History and past of “Digital Ecosystems”

Workshop:
Review of the user needs
Digital Ecosystems: re-tuning user requirements

F. Nachira
European Commission DG-INFSO - Unit “ICT for Business”
Head of Sector “Technologies for Digital Ecosystems“
Knowledge and Business networking: SMEs and local clusters in the knowledge-based global economy

SMEs: from a limited environment to a global dynamic competition - need of:
• more interrelations;
• more specialised resources (marketing, legal issues, know);
• more R&D / innovation;
• accessing to global value chain;
• accessing to knowledge

How to reach the critical mass of resources?
large organisations, virtual enterprises, local clusters, ...

Industrial District | Growth Node | Virtual cluster | Business Ecosystem
Ecosystems

Different views to ecosystem metaphor
(biological, industrial, economy as an ecosystem, digital business ecosystem)

Biological Ecosystem

- A system of organisms occupying a habitat, together with those aspects of the physical environment with which they interact

- A community of living organisms with air, water and other resources
  (The Merriam-Webster Third New Int’l Dictionary of the English Language 1986)
Economy as an Ecosystem

- Social science approach
- Sees global economy as an entity
- Organizations and consumers are the organisms of the ecosystem

- Competition, specialization, co-operation, exploitation, learning, growth

(Rothschild 1990)
"An economic community supported by a foundation of interacting organizations and individuals "the organisms of the business world"

Customers, lead producers, competitors, and other stakeholders

"The keystone species"
A large number of loosely interconnected participants who depend on each other for their mutual effectiveness and survival

Keystone, dominator, hub landlord, niche player

Productivity, robustness, niche creation

Business Ecosystem: Iansiti, Levien
Business Ecosystem: Power, Jerjian

- E-business view
- Integrated electronic business: Ecosystem consists of an interacting system of web sites and physical entities
- There is often one highly linked species
- Gradual birth of new businesses and the death of old ones

Derivative work from
Mirva Peltoniemi, Elisa Vuori
Tampere University of Technology
“Digital environment” populated by “digital species”

The environment enables species to behave like species in the natural world

- Evolve
- Interact
- Become extinct

- EC-funded initiative to enhance the development of SMEs
- ICT support for business ecosystems
- Aiming at regional innovation and growth
Digital Ecosystem: L.E. view

- Ecosystem of applications built around their platform (e.g. SAP NetWeaver)
- It includes a developer community building a set of services and a “service oriented architecture” on top of their platform
- Built on a proprietary technology, the owner sets the standards and the core architecture
Digital Ecosystem

the pervasive “digital environment”

- supports the business ecosystems
- is populated by “digital components”
- evolves and adapts to local conditions with the evolution of the components

THE SOFT SUPPORT INFRASTRUCTURE, OFFERS AND TRANSPORTS SERVICES & INFORMATION (knowledge) EMPOWERING THE NETWORKING
What is a Digital Component?

- could be: software components, applications, services, knowledge, business processes and models, training modules, contractual frameworks, law ...
- .... and hopefully a mixture of these

A USEFUL IDEA, EXPRESSED IN A LANGUAGE (formal or natural), LAUNCHED ON THE NET, WHICH CAN BE PROCESSED (by computers and/or humans)
Business Ecosystems
the local conditions shaping the economy

create a favorable environment for business and people
a socio-economic ecosystem

Technical Infrastructure

Governance & Industrial Policy

Human Capital, Knowledge & Practices

Legal Framework & Financial Conditions

“create a favorable environment for business and people
a socio-economic ecosystem”
Digital Ecosystems
the technical infrastructure supporting the Business Ecosystems

How to establish the infrastructure which supports the transition from industrial district to business ecosystem?

Which ICT technology?

Computing & Telecom. Infrastructure

Community

Structured Architecture
Protocols & Mechanisms

Knowledge of Business & Organisational Models
Evolution in ICT-adoption:
Increased complexity in business networking

MODEL OF EVOLUTION
OF E-ADOPTION

- e-mail
  - effective internal and external communications
- website
  - visibility in the global market
  - diffusion and gathering of information
- e-commerce
  - order and pay on-line
  - reduction of transaction costs
  - maximise accessibility to new markets
- e-business
  - integration supply chain
  - economy in the value-chain integration
  - reduction of costs of exercise
- networked organisations
  - new business models based on organisations' internetworking
- digital ecosystems
  - dynamic aggregation
  - sharing of knowledge
  - natural selection and evolution among services and solutions
  - adaptation to local identity and values

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

extent of organisational change and sophistication
The Digital Ecosystem integrated approach

RESEARCH INNOVATION DEPLOYMENT

Crucial condition for economic growth is a broad deployment and use of ICT by enterprises and public institutions...

The Lisbon objective for the Information Society cannot be reached through research alone. R&D useless if other complementary policy instruments are not developed and used effectively. [5yA]
A representation of the digital ecosystem
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Layers in the digital ecosystems [2002]

Applications and processes
Framework, Middleware
Infrastructure Platform
Semantic Platform
Layers in the industrial view [2005]

A service-oriented platform

**Semantic Platform**
- Knowledge Economy
- Semantic Web

**Framework**
- Application & Process
- Middleware & eServices

**Infrastructure Platform**
- Virtualisation & Mobility
- New operating Systems
The digital ecosystem approach ...

PHYSICAL ARCHITECTURE

MIDDLEWARE AND BASIC SERVICES INFRASTRUCTURE PLATFORM

SECTOR SPECIFIC SERVICES

ORTHOGONAL SERVICES (e.g. TRUST)

BUSINESS ECOSYSTEM

SEMANTIC PLATFORM (e.g. PROCESS MODELLING)

DOMAIN MODEL

SERVICE REGISTRY

SERVICE ONTOLOGY

RECOMMENDER

FADA
... a systemic approach to enterprises global collaboration

open-source, public, distributed pervasive environment
- spontaneous evolution, adaptation and composition of services, digital content and sw components
- embedding business rules, revenue models, ontologies...
Support region to develop and maintain the Ecosystem infrastructure;

Rent/Provide Software Solutions to SME

Develop Software component for Big Enterprises platform

Big and SME software companies provide solutions

Research and other initiatives

Two co-existing production chains (for components and solutions)
Two co-existing production chains (for components and solutions)

Big and SME software companies cooperate in order to fully leverage the potential of the SME market creating business models based on their complementary market characteristics:

- **Big Software Company**
- **Software SME**
- **DE infrastructure**
  - Develop tools and methodology allowing faster and cheaper component development
- **Rent/Provide Software Components to SME**
- **Support region to develop and maintain the Ecosystem infrastructure**
- **Research and other initiatives**

Derivative work from Angelo Corallo
University of Lecce - eBME
Technologies for Digital Ecosystems cluster present, past, future

- Launch of the concept
  - Discussion paper “Towards a network of digital business ecosystems fostering local development”
  - Spring 2003 - workshops

- FP6 - call1 - 2003
  - 3 IP proposals
  - DBE project started in November 2003
  - 2005 six regions acting as pilot (3+ 3) regions joined

- Results
  - initial sw results to be released in open-source (May)
  - contribution in innovations and standards (OMG)
  - concept of ecosystem “contaminated” platforms
  - mainstream in industry and development policy strategies

- Future research ./.
Mission of “ICT for Enterprise Networking” Unit (D5)

Support research in ICT deemed to be crucial for the delivery of distributed and collaborative ambient intelligence-based solutions for the product lifecycle and of innovative inter- and intra-organisational systems and services in the enterprise environment.

Special emphasis will be placed on digital “business ecosystems”, new intelligent and networked products, and the interoperability of enterprise sw and applications.

Stimulate targeted international co-operations and strengthen the co-ordination of research activities and the convergence of research and innovation policies, at national, regional and EU levels.

Orientation

* technology driven <-> policy driven
* long-term vision + intermediate results
* industry-driven <-> user needs driven
* ICT supporting growth of business ecosystems and enterprise networking
## The e-Business Clusters - call 1-3

### Cluster 1

**Tech. for Digital Ecosystems supporting growth & innov.**

<table>
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<tr>
<th>Project</th>
<th>Code</th>
<th>Description</th>
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<td>Paradigms + open-source component-based infra-structure enabling a network of local Digital Ecosystems for SMEs</td>
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### Cluster 2

**Reference Models and Technologies for Business Networking**

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###Cluster 3

**Amb. Int. Tech. For the Product lifecycle**

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### Cluster 4

**TRUSTCOM**

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**ATENA**

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**INTEROP**

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**Other clusters**

- DBE
- EPRI-START
- SATINE
- CROSSWORK
- ILIPT
- MOSQUITO
- MYTREASURE
- CODESNET .6
- MYCAREVENT
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- VE-Forum
- 1.0
- VERITAS 0.7

**Notes**

- Other clusters = DE 2004
- = 250k€
### CLUSTER 1
**Tech. for Digital Ecosystems**

**Paradigms + open-source components**

**Digital Ecosystems**

**for SMEs**

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### CLUSTER 2
**Reference Models and Technologies for Business Networking**

**Amb. Int. Tech. For the Product lifecycle**

**Intelligent Logistic for...**

**Innovative Product Technologies**

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### CLUSTER 3
**TRUSTCOM**

**Framework for trust and contract management in dynamic virtual organisations**

**ATHENA**

**Interoperability in Business through reference architecture, methods and infrastructure**

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### CLUSTER 4
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**NoE in Interoperability**

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**Other clusters**

- DE 2004
- 250k€
### The e-Business Clusters - 2005

#### CLUSTER 1
**Tech. for Digital Ecosystems**
*supporting growth & innov.*

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#### Other clusters
- DE 2004
- = 250k€

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**European Commission - Directorate-General Information Society and Media**

F Nachira
Unit D5: ICT for Enterprise Networking - Sector Technologies for Digital

Brussels
April 2004
ICT for Networked Business - FP6 call 5

- Key Objectives
  - Software solutions adaptable to the needs of local/regional SMEs, supporting organisational networking and process integration
  - Distributed collaborative ambient intelligence-based network-oriented systems for efficient, effective and secure product and service creation and delivery
- Focus
  - Digital business ecosystems for SMEs
    - open-source distributed self-adaptive environment and models enabling SMEs to cooperate for design, development of flexible and adaptable components interoperable with proprietary systems
    - Support of spontaneous composition, sharing distribution of business solutions and knowledge
  - Extended products and services
    - decentralised architectures; new approaches to business processes

46 M€uro
Digital Ecosystems in FP7?

- 6 Technology Pillars
  - e.g. Software, Grids, trust and dependability
  - e.g. Embedded Systems
  - e.g. Nano/electronics
  - ...

- Nano/Bio/Cogno convergence

- 4 Multi-technology, Multi-disciplinary Integration
  - e.g. Personal environments
  - e.g. Robotic Systems
  - ...

- 4 Application Poles
  - e.g. ICT for trust and confidence
  - e.g. ICT supporting business and industry
  - New forms of dynamic netw., interoperable co-operative business models & processes, digital eco-systems strengthening capacity of SME clusters...

- manufacturing of miniature and integrated ICT products...

based on your input and needs