

# Ecosystem Modeling, market and technology roadmap

| KATIA COLUCCI | Ecosystems | ECOSYSTEM MODELING



## Ecosystem Modeling

# Agenda

- ▶ **Context and objectives**
- ▶ **Activities**
  - ▶ *Ecosystem modeling Methodology*
  - ▶ *Representation/simulation tool*
  - ▶ *Conferences' cycle on Ecosystems*
  - ▶ *Complex system learning course*

## Ecosystem Modeling

# Ecosystems

The word ecosystem is borrowed from the natural world

Ecosystem is a portion of  
biosphere naturally bounded

(<http://it.wikipedia.org/wiki/Ecosistema>)



“The physical and biological components of an environment considered in relation to each other as a unit” *Roy Clapham 1930*“

“The whole system,... including not only the organism-complex, but also the whole complex of physical factors forming what we call the environment” *Arthur Tansley*

Central to the ecosystem concept is the idea that various elements are continually engaged in a set of relationships with every other element constituting the environment in which they exist.

## Ecosystem Modeling

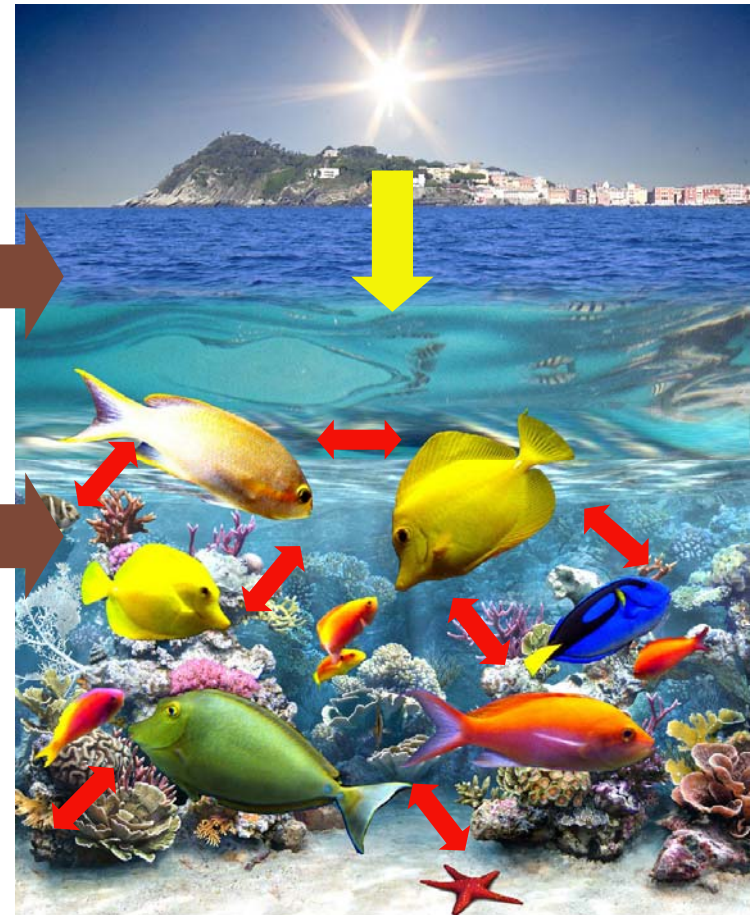
# Ecosystems and Technologies: What relations?

- Nowadays technology innovations and loosely coupled markets are opening up new business opportunities based on business models that thrive in ecosystems embedding the traditional value chains
- Technology innovations can be seen as the underlining fabric of business ecosystems. Their players may be modeled as creatures that live and behave according to rules of mutual engagement often made possible by a communications fabric provided by both Telecommunications and IT

Ecosystem Modeling

# Comprehension of ecosystems: physiognomy, behaviour

how "it lives"



- identify its constitutive elements
- describe relationships among elements

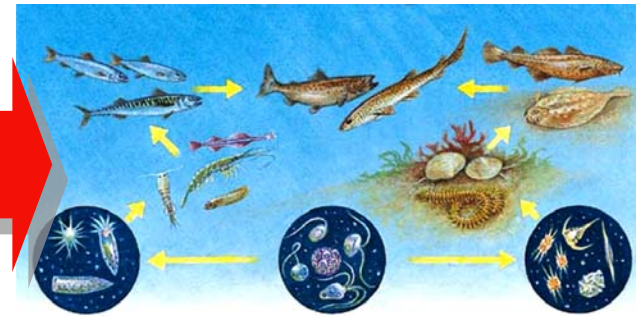
Ecosystem Modeling

# Understanding Ecosystems: evolution over time

how "it changes"



Why does it change?

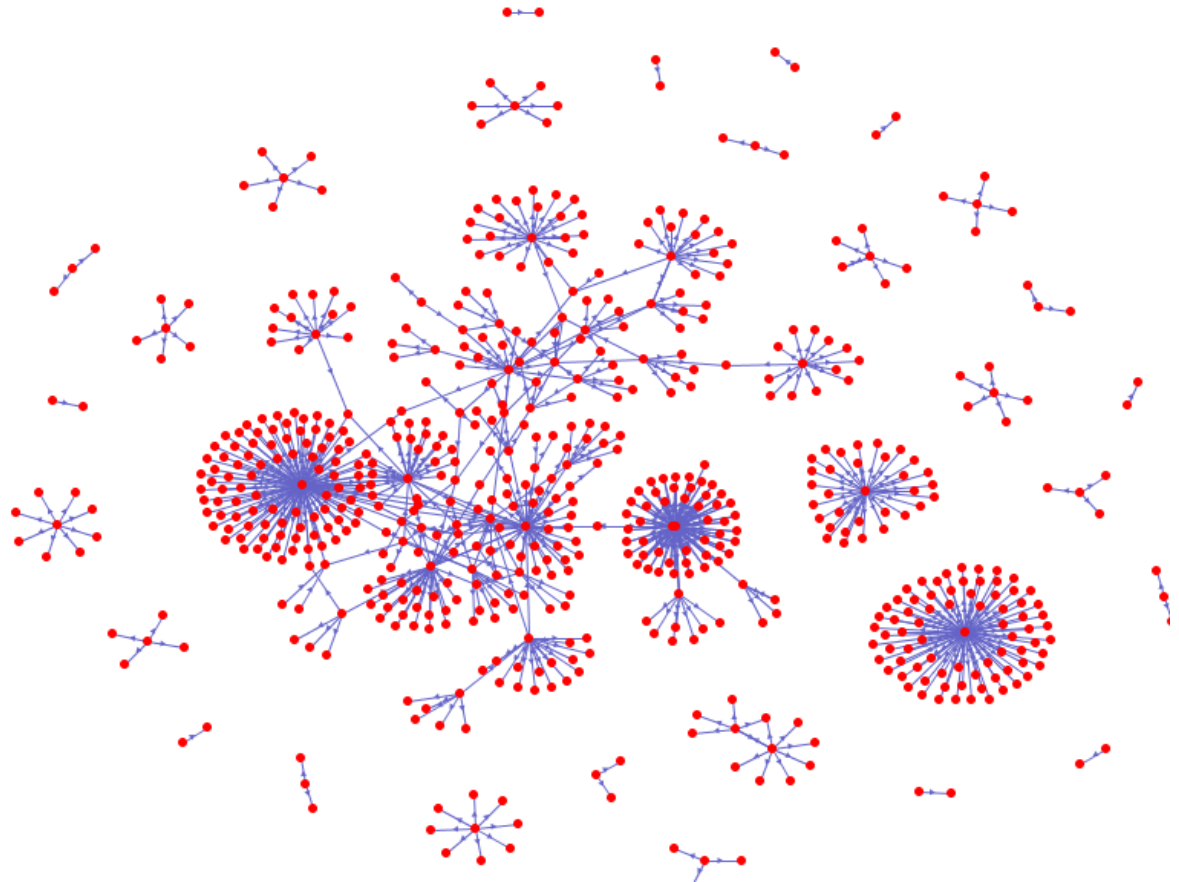


Who are the players?

## Ecosystem Modeling

# Ecosystems characteristics

- connected elements
- variety of relationship
- dynamic balance
- self-regulation
- evolution over the time



Ecosystem Modeling

# Is it possible to predict technologies' ecosystems evolution?

## Single out the variables driving evolution

*Variables not open to influence*



*Variables open to influence*



*It's possible to change the inertial trend driving the ecosystem evolution*

## Ecosystem Modeling

# Technology and market belong to the same ecosystem?

- Is it possible to describe the ecosystem growing around a new technology?
- What are the variables open to influence?
- Can we interact with them to steer technologies, services and related market?
- Can we model and represent the ecosystem and its evolution?
- Is it possible to identify new business models and different roles?

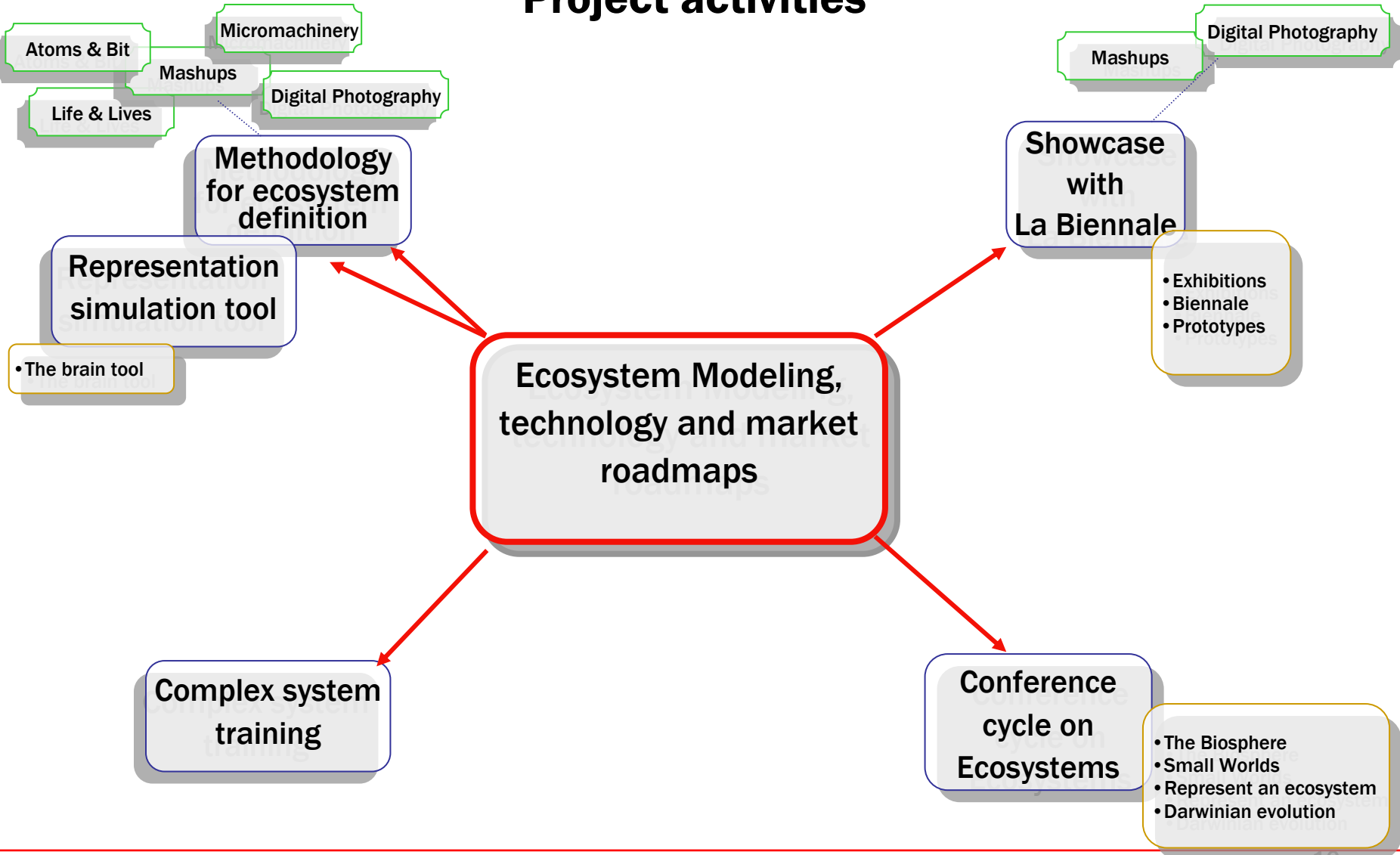
## Ecosystem Modeling

# Project objectives

- The “ecosystem modeling, technology and market roadmap” project aims to support the definition and monitoring of the evolution of ecosystems to help in the understanding of relationships among actors, resources, technology, market and regulations and in the charting of the expected evolutions.
- The project also aims to develop/adapt a modeling tool able to study what can be the best strategies and actions to increase the value of the ecosystem. The goal is to simulate possible evolutions and mutual impacts among the components of the ecosystems to evaluate biz strategies for investment and positioning.

## Ecosystem Modeling

## Project activities



## Ecosystem Modeling

# Ecosystem Modeling Methodology

### Objective

- ▶ The objective is to define a methodology for modeling biz ecosystems. The methodology should support the identification and comprehension of the ecosystems by providing the criteria to define and to model a generic ecosystem physiognomy and its behavior.

### The methodology structure

- ▶ The nature of these problems is highly complex and solutions require specific methodology and tools based on Complexity Science such as Small World Theory, evolutionary programming, genetic algorithms, and artificial neural networks.
- ▶ A draft of methodology structure could be based on the following steps
  - ▶ The Ecosystem meaning definition
  - ▶ Identification of classes of information per each elements belonging to the ecosystem
  - ▶ Data Collection: Data collection on past, actual and expected value per each variable and DB Construction and update
  - ▶ Ecosystem Representation ( Identification of the aim of the model)
  - ▶ What if analysis

### Purposes

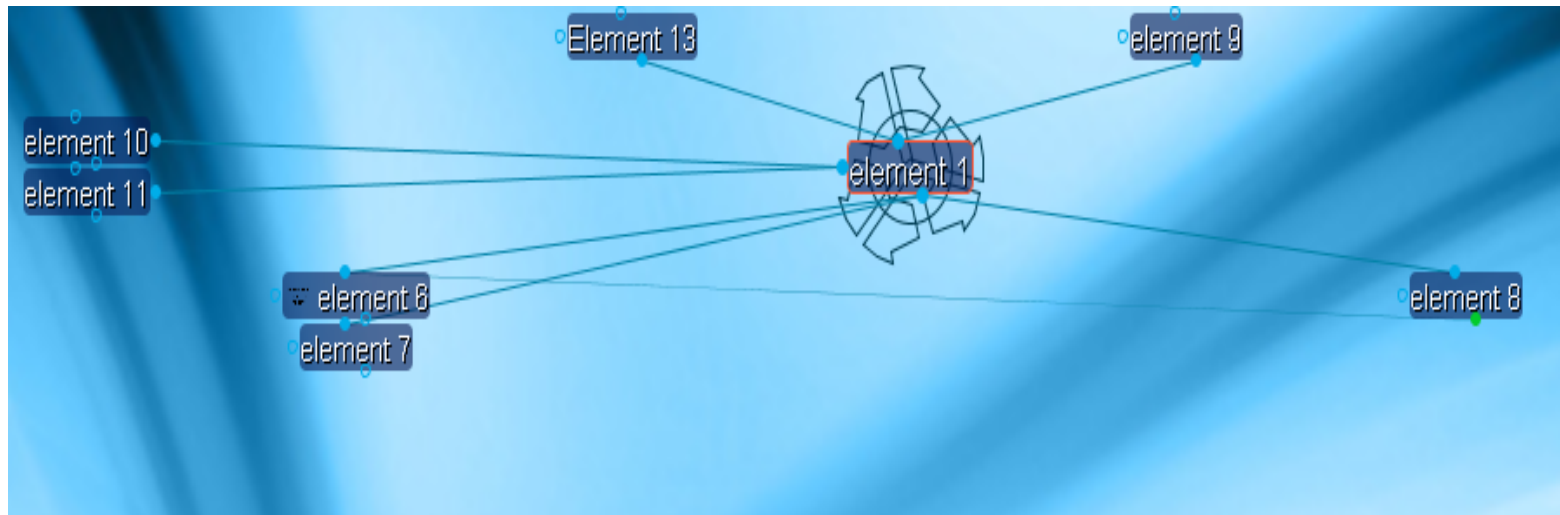
- ▶ This methodology will be applied by the vertical projects in concrete analysis in order to investigate and comprehend the *ecosystems* observed by each project. At the same time each vertical project will provide new data to finely tune the meta-model and the approach applied to modelling *ecosystems*.

## Ecosystem Modeling

# Ecosystem representation and simulation

Tool

The first tool taken into consideration is “the Brain Simulation tool”



The brain sw -<http://www.thebrain.com/#-42>

## Ecosystem Modeling

### Show case with biennale



#### The project idea

- ▶ The open show case is an exhibition of artistic exhibits provided by La Biennale in which the visitors' experience is enriched by leveraging on technology.
- ▶ The show case, will take place within the Cloisters at San Salvador facilities, and it will be based on 2d barcode-based video guide service on iPhone already deployed for the “Mostra fotografica Vapore D’Acqua” held from September the 27<sup>th</sup> until October the 31<sup>st</sup>.
- ▶ The content produced for mobile devices is developed by La Biennale. It is optimized, managed and published using a CMS developed in Telecom Italia Lab (Turin)

## Ecosystem Modeling

# Conference Cycle on Ecosystems

### The Biosphere

September the 11th

- ▶ Can we use the outcomes from biological studies in biz ecosystems? In this conference the evolution rules in natural ecosystems are explored focusing on energy consumption, food chain in order to explain the rules that drive the evolution in business ecosystems

### Small Worlds Theory

September the 23 rd

- ▶ In the 1960s, social psychologist Stanley Milgram claimed that anyone on the planet could be linked to anyone else by a chain of only six other people – the famous "six degrees of separation." The small worlds model is the one that characterize many network (social, biological, digital , ...) and it can be used for modeling biz ecosystems

### Represent an ecosystem

October the 9 th

- ▶ The complexity of the ecosystem is such that we need representation modalities "to keep under control" the whole system as such, stressing the most significant characteristics of the same. We model to represent the ecosystem and to simulate the evolution and "what-if" analyses

### Darwinian evolution and productive systems

October the 16 th

- ▶ Starting from biological ecosystem, we can learn something from what we know about the evolution of living systems if we apply that to the evolution of enterprises once they are no longer playing in rigidly defined value chains but rather in loosely coupled environments

## Ecosystem Modeling

# Complex System Training

### Objective

- ▶ To enable the comprehension, the representation, the analysis and modeling of behaviours of complex processes and systems

### First session

October the 1st , 2nd

- ▶ The Systemic Observation, Knowledge by Meta- observation
- ▶ This first part aims to provide the philosophy of the complexity science approach vs the deductive approach

### Second Session

October the 29th and 30th

- ▶ Complexity and dynamic complex systems
- ▶ This second part aims to provide the theoretical instruments (organization of real network, small world theory, fractals, ...)