



TD1203



DEPARTMENT OF LAW PHILOSOPHY  
AND ECONOMIC STUDIES



SAPIENZA  
UNIVERSITÀ DI ROMA

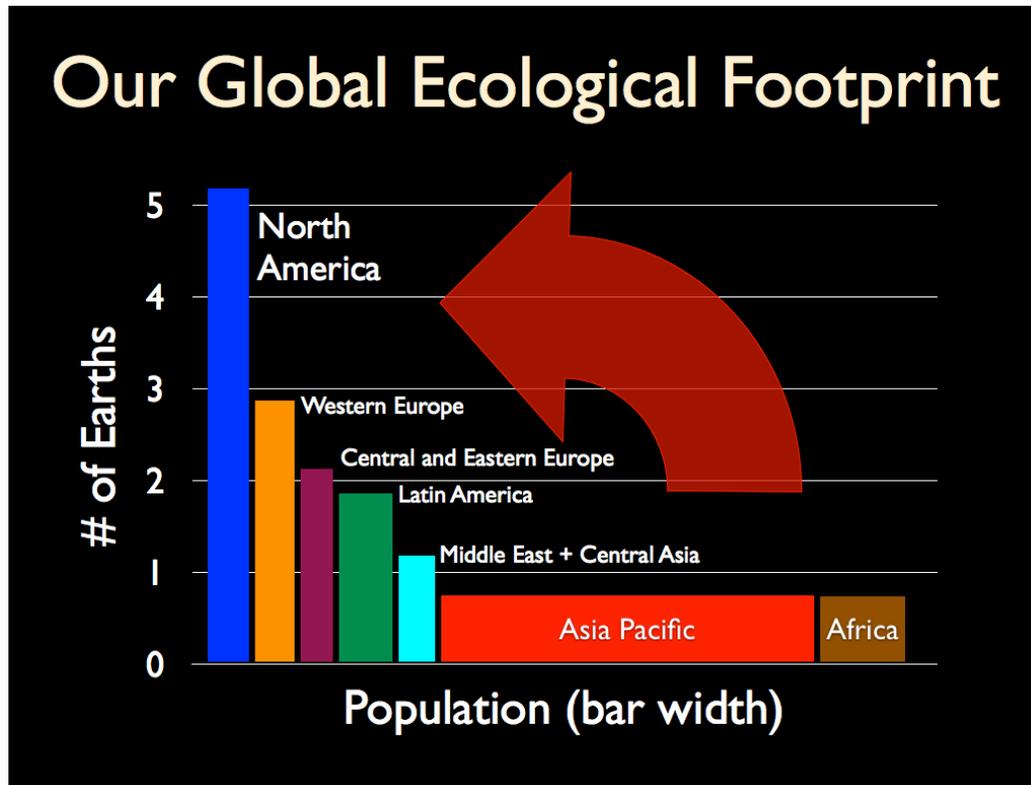
Piergiuseppe Morone  
Valentina Elena Tartiu  
Pasquale Marcello Falcone

## **SOCIAL NETWORK ANALYSIS OF THE BIO-BASED PRODUCTS MARKET** *A focus on bioplastic production network in Italy*

**BIOREFINERY FOR THE PRODUCTION OF ENERGY AND BIO-  
BASED PRODUCTS**

**29 – 30 October, 2013 – Turin, Italy**

# World trends at a glance



## Ecological Footprint

accounts estimate how many Earths were needed to meet the resource requirements of humanity

This **global assessment** shows to what extent humanity is in ecological overshoot

**Overshoot** is possible in the short-term because humanity can liquidate its ecological capital rather than living off annual yields

# Sustainability Transition

- A socio-technical transition adds to more than just the occurrence of an **innovation**



**Fossil Fuels economy**



vs.



**Bio-based economy**

- It is characterised as a **coupled** dynamic of **selective pressures** and **technological innovation(s)**

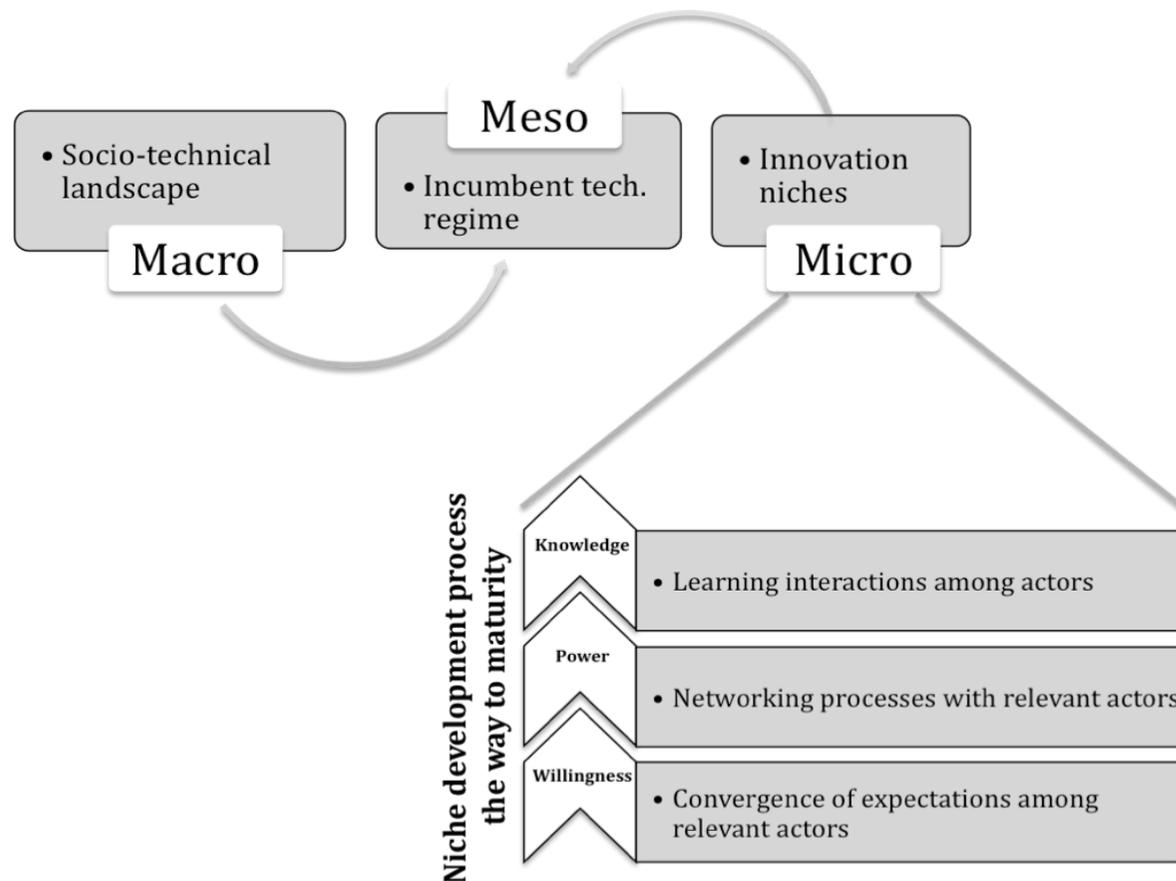
# The multi-level perspective

Changes can only occur if:

- A ***path-breaking innovation*** takes place (the *niche level*)
- A ***selective pressure*** is exerted by various actors and through various channels (the *landscape level*)

# The role of niches

## Multi-level perspective and niche evolution mechanisms



# *The role of technological niches*

## ***What does it take for a niche to develop?***

- ✓ Knowledge about the new technology
- ✓ Sufficiently high expectations on the potential
- ✓ Good networking among actors involved in the niche development process

# The case study – facts

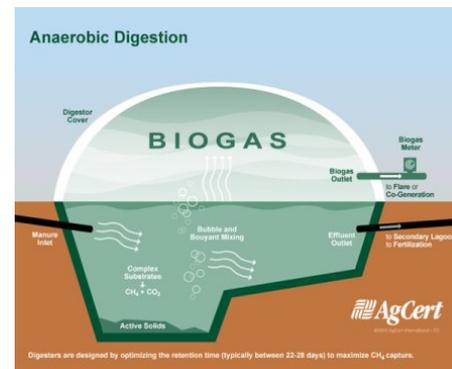
Approximately 120 to 140 **million tones** of bio-waste are produced every year only in the EU and about 40% of this entire amount is landfilled (EU, 2011)



Making the bio-waste handling more environmentally friendly is a key objective for policy makers

# The case study – facts

The most used practices to treat urban bio-waste are **anaerobic digestion** and **composting** - These techniques lead to low value products



More advanced technologies could offer the potential to recover **higher value products** for use in chemical, agriculture, pharmaceutical or other industries (D'Hondt and Voorspoels, 2012; Montoneri et al., 2011)

# The case study – facts

In this study we look at the the **Italian bioplastics sector**, assessing its potential to develop into a mature technological niche



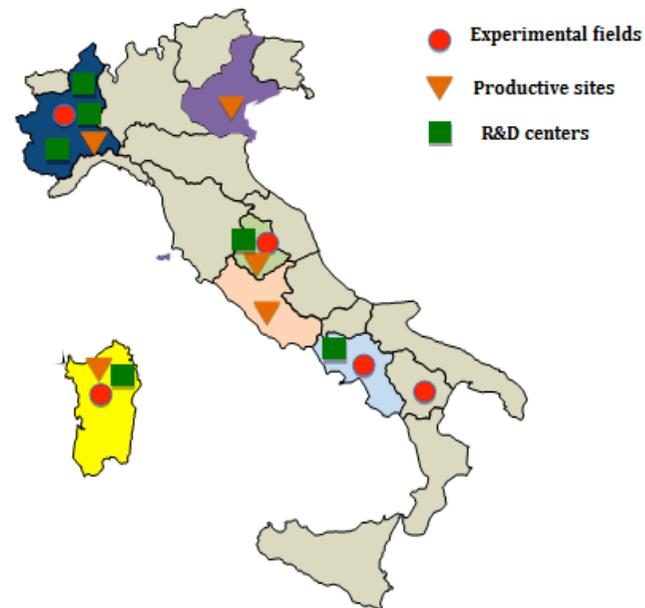
Specifically, we concentrate our attention on bioplastic shopping bags sector, based on urban bio-waste valorization

# The case study

We look at a **network of actors** (producers, suppliers and institutions) operating in the Italian bioplastic sector

These are firms **potentially interested** in the urban bio-waste valorisation

We investigate the **network architecture** of the emerging **socio-technological niche**



# The case study

**Snowball sampling technique allowed us to construct a social network of 64 actors**

- ✧ 48 **firms** (producers of bioplastic shoppers)
- ✧ 8 **suppliers** of raw material (chemical industry, both national and international)
- ✧ 8 **institutions** (e.g. regional and local authorities, universities, NGOs, etc.)

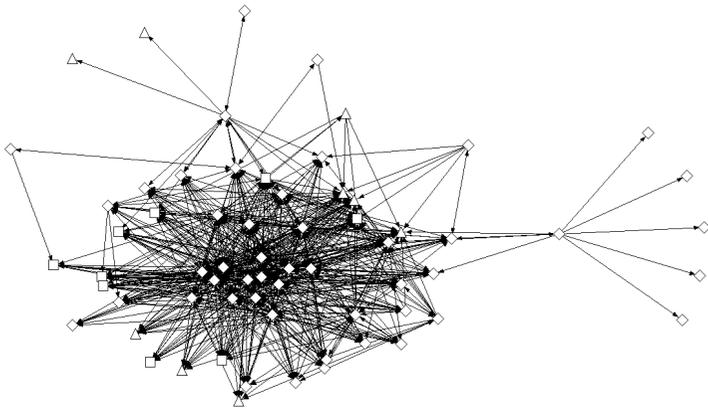
# The case study

## We look at 4 different networks

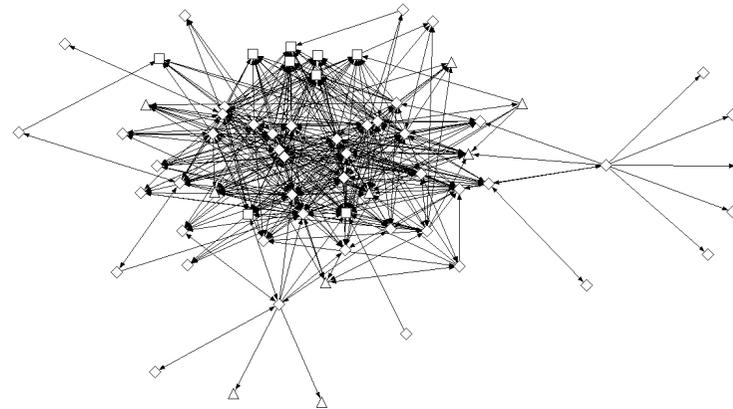
- ✧ **Who-knows-who** networks
- ✧ **Interaction** networks
- ✧ **Communication** networks
- ✧ **Knowledge** networks

# Networks architecture

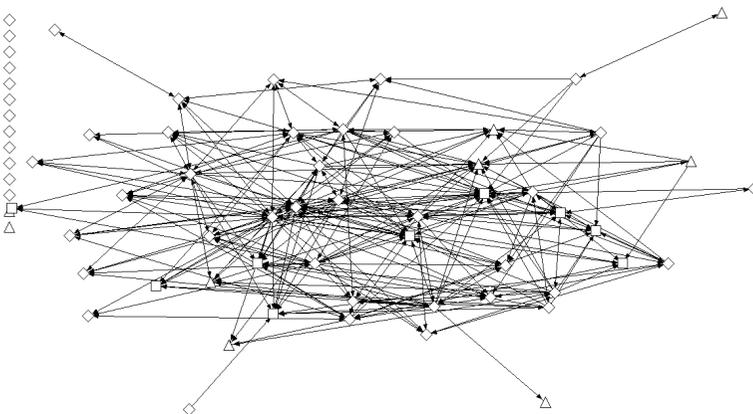
**Who-knows-who network**



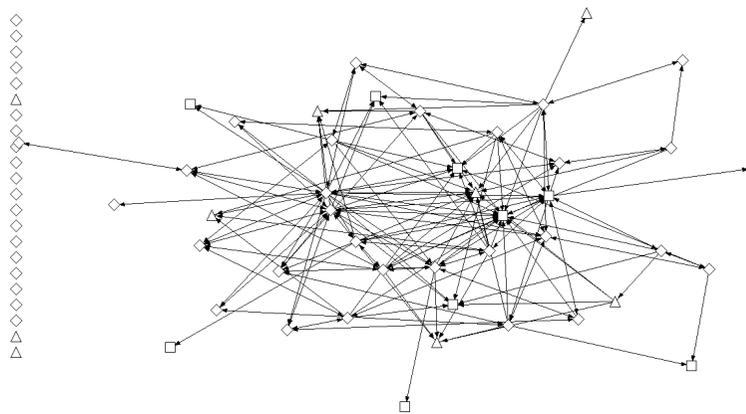
**Interaction network**



**Communication network**



**Knowledge network**

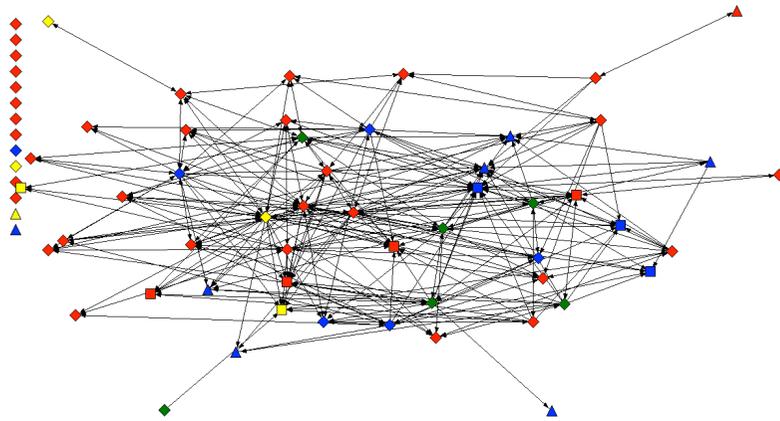


# Findings (1)

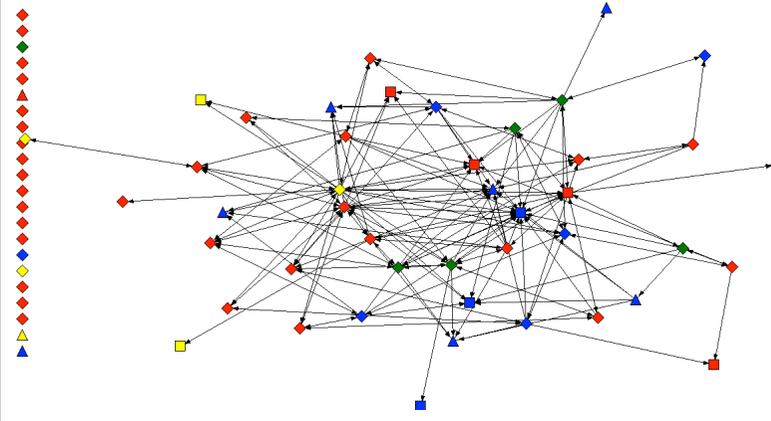
- ✓ There is a **large and unexploited potential of interactions** when comparing who-knows-who and interactions networks with communication and knowledge networks
- ✓ Yet, also these two latter networks show a sufficiently high level of **density, inclusiveness and average degree**

# Networks, knowledge and expectations

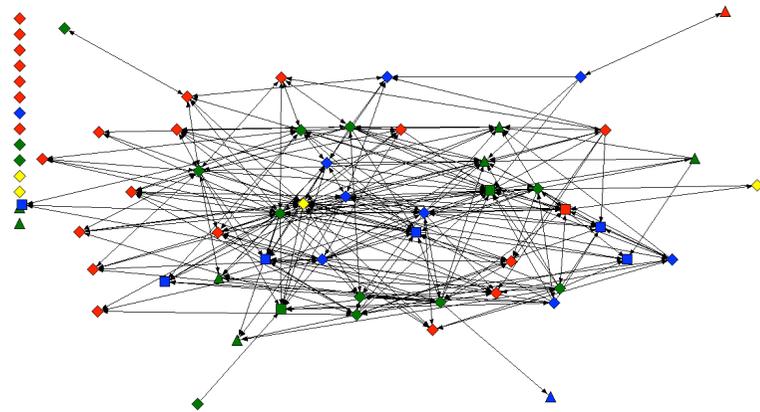
Communication network (attribute: expectations)



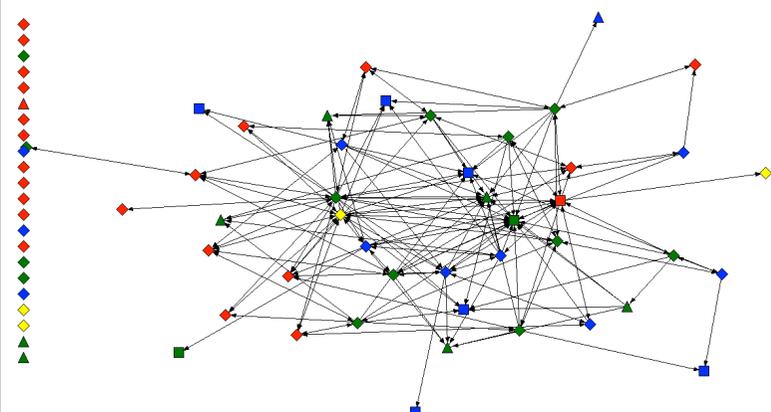
Knowledge network (attribute: expectations)



Communication network (attribute: knowledge)



Knowledge network (attribute: knowledge)

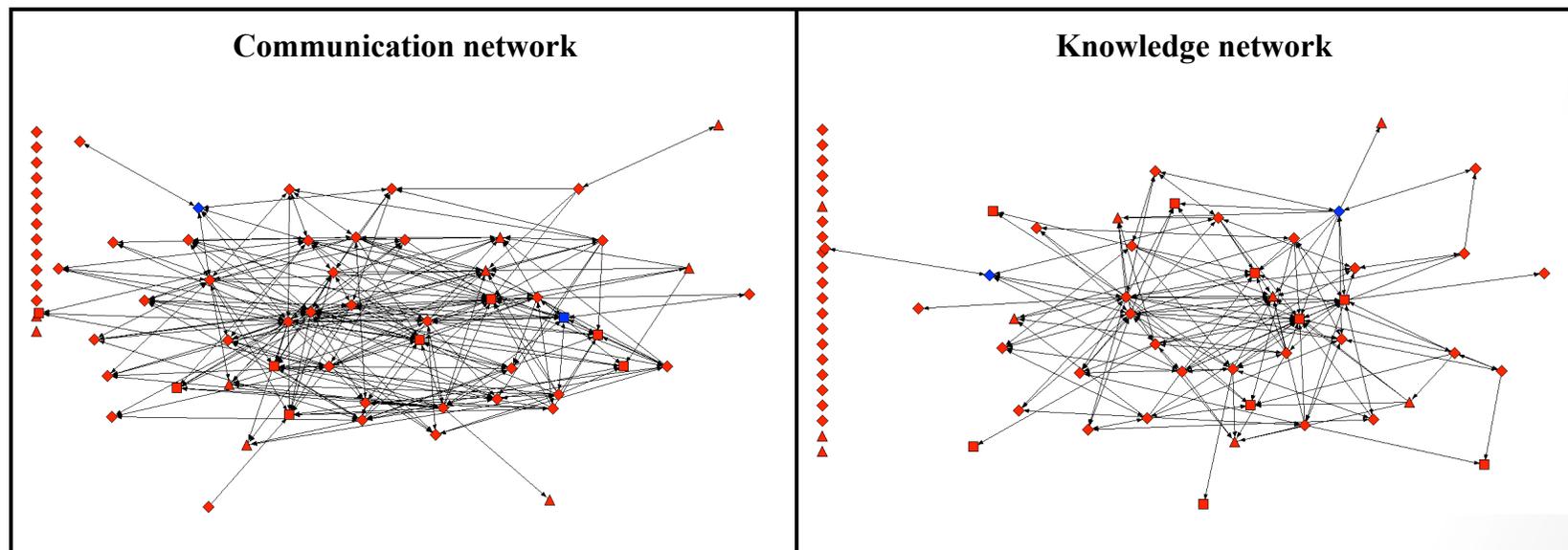


# Findings (2)

- ✓ Actors are **knowledgeable** but there is an **inefficient use** of resources available in the network with a group of knowledgeable actors occupying **peripheral positions** in the network or being completely **disconnected** from the central component
- ✓ On the other hand, there are **sceptical agents** (i.e. characterised by low expectations) which have a **central position** in the communication and knowledge networks

# Networks and bottlenecks (cut-off points)

The importance of cut-points rests in their **ability to connect** (and, conversely, to disconnect) two or more components of a social network. Hence, these nodes may act as **brokers among groups, building bridges between sub-groups** which would be otherwise cut-off and split into unconnected components or actors



# Findings (3)

- ✓ No critical problems are created due to the presence of bottlenecks in the network, which actually seems to be **flexible** and **unstratified**

# *Summing up*

- **Strengths:**

- The **architectural structure** of the network → sufficiently dense, flexible and unstratified
- Actors are overall knowledgeable and can contribute to the learning mechanism

- **Weakness:**

- Expectations, which are generally low
- More critically expectations are low for central actors in the network

# *Summing up*

- **Strengths:**

- The **architectural structure** of the network → sufficiently dense, flexible and unstratified
- Actors are overall knowledgeable and can contribute to the learning mechanism

- **Weakness:**

- Expectations, which are generally low
- More critically expectations are low for central actors in the network

**Thank you very much for your  
attention!**