
channel

R&I

Changes in existing practices & new practices  
to take into account complexity

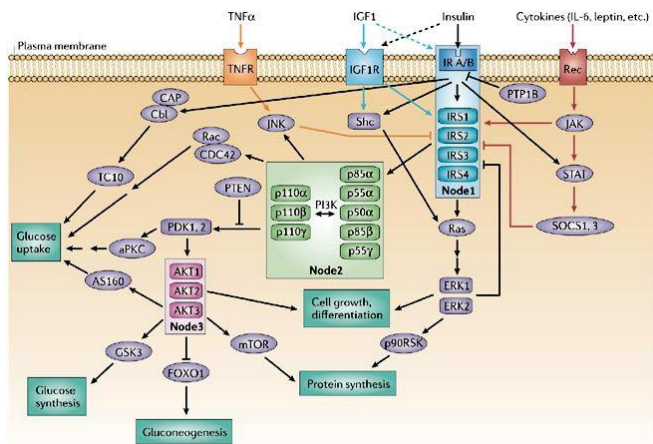


# How to transform the R&I system?

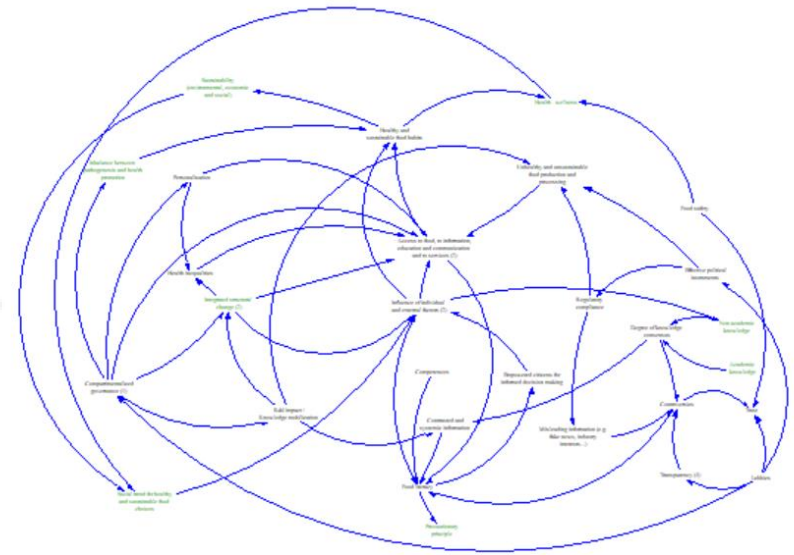
Inspiration from different movements...



# Mapping nature and mapping complexity for change (at TD)



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“Missions must include new conversations between **fundamental research**, **applied research** and **cutting-edge innovation**”, Mazzucatto, 2018.



# Thank you!

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