

**Summary of the conclusions of the Brainstorming on  
“Digital Business Ecosystems” concept  
October 4<sup>th</sup> 2002 – Bruxelles**

**The context**

The discussion was held on the base of the following assumptions:

- The IST programme is a research and development programme; the FP6 will be more focussed on long-term research. The FP6 instruments include Integrated Projects which cover all the research life cycle.
- The digital business ecosystem is targeted to help small organisations to compete better using Information and communication technologies (ICT).
- The technology deployment and application following the “take-up scheme” might be funded with other financial means like national funding or ERDF.

**Digital Business Ecosystem (DBE).**

The concept defined in the discussion document was debated. It was difficult to reach a sharpened overall definition, as the approach needs to be “multidisciplinary”.

As a result of the discussion, it was agreed that the Digital Business Ecosystem could be defined as “evolutionary self-organising system aimed at creating a software environment for small organisations”.

The key elements of the DBE structure are software components and agents, which show an independent behaviour and are subjected to evolution and to self-selection based on their ability to self-adapt to the local business requirements.

**Goal**

The main goal of the DBE is to support regional/local development by empowering open, distributed and adaptive technologies and evolutionary business models for small organisations growth.

The DBE will set the basis to overcome the twofold digital divide: between regions and between small organisations and large enterprises

**General Approach**

The debate concluded that the scientific research focus is in:

- translating the concepts, that have been developed for interpreting the social organizations and living organisms, into a set of appropriate concepts and operative models for the development of digital ecosystems targeted for small organizations
- ensuring that all the enabling technologies and models for the implementation of the ecosystem are in place

The dichotomy “theoretical approach versus applied projects” is part of the business ecosystem approach and a continuous effort should be devoted to reconcile the theoretical research with industrial and business realities.

To achieve the multidisciplinary research approach, an interdisciplinary research team needs to be built. It will be composed of actors who have an excellence track in their field of expertise and research.

The theoretical approach includes: complex system theory, statistic mechanics, mathematical modeling, advanced research in algorithms, engineering and computer science. Study of technology adoption from the social research viewpoint and study in business models is also relevant.

In order to implement the DBE concept, an incremental evolutionary process has been considered necessary.

The process should plan intermediary results driven by a clear framework and visionary approach. The release of precursor products will highlight the digital ecosystem creation and the steady evolution of the system.

The interdisciplinary approach takes into consideration the following three facets:

- technology,
- e-business models and services,
- business knowledge sharing.

The three facets represent the pillars needed for a holistic and self-sustainable model.

Indeed, the research goals are very ambitious and the initial steps are perceived as critical. The initial set-up of the rudimentary ecosystem could strongly influence the evolution path of the ecosystem. The choice of initial rules and of the initial components (the “precursors”) must be done very carefully. During the workshop, it has been strongly agreed and emphasized that the basic infrastructure components should be based on open source model. A user centered research approach will help in setting an evolutionary environment for software component architecture

In order to be feasible, the DBE has to practically address horizontal (e.g. logistics, security) or vertical sectors where small organisations are highly represented. The role of the local areas is an important element of the scenario and a value chain integration approach has to be taken into account.

The role of the local areas could be approached by testing the project outcomes in a limited set of regions and business sectors. To be more effective, the approach could start by testing the projects among 3 or 4 of the most advanced European regions or districts. This could guarantee a strong commitment at local level, including the support of a local community and local government. The less advantageous regions, in order to promote cohesion, should be involved in a further stage.

The open source approach could open the access to the new technology paradigm offered by the DBE fostering the growth of local technology and solution providers pushing forward the regions and local small organisations economic development

### **Technology approach**

The technology could be developed on the basis of an evolutionary model, including and adapting widely adopted standards as soon as they are adequate, or seamless switching if new disruptive technologies or standards appear. Both solutions and standards should compete in the business ecosystem in order to make possible their “natural selection” in a win-win scenario.

Three layers have been identified as part of the concept and they do not necessarily represent sequential steps:

- pure research for architecture, business models, complex systems modelling and functionalities,
- test for early adopter
- adoption in the regions.

As the approach will be evolutionary, therefore based on continuous development and adoption, early production of “precursor” results and preliminary links, integration among the layers and

identification of assembly rules, will quickly lead to operational primitive digital ecosystems. The primitive ecosystem, subject to a continuous evolution process, allows early test and adoption in testbed regions.

The final users of the DBE are the small organisations; which are business-oriented and need practical solutions and clear terminology reflecting their immediate needs. The complexity of the project and its components should be hidden from them.

### **Research topics in technology**

The holistic approach is original; it requires fundamental research such as self-organisation in complex systems and research in network architecture and in socio-economics .

The deployment of pervasive wireless networks as transport infrastructure (e.g. 3G) composed by distributed nodes, increases the chaotic behaviour of the system. Since the present webservices technology is static and not distributed (e.g. UDDI) and does not cope with the plasticity of the network.

The following topics on ICT research should be considered:

- Pervasive, adaptive, self-configuring and self healing network software architectures
- Semantic discovery and registering applications
- Distributed security and federated network identity
- Dynamic component composition, software component and knowledge sharing on the network
- Interoperability
- Multi-Agents, behaviour of complex systems and agent communities
- Semantic web, knowledge sharing and cooperation mechanisms, ontologies, business process modelling and integration

### **Constituency**

The constituency should be mainly composed by organisations excellent in their respective fields, supporting open standards and able to create critical mass.

As an intermediate step in building constituency(ies), the participants agreed to first create technology oriented core group clearly identifying the basic research and technologies needed, and consequently detect the excellent centres around Europe able to commit themselves to the project and to give a contribution on these specific technologies.

Some key players, which should be in the core group, have been mentioned during the meeting:

- Large ICT enterprises committed to open standards
- Large research organisations
- Small organisations (small innovative ICT) already working on the key enabling technologies needed
- Open source developer communities

The need of an open source infrastructure and the need of an early involvement and support from the open source community have been considered crucial.

In order to complement the technology oriented core group and cover the whole technology life-cycle, including technology application and business test beds further players might come from:

- Vertical sectors (e.g. agro-food, garments, biotechnology, tourism, manufacturing), horizontal sectors (e.g. logistics) and representatives from SMEs trade associations
- Leading regions and local actors (the triangle for innovation actors: innovation/research centers, local administration, universities)
- Relevant results and players from FP5.

The end-user SMEs might see the approach as too abstract. The concept is a research instrument and not a presentation for end-user SMEs. The project will develop a communication and dissemination strategy of and knowledge sharing instruments. Indeed, the SMEs will not participate in the research tasks and in the concept definition, but will take advantage the outcomes, exploiting the digital services present in the DBE for their business. In order to involve small organisations in the testing of technology the possibility to take on board their sectoral associations, chamber of commerce was considered.

Good instrument for achieving these multidisciplinary goals could be through a IST-FP6 large Integrated Project which could be reinforced by a Network of Excellence on basic research on self-organisation and complex systems. The cost of the deployment and implementation of local/regional ecosystems should be done through other sources of funding in the framework of initiatives at European, national and local/regional level. The implementation will take advantage of structural funds, public and private partnership with the involvement and commitment of local governments.

### **Next steps**

Actions from the Commission:

- The Commission will publish the discussion paper on their website under open content license and it will provide the links to the on-line resources (groupware systems, websites, mailing lists) to any group (one or more) working on the DBE concept.
- On participants/players request the Commission will publish the web-address(es) of their groupware sites.

Actions from the participants:

- A first group(s) initially formed by the participants to the workshop. Part of them will draft the document(s) as basis for discussion with other key players.
- Groupware support area(s) will be created on the web site(s) of the participants or players which have offered to do;
- October, 18, 2002 – Prague: eBusiness and eWork 2002 conference
  - Informal meetings
- November, 4-7, 2002 – Copenhagen: IST2002 conference
  - Informal meetings and constituency building activity
  - Discussion Fora and workshops settled by the Commission, Unit e-business - IST Conference and specific official workshop on 6<sup>th</sup> November on “Organisational ecosystems for SMEs”
- Early December 2002 – Bruxelles
  - Follow-up workshop on Digital Business Ecosystem. The Commission offers meeting facilities and will participate as observer to the meeting of self-aggregating key technological players interested in preparing a proposal for a possible IP(s).