

A procedure to approach
interdisciplinary issues
in One Health initiatives

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OUTLINE

- WHY OUR APPROACH
- MAIN IDEA WITH OUR APPROACH
- OUR “GLOSSARY”, some DEFINITIONS
- COGNITIVE PROCESS - GROUP WORK

WHY

- need to simplify
- need to find methodologies to get together different expertises and disciplines
- need to visualize a system and the connections within each part of it
- Need a common language (eg among - policy makers –scientists – different stakeholders -...)
- Need to describe needs (eg to ask for resources)

MAIN IDEA

- not the only possibility, one of the possibility
- Mainly it's a «OPEN» exercise
- We wanted to understand the cognitive process and mechanisms behind interdisciplinarity needs / hybridization of knowledge

OUR “GLOSSARY”

- SYSTEM
- SYSTEM BOUNDARIES
- HYBRIDIZATION OF KNOWLEDGE
- KNOWLEDGE MATRIX

- **system** as “a set of elements so interconnected as to aid in driving toward a defined goal.” (Whitehead et al. and Gibson et al.).
- **system boundaries** depends on scientific, economic and organizational constraints (i.e. existing knowledge, available resources, institutional limits), which can all be considered exogenously, determined at a first stage of the exploration but might change over time also in relation to the result of the cognitive process

Hybridization of knowledge

knowledge matrix;

Knowledge	Expertise	Advancement in knowledge	Method
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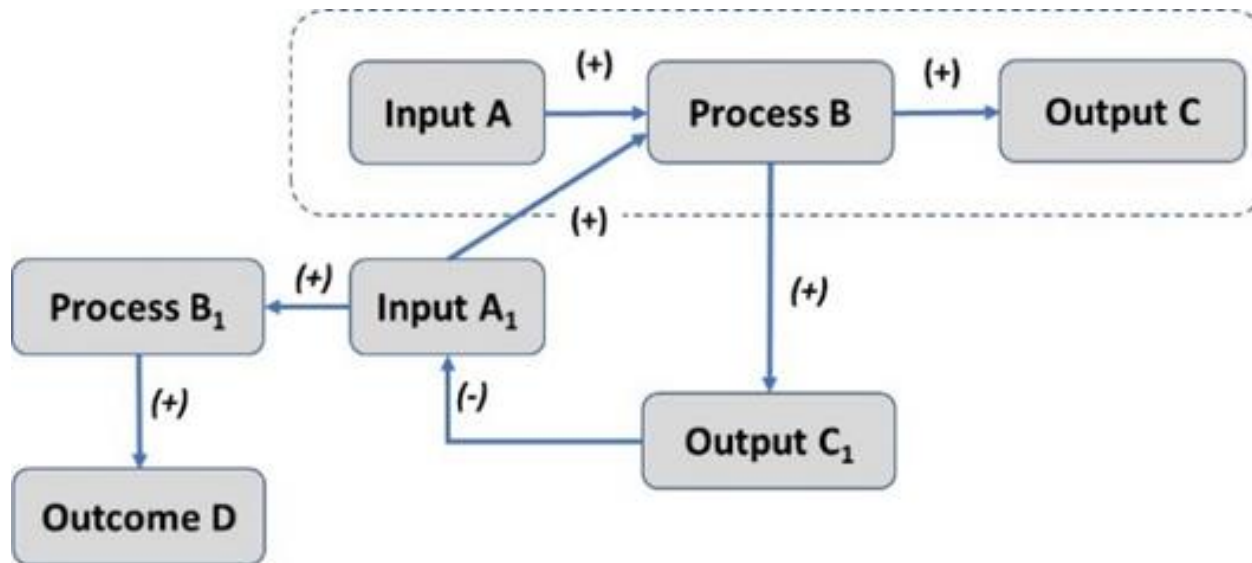
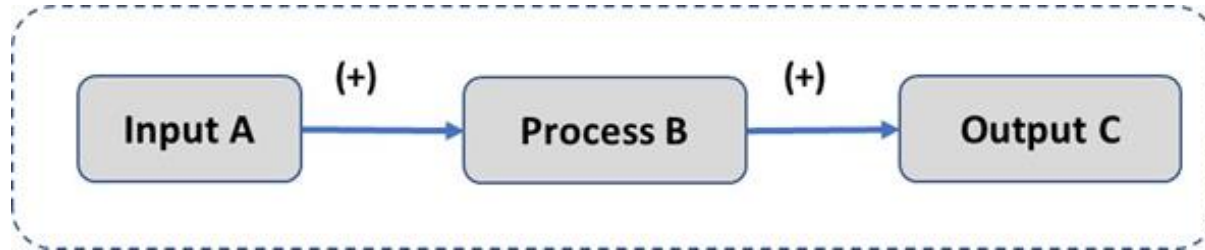
hybridization process

TEAM MEMBER	MAIN KNOWLEDGE	MAIN EXPERTISE	ROLE IN THE TEAM
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association between **each knowledge** and **team member's role** in the identification and understanding of the system.

- (i) the domain of expertise
- (ii) the advancement in knowledge it creates
- (iii) the method(s)

Original problem + ways of expansions

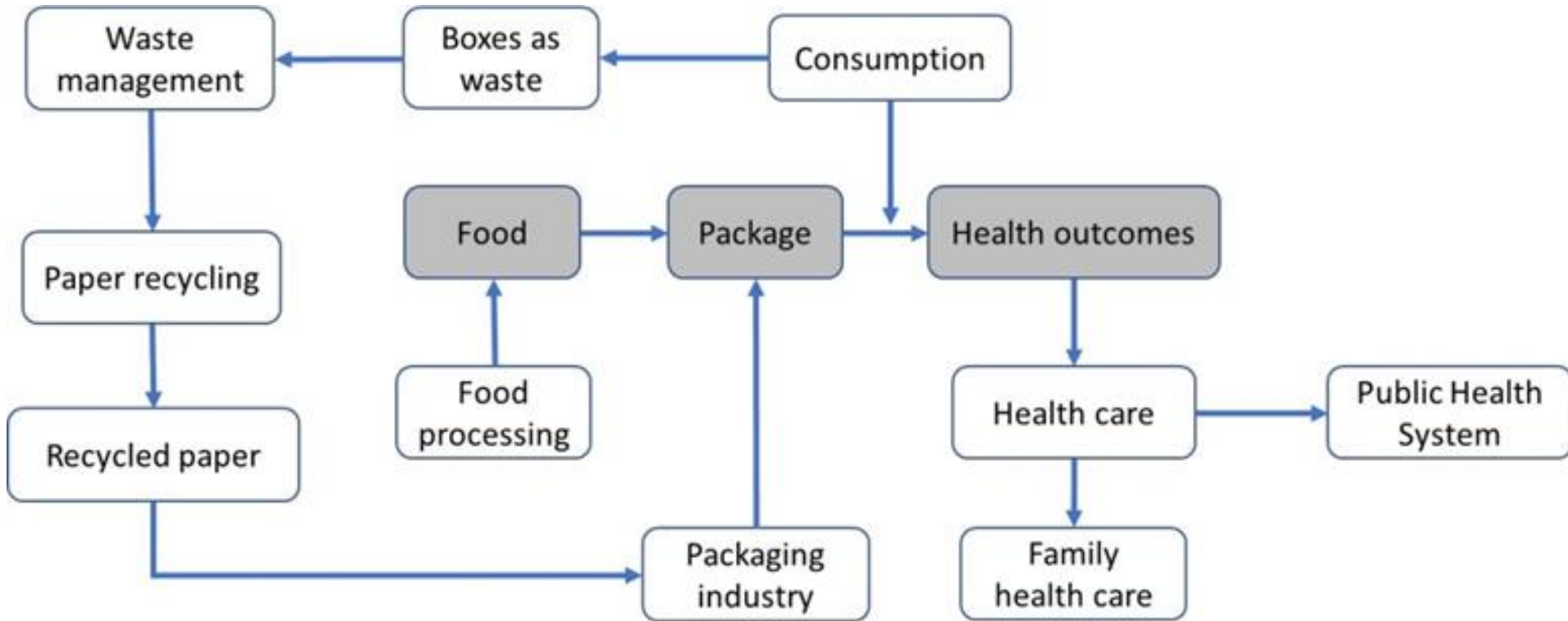


MAIN IDEA WITH OUR APPROACH

- Cognitive system / hybridization of knowledges / use of existing methodologies / identification of needed expertises
- Identification of the system, its boundaries and the question to solve (eg food packaging)



Adding elements – giving a context



Knowledge matrix

Knowledge	Expertise	Advancement in knowledge	Method
Food technology	Process engineering	Explain the causes of C_1	Production process analysis
Environmental science	Environmental externalities	Explain the relationship between C_1 and A_1	Bio-chemical analysis
Health institutions	Human health	Explain output D due to A_1 on humans through process B_1	Epidemic and clinical analysis
...

IN BRIEF MAIN STEPS we suggest:

SYSTEM AND BOUNDARIES

TEAM WORKING team member/main expertise/main knowledge/role/

GOVERNANCE

DEFINE RELATIONSHIPS in the SYSTEM and WAYS OF EXPANSIONS

what should be known more about the problem?

how can this be done?

Knowledge matrix (what is needed)

Knowledge /expertise/advance in knowledge /methods

Hybridization of knowledge **methods + expertise/knowledge**

EXAMPLE OF COMPLEX PROBLEM

TO SOLVE IN THE SYSTEM:

- health outcomes (the **DEHP exposure from recycled packaging** – consume of take away pizza by pregnant women
- the endocrine disrupter effect of DEHP and, as endpoint biomarker of testicular dysgenesis syndrome
- possible **increase of infertility in male adults**
- waste in the environment – **animal health**
- **Economy and sustainability** recycled packaging



Possible future contribution to DALY INFERTILITY – SUBFERTILITY in Danish MEN population



DEHP: total migration value :
271 $\mu\text{g}/\text{dm}^2$ (3 fold uncertainty)
(Pieke et al., 2017)



Danish fertile women age
15-49 consuming pizza
(DANSA data)



AGD decrease in men population and sperm
count decrease – epidemiological study and dose
response curve (Mendiola et al., 2011)



Urine methabolites deriving from DEHP exposure
and relationship (dose response curve) with
decrease of AGD in male newborn (Swan et al.
2015)

+ animal health / sustainability / social science / ...

MATRIX OF KNOWLEDGE – FOOD case study

Knowledge	Expertise	Advancement in knowledge	Method
Human medicine	...Medical doctor,	...disease occurrence from DEHP exposure	Health outcome tree DEHP
Toxicology, Risk assessment	Toxicological analysisDose response curves	... Burden of disease model ;
Food package technology	Process engineering	Level of DEHP in pizza package, as result of the producing process	Analysis of production process
Recycling paper technology	Process engineering	Transmission of DEHP through paper recycling process	Analysis of production process
Consumption models	Supply chain analysis Demand analysis	Consumption habits of packaged pizza	Socio-economic analysis of food consumption by social categories ; burden of disease model
Health economics	Economic evaluation	Identification of public and private cost	Cost analysis methods, cost-benefit analysis

TEAM working members and expertise – **iterative exercise**

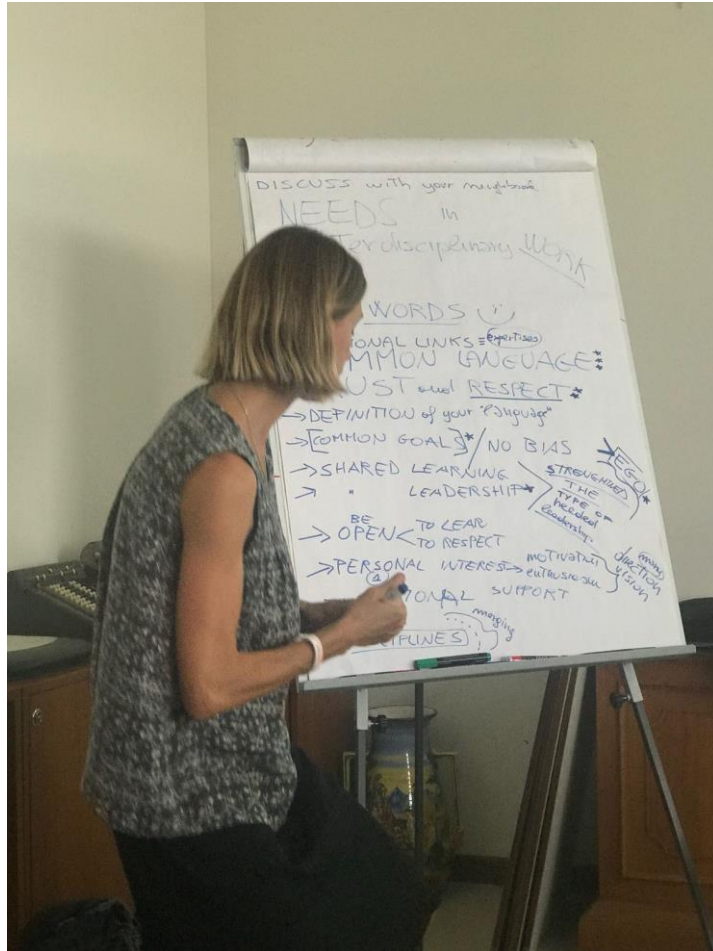
Team members	Main knowledge	Main expertise	Role in the team
EB	Human /Environmental Chemical Risk Assessment – Toxicology –	Toxicologist – Chemist – Endocrine disrupters expert	Exercise author
MA	Agro-food economist	Supply chain analysis Economic evaluation	Exercise author
MC	Agro-food economist	System evaluation	Exercise author
ML	Food hygiene	Shellfish control	Exercise author
RE	Governance - practical application in the field	Health control policies	Exercise author
...PF	Sustainability, life cycle assessment	Sustainability evaluation	External reviewer
...SP	Risk Benefit analysis	Burden of disease analysis	External reviewer

GROUP WORK example 2



case studies coming from the participants
Building together the system and knowledge matrix
different perspectives , how to build a figure/protocol
where models from different disciplines are used and
combined and how experts interact

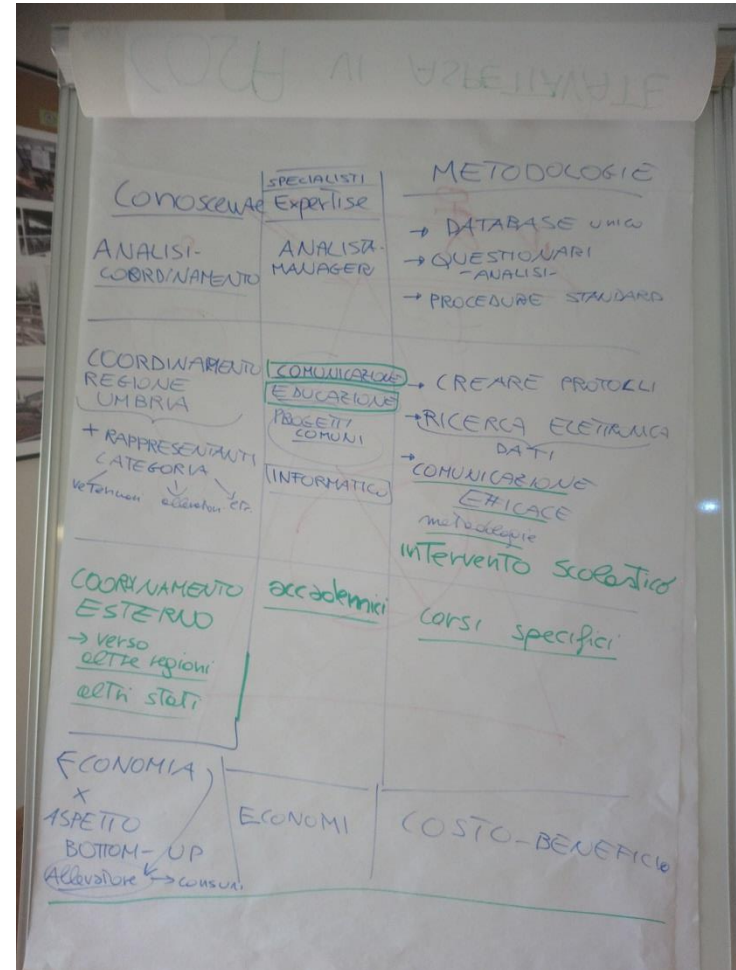
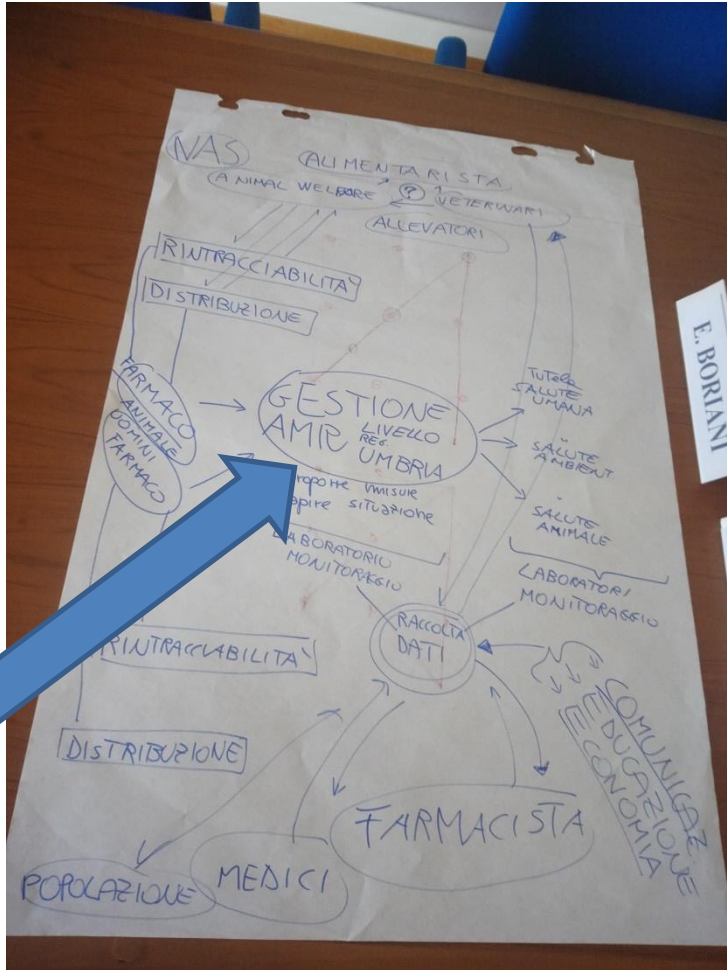
GROUP WORK (1.0)



NEEDS for interdisciplinary work

Group discussion in the class
after small discussion
2/3 person

GROUP WORK (1.1)



Knowledge matrix



Problem to solve

THANKS 😊

- QUESTIONS
- OPINIONS
- WANT TO COLLABORATE
TRY YOUR CASE STUDY
ORGANIZE A WORKSHOP?

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