



Digital Ecosystem

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ICEB + eBRF 2006

Global Conference on Emergent Business Phenomena in the Digital Economy

The European Innovation Ecosystem Initiative for SMEs and Regional Development

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<http://www.digital-ecosystems.org>



SOME RIGHTS RESERVED

Convergence

- Digital media convergence

Communication + Media

Communication services:

- Audio, -Video
- Data - Voice

Exploit creativity in:
how, when and where
to consume the entertainment

- Ecosystem Convergence

Digital ecosystems +
Business Ecosystems

= Innovation Ecosystem

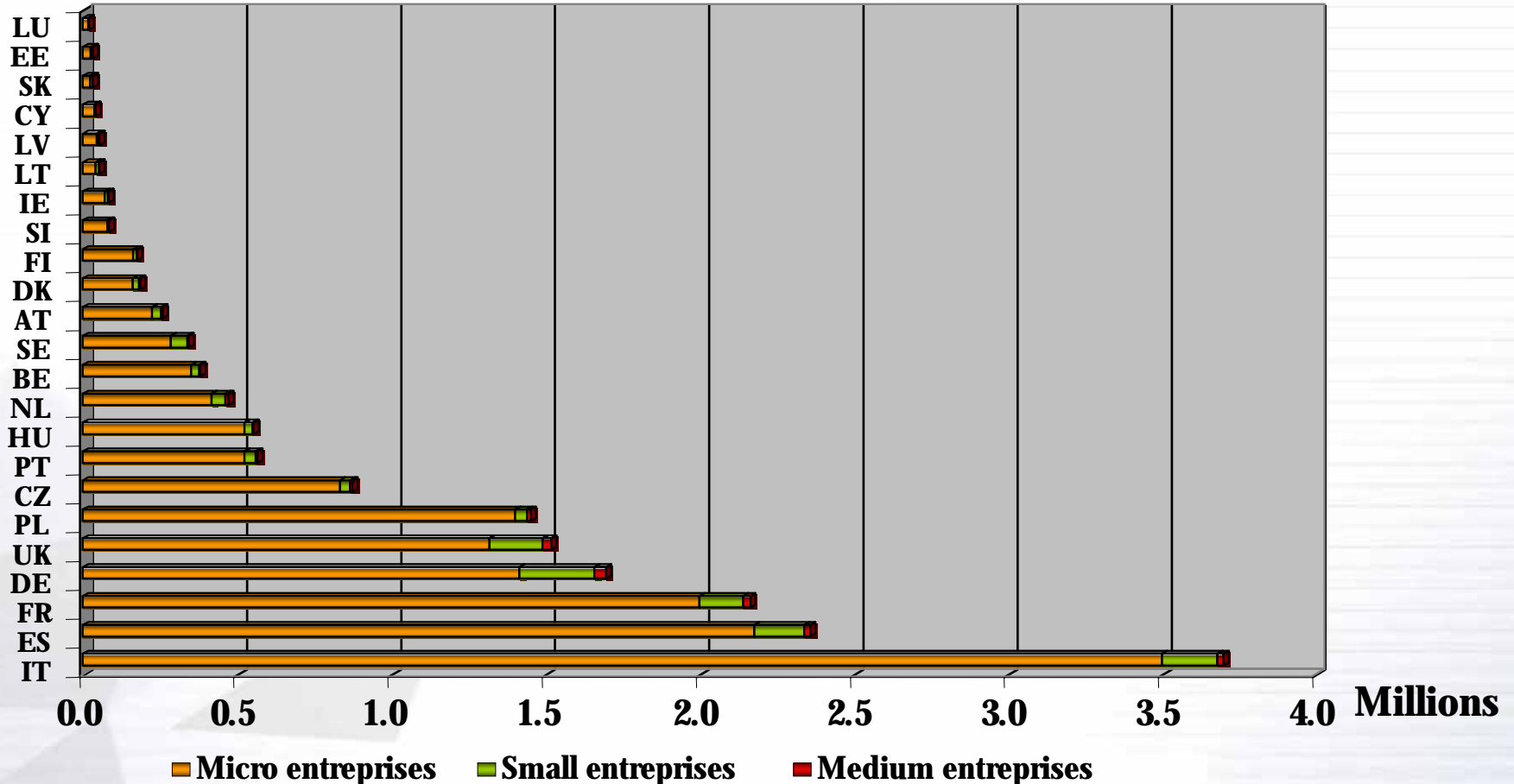
- Digital Business Ecosystems
- Semantic Web
- Web 2.0

Exploit creativity in:
participating in the
economic process

To achieve Lisbon objectives: Activate SMEs

EU-25: 99.7% of SMEs
 91.2% micro enterprises (1 - 9 employees)
 17 million of SMEs

European enterprises by size (totals), 2003



Difficulties of SMEs

- SMEs have limited resources and difficulties to:
 - To access global value chains
 - To access knowledge
 - To access specific services (e.g. legal)
 - To adopt new technologies (ICT)
 - To adopt new and distributed biz models and work organisations

How did the Digital Ecosystem Concept Originate?

Working group in 2002 observed that in some SME communities:

- The current slowly changing network of organizations could be replaced by more fluid, amorphous and often transitory structures based on alliances, partnerships and collaborations...
- ...building a community of enterprises that share business, knowledge and infrastructure, develop creativity

Thus, we wanted to develop an environment that would reinforce:

- ➡Dynamic and complex business interrelations
- ➡Need of continuous innovation and knowledge
- ➡Need of specialised resources

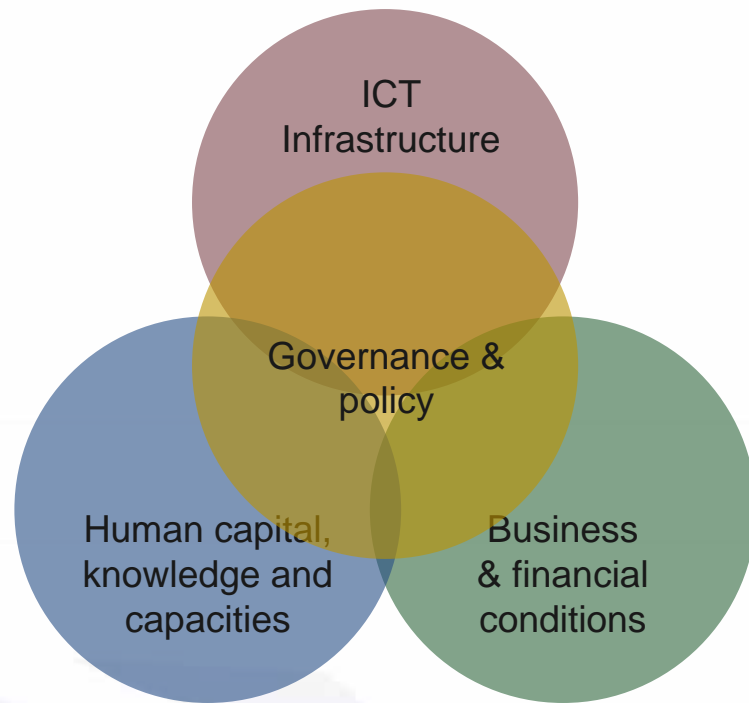
Empirical observations on emerging business phenomena based on collective creativity and participation

Complex products/services	Produced by large structured corporations	Produced by informal amorphous networks
Knowledge	Owned and protected	Shared
Innovation	Produced by an entity	Produced collectively
Final user	Is passive (“the king”)	Interested to participate
Organisational structure	Based on instructions and structured organisations	Self-organised networks
Motivation	Incentives, personal advantages	Self-esteem, sense of responsibility, reputation
Advances in IST	originated by technology	Originated by business and people networking
<i>Examples:</i>	<i>Large Enterprises move from outsourcing to crowdsourcing</i>	<i>Wikipedia, Linux, eBay, Youtube, last.fm, ...</i>

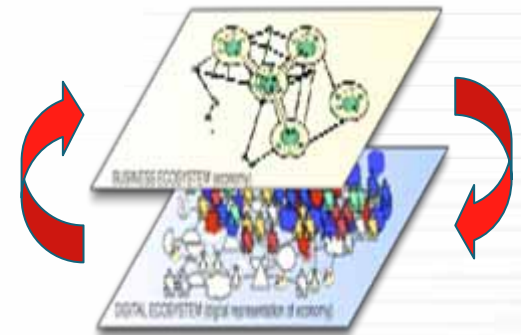
People/organisations become interconnected,

- **build communities that share objectives, activities, knowledge,**
- Opportunities for SMEs and individuals**
- **socially recognised by developing capacity and creativity**

How can we leverage these emergent phenomena?



Business Ecosystem ICT Infrastructure

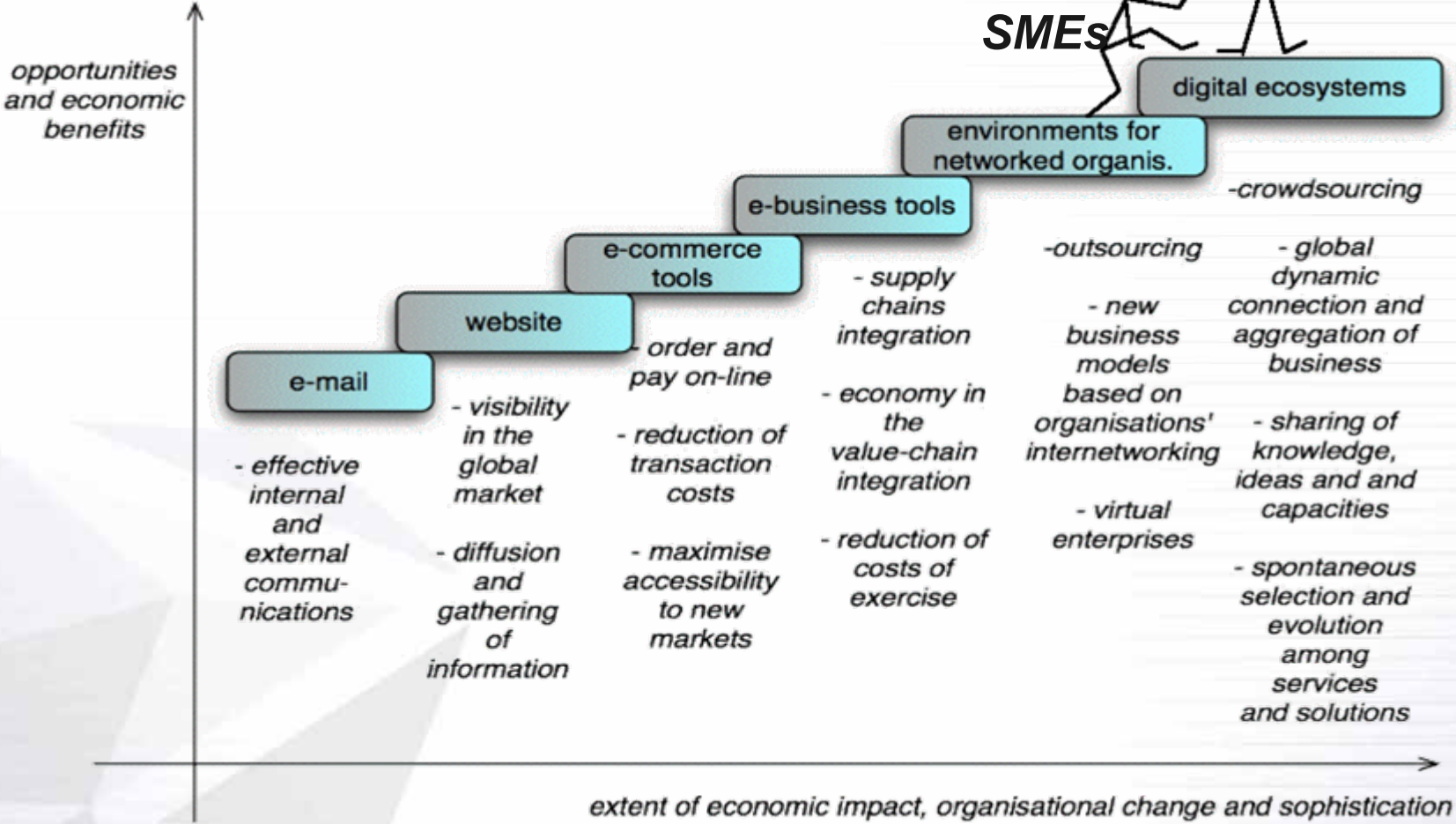


Which ICT Infrastructure ?

Initial principles

- global solutions which adapt to a local needs
- ability to evolve, differentiate and self-organise
- scalability and robustness
- no single point of failure or control
- not be dependent upon any single instance or actor
- equal opportunity of access for all

Stages in ICT adoption



Adapted from Cisco led Information Age Partnership study on e-commerce in small business

Ecosystems

- **Business Ecosystem**
- **Service Ecosystem**
- **Natural Ecosystem**

Economy as ecosystem

- **Digital Ecosystem (of services and ideas)**

Shift of paradigm

Engineering “problem solving” approach:

Isolate problem, identify variables, make a plan ...

Economy as machine

Complexity, Ecosystemic approach:

- From building a machine → nurturing a garden
- From “engineering approach” → “ecosystemic approach”
- From making a plan → creating the conditions

Economy as ecosystem

o.s. Innovation Ecosystem:

- Embeddedness of economic action in social structure
- “Toll-free” medium of business communications and interactions
- Knowledge formalisation, community building through shared languages
- Evolutionary and self-optimising service-oriented architecture

Sustainable socio-economic development

An Ecosystem-Oriented Architecture can support and facilitate the emergent business phenomena

The range of possible behaviours of a system is determined by its structure. This structure specifies its realms of interaction.

[Maturana, Varela]

The cyberspace [or a digital ecosystem] has an architecture, its code - the software and hardware that defines how it is — is its architecture. That architecture embeds certain principles; defines what's possible in a digital ecosystem. And these terms

and possibilities affect innovation in the cyberspace.

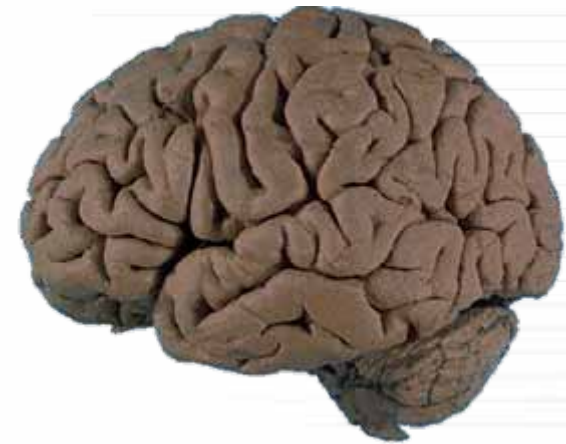
Some architectures invite innovation, others chill it.

[Lessig]

A Collective Brain for the Formalisation and Distribution of Services and Knowledge

**Like a brain,
a digital ecosystem has to**

- A) representing / formalise
- B) store
- C) retrieve...



software components, applications, services, ...
business processes and models, revenue models, laws ...
trust relationships, reputation skills, talents, ideas

[A] Represent / Encode

**ANY USEFUL REPRESENTATION,
EXPRESSED IN A LANGUAGE
(formal or natural),
DIGITISED AND LAUNCHED ON THE NET,
WHICH CAN BE PROCESSED
(by computers and/or humans)**



Repres. of service:

- biz model
- rev. model
- comp. model
- ref. to Ontology

[B] Store

No single point of control or failure (tech-organism)

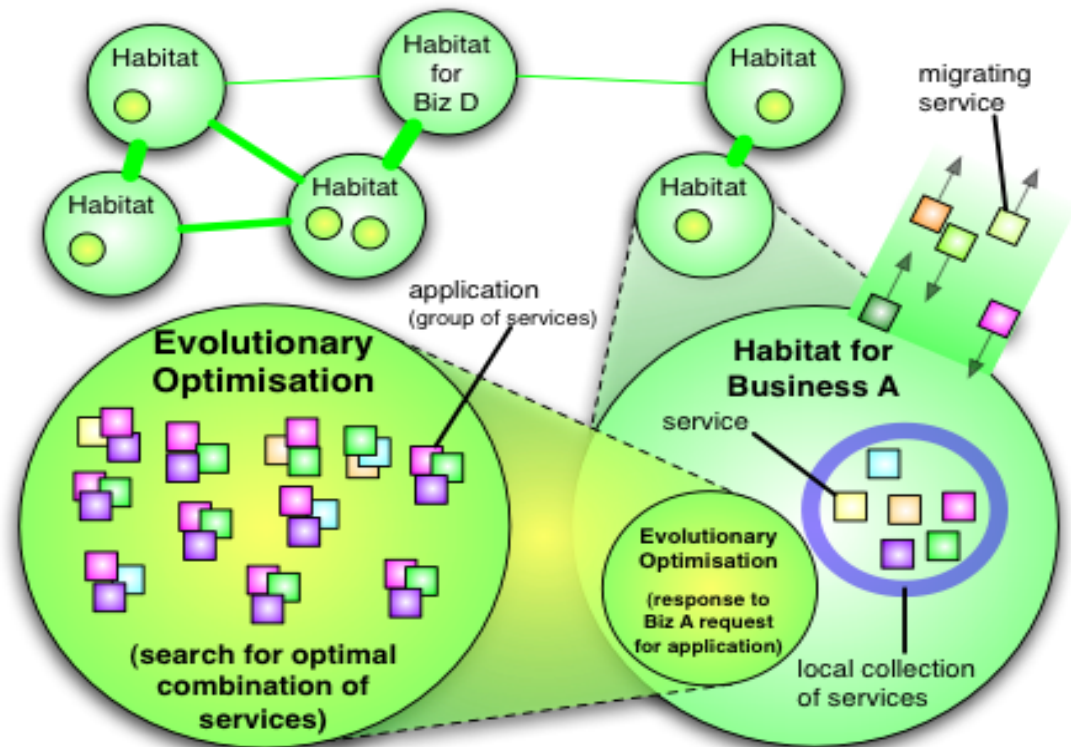
- Holographic, distributed as in the brain
- Technologies developed in FP5 and FP6 projects



[C] Retrieval vs. Migration

Taking advantage of natural science

- Concepts of habitat, migration, evolution, digital species ...
- Spontaneous networking and self-organisation



Language Processes: Semantic Web and Web 2.0

The representation of the world is an old dream,

Some obstacles:

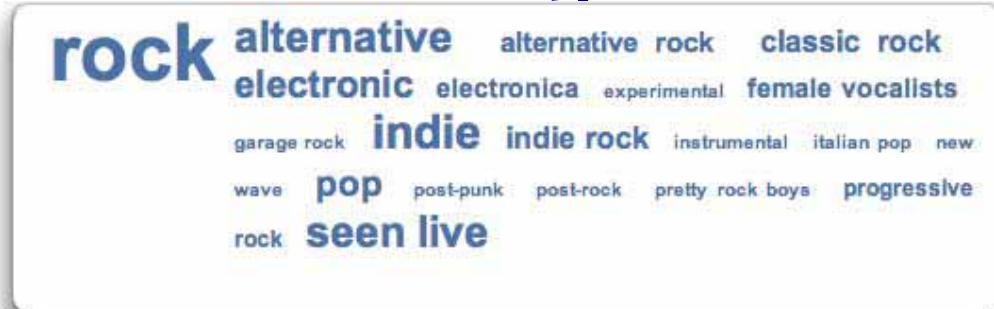
- which formalisms, languages?
- an interpretation of the reality is subjective,
how we can have a consensual representation?
- which are the resources for populating the ecosystem?

Taxonomies and Folksonomies

collective construction of shared semantic leading to recommendations and self-organisation

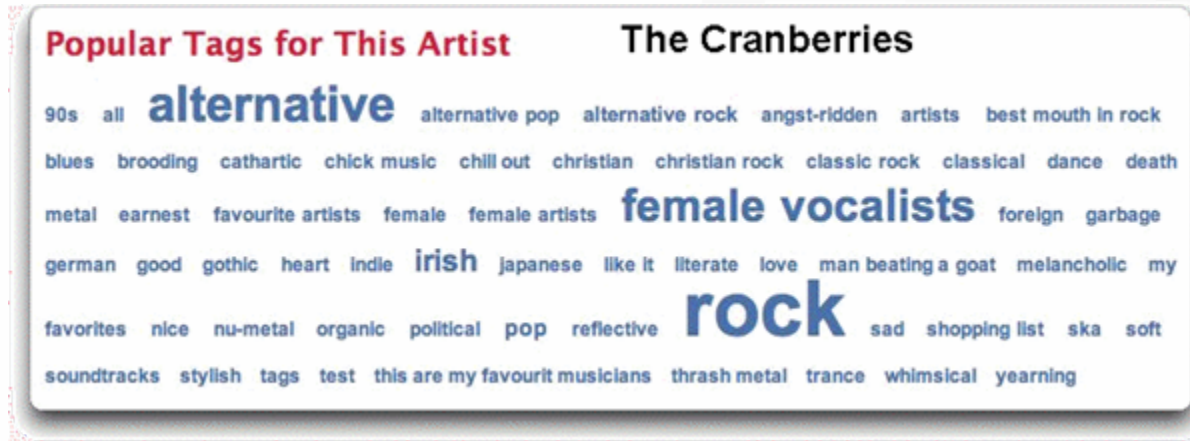
MUSIC Last.fm

- the users classify the kind of music based on their perceptions
- the system track the music played
- the system groups users in communities
- + it creates on the fly customised radio station you like
- + allows contacts among members of communities



BOOKS Amazon

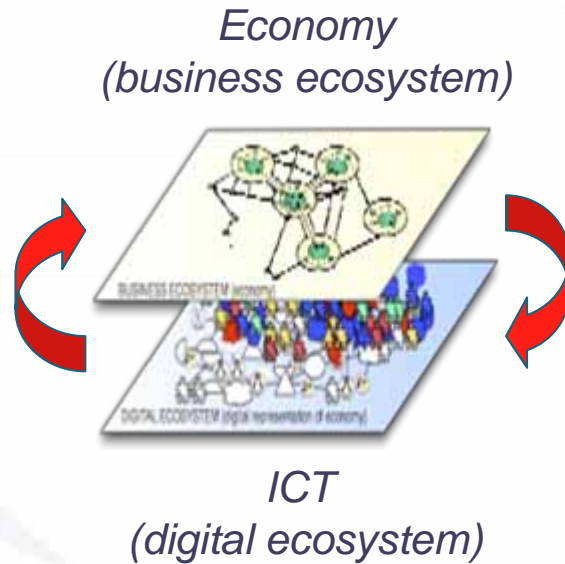
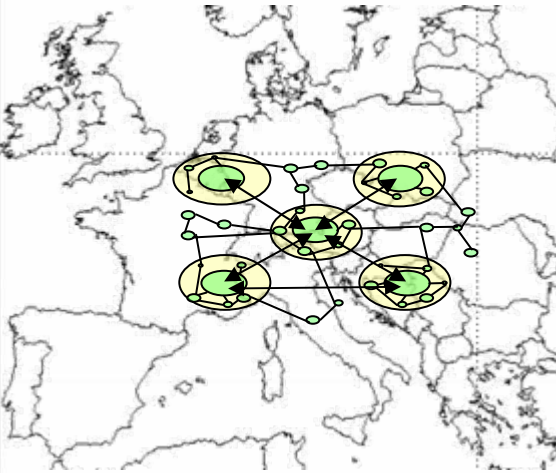
- it tracks the books acquired and the user evaluations
- + suggests books you may like



BUSINESS eBay

- buyers provide a feedback on the reputation of the sellers
- + reputation system is used to build trust and to find the most reliable sellers

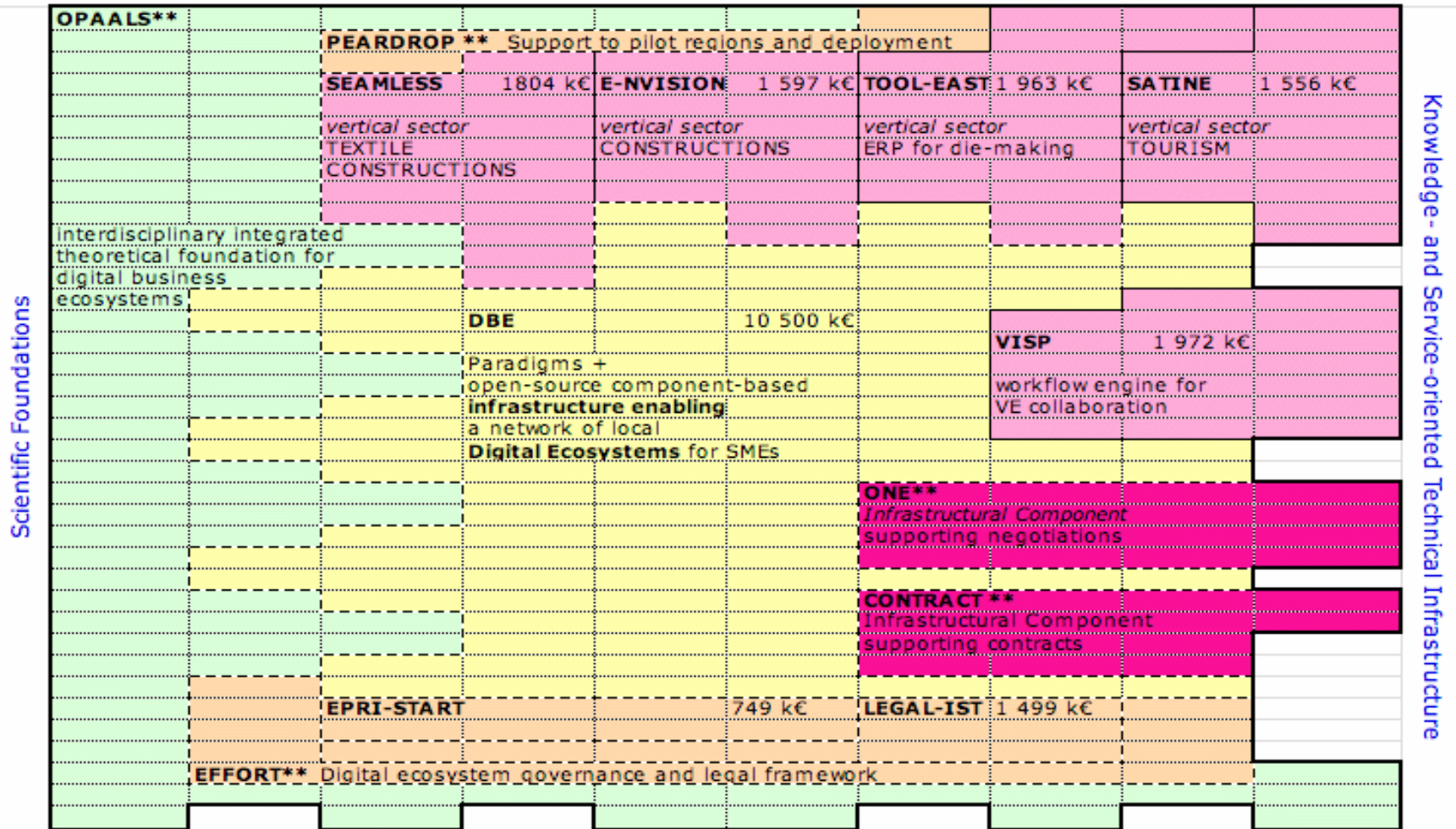
Business Ecosystem + Digital Ecosystem = Innovation ecosystem



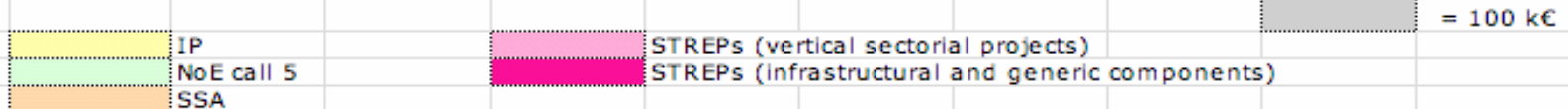
Collectively built representation of the economy
Issue of Governance

Cluster of EU Projects on Digital Ecosystems

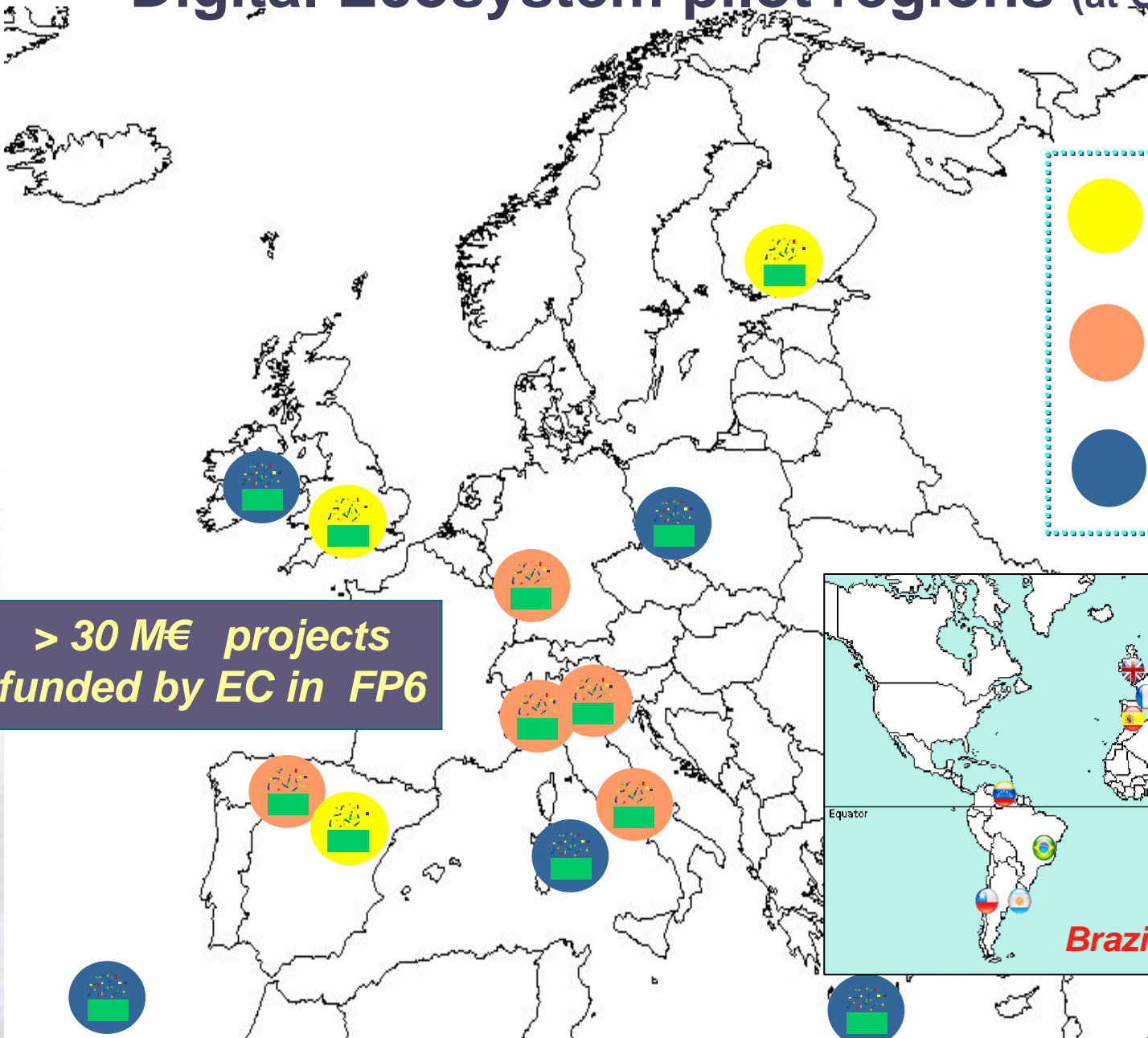
Economy and local/regional deployment



Socio-economic and legal framework

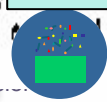
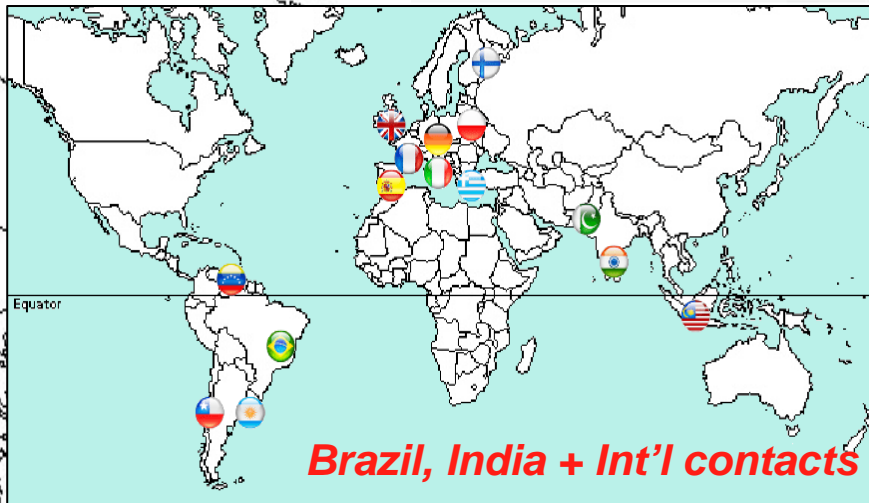


Digital Ecosystem pilot regions (at October 2006)



-  Local Business Ecosystem co-funded by DBE project
-  Local Business Ecosystem joined as new pilot
-  Potential future take-up local ecosystems

> 30 M€ projects funded by EC in FP6



Science

Research - Natural Science
Multi-disciplinary Approach

Natural Ecosystem



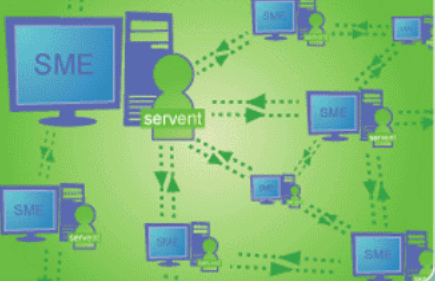
SBVR (Semantics of Business Vocabulary and Business Rules)
BML 2.0

Evolutionary Environment (EVE)



Computing

Peer-2-Peer Network



No super-node
Built on Standards - Technology Agnostic
Inter-operable
BML (Business Modelling Language)

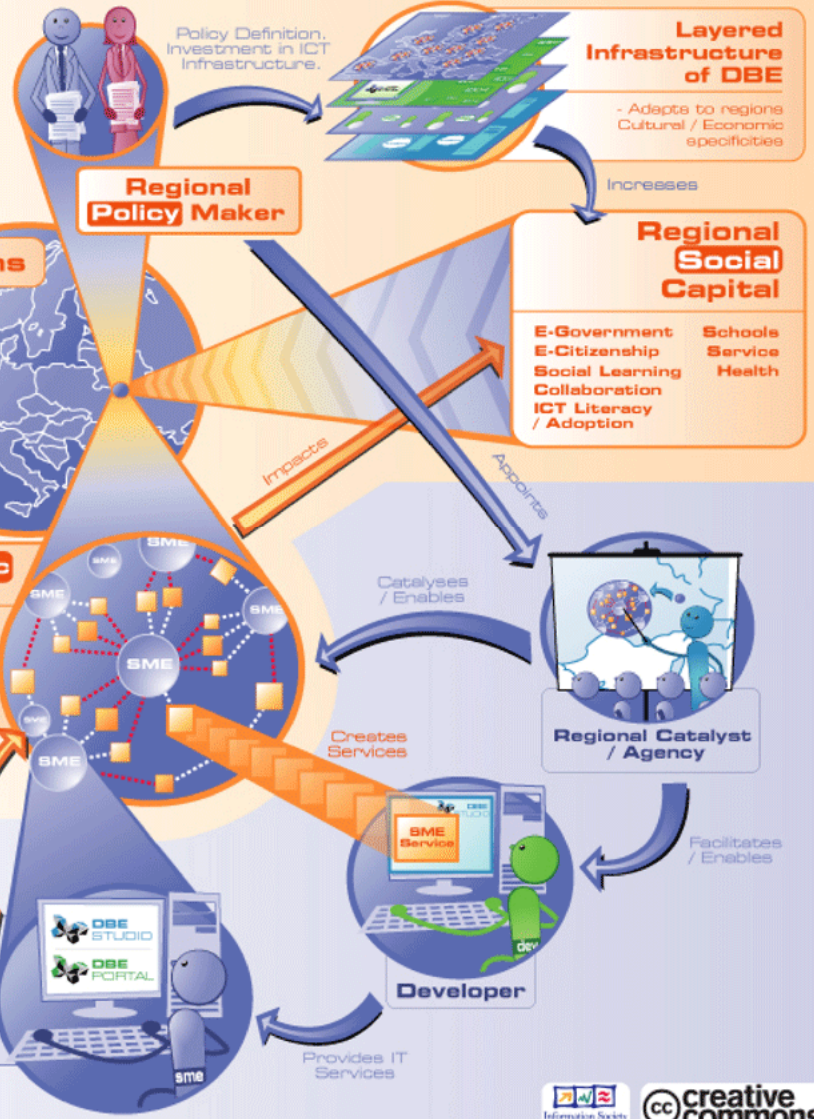
Open-source

Social Science

Research in
Topology of Regional
Ecosystems



Regional Development



Layered Infrastructure of DBE

- Adapts to regions
Cultural / Economic
specificities

Increases

Regional Social Capital

E-Government
E-Citizenship
Social Learning
Collaboration
ICT Literacy / Adoption

Schools
Service
Health

MACRO ECONOMY

Regions



GROWTH

MICRO ECONOMY

More info on

<http://www.digital-ecosystems.org>

