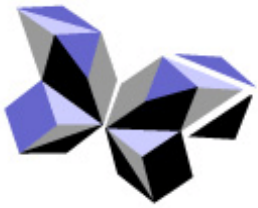

Digital Business Ecosystem

Contract n° 507953

WP31: Regional Catalyst Action

Del 31.1: Analysis and specification of current and potential regional catalysts

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APPENDICES

1 Introduction

1.1 Electronization of Business

It has been successfully argued that a major transformation process, akin to industrialization, is under way in society world-over. In the language of this report, a process referred to as 'electronization' or 'knowledgization' works to transform industrial society into knowledge society. It can be further argued that, to ideally enhance the electronization of business, more and deeper interaction is needed across the sectors of Business, University, and Government; those who in different ways use and utilize knowledge and those who create knowledge. Based on far-reaching transformation strategies that involve the entire society, ranging from trans-national strategies, such as eEurope, to local strategies, such as eTampere, it can be further concluded that new types of catalysts are needed to tackle the challenges related to the electronization of business – to making e-business business as usual.

The general business environment of our time is characterized by the concept of Network Economy. To stay competitive it is increasingly important for companies to network with each other and to turn into what is referred to as "networked organisations". On the one hand, information and communication technology (ICT) has the role of driver in changing the way companies do business. On the other hand, technology offers means to facilitate networking. This phenomenon is not restricted to large, global companies, but also applies to smaller enterprises. However, smaller companies are still far behind the bigger ones in their ICT use and e-business uptake (referred to as digital divide by company size). (The European e-Business Market Watch, 2004) Small and medium sized enterprises (SMEs) form the vast majority of European enterprises. Therefore, the competitiveness of SMEs has a notable impact on the competitiveness of the entire European economy. Hence, it is a particular challenge to foster effective adoption of ICT in enabling the SMEs to increase their competitiveness on both the European as well as the local level. (European Commission, Information Society, 2004)

In the spirit of the eEurope strategy, Digital Business Ecosystem (DBE) was launched as an integrated project to foster local ICT adoption in Europe and to enable European software-producer SMEs to be competitive in the global software production markets. DBE is set to create and launch a disruptive technology paradigm for the creation of a digital business ecosystem for SMEs and software providers. It faces the challenges also brought up in previous studies and experience of e-business initiatives in promoting regional clusters between ICT service providers and SMEs and improving the availability of e-business solutions for SMEs (see e.g. Commission of the European Communities, 2003). In the DBE vision SMEs should join-in a digital business ecosystem for networking effects, improved connectivity and extended reach for their services. DBE will facilitate not only the linkage of SMEs to more complex, and maybe virtual, value chains that will extend the market coverage but also the improved electronic linkage with an increasingly networked and global customer market.

It is the underlying assumption of the DBE project that, for the project to succeed, it is central to facilitate the integration of SMEs into the emerging digital business ecosystem. Thus, the concept of Regional Catalyst has become a central concern in the project.

1.2 Research phenomenon

It is stated as a starting point for this study that a special set of activities, called catalysing, is needed in building a Digital Business Ecosystem. Since forming such an ecosystem requires participation of companies (both software providers and software users) as well as public sector entities and hence people and their business decisions that require justification at each stage, it is evident the ecosystem will not come about without catalysing. It has also been stated from the beginning of the preparation of the DBE project that this catalysing will take place via business activities. Catalysing via business activities, in a wider sense, contrary to for example chemical catalysing, solely mental catalysing or solely technical catalysing (e.g. a software or a line of code as means of catalysing). Experiences from previous initiatives demonstrate that SMEs require the right type of intermediaries and the right kind of support from "catalysers" in order to accelerate the diffusion of the Internet and e-business (European Commission, DG Enterprise 2002 and European Commission, Information Society, 2004). In conclusion, this study approaches challenges that are mainly located in the software engineering space from the business disciplines' point of view.

In addition to the **business approach**, a **regional approach** is chosen as a starting point for catalyst activities. Later in the study, this approach is challenged. Despite the fact that the concept of a digital business ecosystem is global in nature, the rationale for a regional approach lies again in the enterprise level. It is envisioned that the digital business ecosystem is populated by software and business activities, both executed by enterprises. Most of these enterprises are SMEs and most of them relatively small in both size and scope of activities. Hence, their business environments (e.g. forms and ways of operation and nature and level of business relations) are markedly local in nature. It is noteworthy that the various regions of the global, or in the first stage European, digital business ecosystem also significantly differ from each other in terms of various economic, social and cultural parameters. Although the vast historic differences between regions were softened through industrialisation, significant catalysing is still needed before we are truly one global village where regional differences do not need to be specifically addressed. The past experiences also indicate that e-business policies and initiatives should take into account the needs of underlying regions and sectors (European Commission, DG Enterprise. 2002). Therefore, for regional catalysts to have a better "access" for catalysing the SMEs, and to better take into account regional differences, a regional approach is chosen as a starting point for specifying catalyst activities.

1.3 Research Mission

The aim of the present study is to explore Regional Catalyst activity and to conceptualize Regional Catalyst in the context of the Digital Business Ecosystem. The primary outcome of this study is a **conceptual framework**, providing a solid foundation for the latter project activities in the areas of technology development and diffusion.

A conceptual definition of the Regional Catalyst in the DBE context is needed in order to develop an operational construct for the Regional Catalysts in the DBE project. Based on the present study, the next step in the research process is to build an operational construct for the Regional Catalyst in the context of the DBE. However, this study is aimed at building a first proposition for a conceptual framework of the Regional Catalyst activity in the Digital Business Ecosystem.

1.4 Research Strategy

1.4.1 Research Method

This study is exploratory and conceptual in nature. Theoretically, the approach in the search for the conceptual framework for Regional Catalyst activity is anchored in the **corporate strategy research domain** where the interest is to holistically understand the mission, operating environment, and stakeholders of an operator and where emphasis is placed on an operation (classically a corporation) as a vehicle of owners to organise activity and accomplish a certain goal. In the context of the DBE, Regional Catalysts are seen as special purpose vehicles whose mission is to integrate operating companies and other entities to the DBE. It is envisioned that while the mission is likely to remain relatively unchanged, the ownership as well as the nature of operations of the Regional Catalysts may change over time.

The key sources of information include DBE project related data and information, information on other related concept systems, earlier theoretical and contemporary literature on the phenomenon, interviews with “current regional catalysts”, and other workshops and meetings in the DBE work. Since the target environment (a sophisticated digital business ecosystem) of the concept system (regional catalyst in the DBE) is still under development, the outcome of the study cannot be applied and tested directly in an existing environment. Therefore, the study is not limited to a conceptual analysis of existing phenomena. By building a proposition for a new conceptual framework, new construct system is in the making.

At this stage of the DBE project, and the conceptualisation work related to the Regional Catalyst, region specific empirical data has only been available from the Tampere region. Hence, in terms of research strategy, Tampere has been the initial case environment.

1.4.2 Research Perspective

The framework used in this study has its origin in the classic strategy logic framework of Normann (1976), the Business Idea approach, as modified by Seppä (2000) towards understanding the use of an organisation as a strategic vehicle of the owners.

The basic Business Idea approach emphasises three elements of an operation and its strategy logic: (1) the product or service system, (2) the organisation (the way to operate), and (3) the market segments (the customers). The fit between the three comprises (4) the brand or image of the operation and yields a perception of value added. Answers to the basic questions of *what* an organisation produces, *how* it produces, and to *whom* it produces comprise a basic understanding of its strategy and yield an understanding of *why* it is (or is not) successful in business.

To further understand the strategy logic of a given entity, however, one has to dig deeper into the ownership of the organisation, mission, and underlying interests and incentives, in order to understand why the entity truly exists. In the context of catalyst activity, it is important to understand *who* are (or should be) the owners, *why* they are in business, and *how* they are in business: What is (1) the identity and chain of command of the owners (the underlying principal-agent dynamics), (2) the true mission of the owners and (3) the intended or envisioned life and the optimal legal structure of operation.

Figure 1 illustrates the underlying theoretical framework used in this study when seeking to conceptualise the Regional Catalyst.

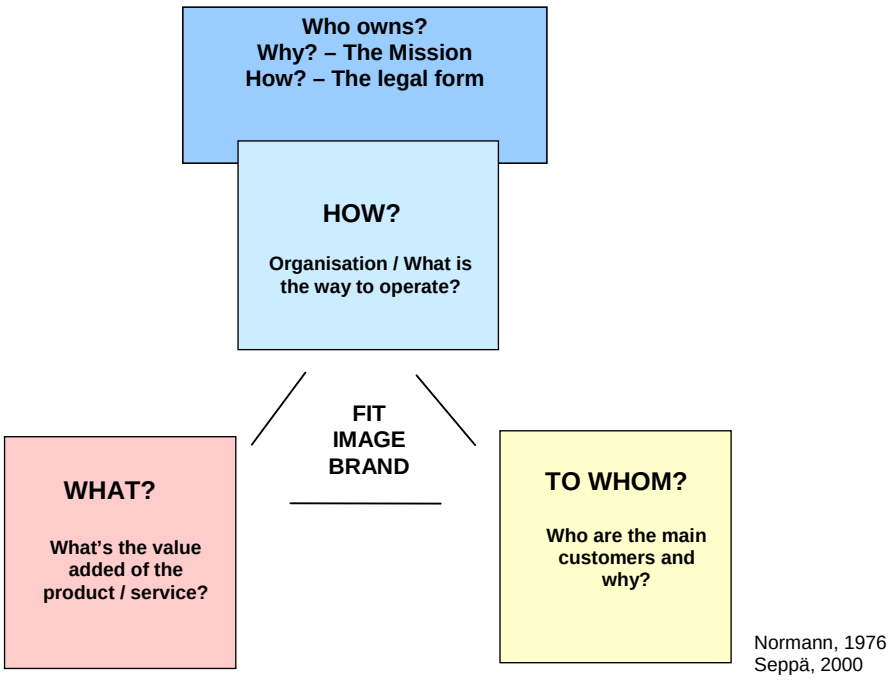


Figure 1. The extended Business Idea framework

Figure 2 puts the underlying theoretical framework in the context of the DBE by adding the time horizon related to the electronization of business in the figure. Electronization is seen from three viewpoints in this framework: technological, business and social. Electronization is seen in this context not only as increased use of technology. Rather electronization refers to utilizing technology in business and changes in the way business is carried out. The object of electronization in this framework is a business ecosystem (defined later in this study) and hence a larger entity than a single (SME) organisation. This raises the importance of the social viewpoint of electronization including the community or ecosystem formation. It is foreseen that rather significant changes will be needed in the catalysing activity and the anatomy of the catalyst, over time. Such changes are envisioned in the product or service system and market segments, as well as the organisation and ownership level.

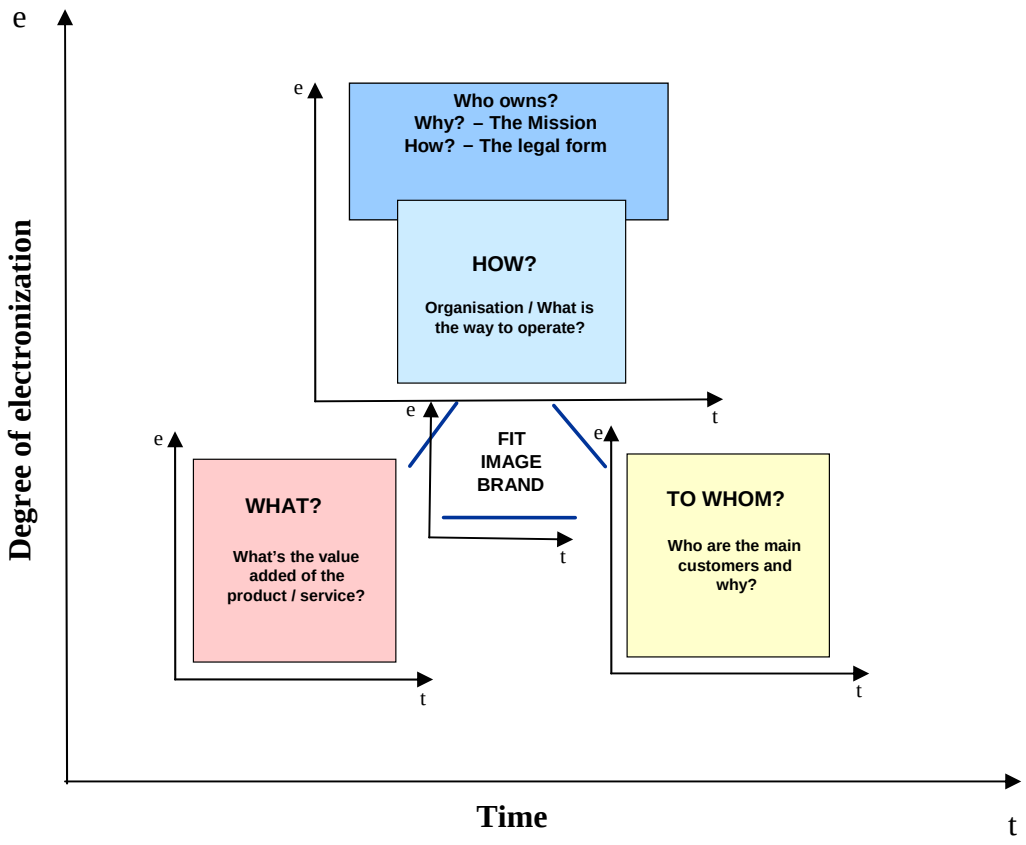


Figure 2. The DBE research framework for Regional Catalyst

So far in the DBE project the focus has mainly been on issues related to what products or service the DBE should produce and to whom. In other words, in the language of corporate strategy literature, the discussion has revolved around the classic product-market decisions. Questions related to the organisation and the way to operate, to (1) who are or should be the owners of such activity, (2) what is or should be their mission, and (3) how is their operation structured legally and fiscally, have been far less addressed. In the context of the Regional Catalyst, and the envisioned effects and dynamics of the same, these are central concerns, however.

1.4.3 Research Process

This study is part of the process of defining "The Concept Regional Catalyst in the Context of the DBE" in the DBE project. There are other steps, activities and deliverables included in the process. The whole process goes as follows:

1. This study
    - Month 12: Deliverable 31.1. Analysis and specification of current and potential regional catalysts
    - "the conceptual frame"

2. After this study
    - First version of the operational construct of Regional Catalyst in DBE
    - "the proposition"

3. Testing in practice

4. After testing in practice
    - Deliverable: Regional Catalyst in DBE, conceptual and functional description
    - "the manual"
    - the operational construct, emphasis in functional description

Several iteration rounds are planned between phases 2 and 3 as illustrated in Figure 3 below.

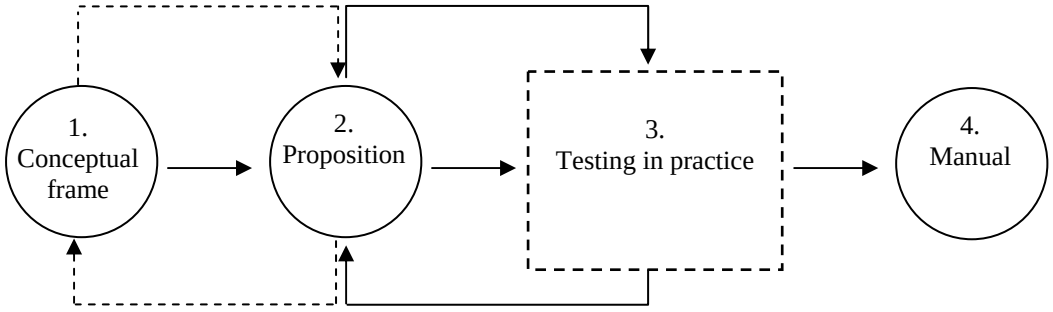


Figure 3. Research process.

1.5 Deliverable structure

First, the background and the research phenomenon are presented in this study. Secondly the mission and research strategy are discussed. The framework for the research is also presented and discussed in the introduction.

In the second chapter the basic concepts underlying the study are discussed. An overview is made of the ecosystem concept and secondly the regional catalyst concept. The discussion follows the path from ecosystems to digital business ecosystems, and from catalysts to regional economic or business catalysts.

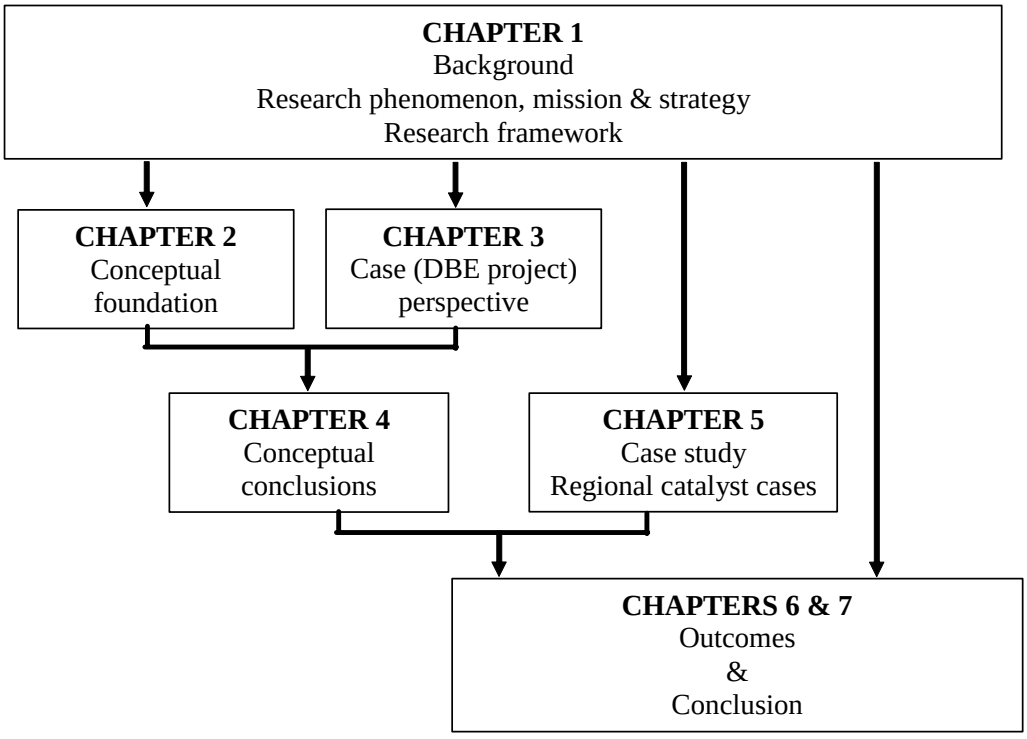
The case perspective is brought into the conceptual analysis in Chapter 3. This chapter studies the requirements and expectations of the DBE project toward the regional catalysts. The expectations concern firstly the regional catalysts in general and secondly the specific activities performed by the regional catalysts.

Based on the conceptual foundation in Chapter 2 and the case perspective in Chapter 3, some conceptual conclusions are drawn in Chapter 4.

Regional catalyst cases are discussed in Chapter 5. Based on the conceptual conclusions and case studies, Chapter 6 presents outcomes of this study. The outcomes are presented following the research framework introduced in Chapter 1.

Finally, overall conclusions of the study are presented in Chapter 7.

The following chart illustrates the deliverable structure and the logical progress of the study.



2 Conceptual Foundation

The use of ecosystem thinking has spread from natural sciences to social and business sciences. Natural ecosystems have been used as metaphors in studying *business ecosystem*. Thus there is a wide range of studies and conceptual definitions concerning business ecosystems. The ecosystem metaphor is also used in computer science, which has led to several definitions and interpretations of the concept of *digital ecosystems*. The concept of *digital business ecosystem* is still to be conceptually defined, and is seminally used in the DBE project context. The concept of a regional catalyst is quite widely used for a wide variety of meanings. However, in the context of the DBE, Regional Catalyst is an undefined concept. In the following chapters an overview of these concepts is presented.

2.1 Ecosystems

2.1.1 Ecosystem Definitions

The ecosystem concept originates from natural sciences. Ecosystem can be defined in biology as: “The organisms in a plant population and the biotic and abiotic factors which impact on them. (The Department of Biochemistry, Molecular Biology & Cell Biology, Northwestern University, 2004)”

The use of the ecosystem concept has also spread to other sciences and contexts, e.g. “An ecosystem is a system whose members benefit from each other's participation via symbiotic relationships (positive sum relationships). It is a term that originated from biology, and refers to self-sustaining systems. (Learn That, 2004) ”

The ecosystem metaphor has been used and also established in so many disciplines and contexts that some of the ecosystem definitions do not even refer to the original context of natural sciences and so to natural ecosystems. For example, an ecosystem can be defined as

“a system formed by the interaction of a community of organisms with their physical environment. (http://www.thefreedictionary.com/Ecosystem) “

or

“The principles underlying the study of ecosystems are based on the view that all the elements of a life-supporting environment of any size, whether natural or man-made, are parts of an integral network in which each element interacts directly…(Encyclopaedia Britannica Online, 2004.)”

Some conclusions about ecosystems can be drawn from the definitions. Ecosystems are self-organising and self-sustaining in nature, and members/organisms interact with each other and are connected to the surrounding environment.

2.1.2 Business Ecosystems

A common result in searching for business ecosystems was e-business ecosystems. In the following examples some of the business ecosystems refer to the business overall and some of them are linked to Internet economy. For example, ecosystems are seen as the business models for the Internet economy (Sandsmark, 2004.) "By building an Internet ecosystem, companies take advantage of the web of partners, along with Internet technologies, to create a horizontal business model and conduct business processes online (ibid.)" Sandsmark also presents nine steps to be remembered when building a business ecosystem:

1. Know what you bring to the table.
2. Remember, relationships are interdependent.
3. Attracting the Right Partners - Choose quality over quantity.
4. Don't let Darwin stand in your way.
5. Think like a diplomat, not like a spouse.
6. Specialize in locating the right partner.
7. Consider your culture.
8. Watching Out for Your Own Best Interests - Look at the bottom line.
9. Protect your own interests.

No analysis of business ecosystems vs. e-business ecosystems is carried out in this study since it would require a total conceptual analysis of e-business. The emphasis in this research on business ecosystems is to consider business ecosystems in a wider context rather than narrowing or differentiating the different facets of business ecosystems, e.g. e-business ecosystems. In this broader context, business ecosystems can be defined as "a system where the relationships established across different industries become mutually beneficial, self-sustaining and (somewhat) closed. (Learn That, 2004)"

Iansiti (2004) emphasises the organisms (stakeholders) of business ecosystems and the co-evolution of these organisms: Business ecosystems: "…loose networks—of suppliers, distributors, outsourcing firms, makers of related products or services, technology providers, and a host of other organizations—affect, and are affected by, the creation and delivery of a company's own offerings. (Iansiti et al., 2004)"

In Moore's (1996) definition, the co-evolution of the organisms is also taken into account. Business Ecosystem is seen as "an economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to more toward shared visions to align their investments, and to find mutually supportive roles. (Moore, 1996)"

Other characteristics than the evolution of natural ecosystems have also been seen to be central to business ecosystems: “A capitalist ecosystem can be best comprehended as a living ecosystem. Key phenomena observed in nature – competition, specialization, co-operation, exploitation, learning, growth, and several others - are also central for business life. Moreover, the evolution of the global ecosystem and the emergence of modern industrial society are studded with striking parallels”. (Rothschild, 1990)

One issue in defining the business ecosystem is to consider the relationship of the business ecosystem to a single company and business environment. Robin Wood (2000) has mapped business ecosystem among the external and internal domains around an enterprise in the following way.

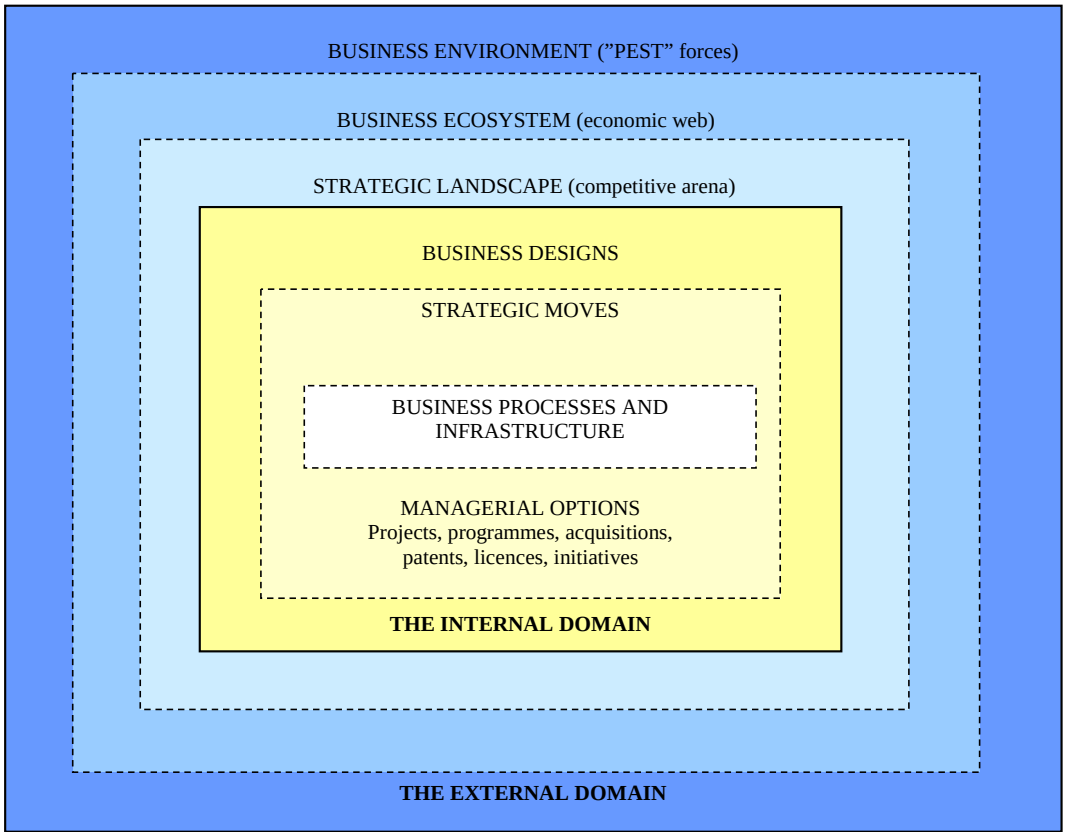


Figure 4. Positional business ecosystems in an enterprise’s internal and external domains (adapted from Wood, 2000).

In this viewpoint, business processes and infrastructure, managerial options and strategic moves are part of a company’s internal environment. Strategic landscape, business ecosystem and business environment form the external domain of a company. The company cannot directly affect the external domain. The choices made in the internal domain affect the company’s success and performance in the external domain. Wood states that the business ecosystem is part of a larger external domain level, business environment, where the “PEST” forces (political, economic, social and technological) are beyond a company’s control but influence the characteristics of the

business ecosystem. Business ecosystem is defined as "…community of organisations and stakeholders (players) operating within a particular business environment, which collaborate and compete in an economic web of relationships. This web of relationships co-evolves through time subject to general forces in the business environment and specific moves made by the web of players."

It can be concluded that business ecosystems have characteristics of living ecosystems such as interacting organisations and individuals (organisms), evolution (including self-organising), competition, specialisation, co-operation, exploitation, learning and growth. These are also the main factors that differentiate business ecosystems from the concept of business networks. The conclusion of the position of the business ecosystems with regard to an organisation and its environment follows the one presented in Figure 4: A business ecosystem is part of the external environment of an organisation and it is surrounded by other than business forces as part of the external environment.

2.1.3 Digital Ecosystems

The use of ecosystem metaphor has also spread to computer science. The use of the digital ecosystem term is somewhat diverse. For example, the concept of digital ecosystem is used in referring to carrying out internal and external business processes facilitated by technological solutions and infrastructure: "The essence of Digital Ecosystems is establishing streamlined, interconnected internal and external processes required for business operation implemented over a robust and reliable distributed infrastructure with sufficient control and monitoring systems" (Silicom, 2004). According to this perspective the Digital Ecosystem includes and integrates

- E-Commerce, - On-line order processing
- Marketing - Product and service information
- Customer Service - Customer care, telephone support, information, on-line help, software download
- Outsourcing - Activities and tasks required for a business but performed outside the company
- Inventory - Tracking and ordering
- Suppliers - Materials and services required for business operations but provided with a high level of outside involvement
- Co-business Partnerships - Business functions that are an integral part of the business, but outsourced for strategic reasons
- Non-Internet Operations - Core competency that is not information technology related (e.g. growing strawberries) (Silicom, 2004.)

Digital ecosystem may also refer to the Internet and the opportunities Internet offers: "Perhaps the most significant impact of the Internet on the business world is the shift from physical to digital value chains. The Web makes it possible to develop deeper relationships with customers by linking the information systems of interacting organizations together in order to reduce or eliminate the time required to react to

changing market requirements — leading to the construction of complex business-to-business Digital Ecosystems. (Kulkarni et al., 2003.)

Besides the Internet, digital ecosystem may also refer to the technical infrastructure formed by information technology applications: “A holistic approach to building a digital ecosystem is a three-part process that includes the following:

> 1) Digital Blueprinting to map out an organization's existing infrastructure and determine a strategic direction.
>
> 2) Constructing a technology solution that takes advantage of business opportunities.
>
> 3) Managing and upgrading existing applications cost-effectively”. (Kulkarni et al., 2003.)

The previous examples of the use of the digital ecosystem concept imply that the digital ecosystem concept is not yet well established and that there is still a lot of variation in the use of the concept, ranging from business perspectives to purely technological perspectives. Moreover, the ecosystem characteristics of digital ecosystems are not widely discussed.

2.1.4 Digital Business Ecosystems

The concept of digital business ecosystem is still to be conceptually defined, and is seminally used in the DBE project context. The concept has been mainly used in the DBE project related material or in the discussion paper preceding and forming a pillar of the DBE project.

The discussion paper by Nachira (2002) takes the perspective where the digital business ecosystem is presented as a stage of the ICT adoption (the use of the Internet) in an enterprise: “Digital business ecosystem is seen as the latter step in the adoption of Internet-based technologies for business, where the business services and software components are supported by a pervasive software environment, which shows an evolutionary and self-organising behaviour, will be named digital business ecosystems” (ibid.).

Following this definition, an adding some technological flavour, the DBE Project has then defined Digital Business Ecosystem as an “evolutionary self-organising system aimed at creating a digital software environment for small organisations that support regional and local development by empowering open, distributed and adaptive technologies and evolutionary business models for the growth of small organisations” (DBE Technical Annex).

The conclusion of the digital business ecosystem concept can be made, due to the sources found and purposes of use of the term, only in the DBE project context. These conclusions are presented in Chapter 4.4.

2.2 Regional Catalysts

2.2.1 Catalyst Definitions

Like the concept of ecosystem, the catalyst metaphor originated in the natural sciences. Catalyst can be defined in chemistry for example in the following ways:

"A substance that increases the rate of a chemical reaction without itself being permanently changed" (The Department of Biochemistry, Molecular Biology, & Cell Biology, Northwestern University, 2004).

or,

"A substance that increases the rate of a chemical reaction by reducing the activation energy, but which is left unchanged by the reaction"(About, 2004).

or,

"A catalyst will change the rate of a reaction. A catalyst is often used to make a reaction go faster. The catalyst itself does not take part in the reaction. It is not changed by the reaction, it is not used up during the reaction, it is still there when the reaction is complete. A catalyst is usually a transition metal, a transition metal oxide (see uses of transition metals) or an enzyme in living cells. An exception is aluminium oxide, used in the Cracking of Hydrocarbons. (gcsescience.com, 2004)"

The catalyst concept has also been applied to other contexts than natural sciences. According to Hyperdictionary (2004) "a catalyst is
1) something that causes an important event to happen; "the invasion acted as a catalyst to unite the country"
2) (chemistry) a substance that initiates or accelerates a chemical reaction without itself being affected"

To summarise these natural science definitions, a catalyst accelerates or facilitates a reaction, but remains unchanged itself.

2.2.2 Regional Catalysts in Economic/Business Context

Regional Catalysts are referred to in various contexts in books, articles, reports, etc. A large data search, conducted in this research, demonstrated a very diverse and large-scaled usage of the term "regional catalyst". To narrow and focus the concept analysis to better meet the needs of the DBE project, the term regional catalyst was studied in business contexts. At this point, the concept was directed more towards referring to Regional Economic Catalysts. However, even in a business context, the term Regional Catalyst means quite a lot of different things. The analysis shows that in the business context at least the following categories of regional catalysts can be identified:

- Continent or geographic area
  e.g. Asia can act as a catalyst and driver for global economic development

- Legislation, policies and policy actions
  e.g. nation's investment policy, deregulation, development aid, the Finnish Employment and Economic Development Centres model

- Characteristics of a region
  e.g. city's aesthetic qualities, physical infrastructure (e.g. an airport)

- A whole industry
  e.g. tourism, food industry, casino gambling, city theatres

- Innovations

- Information and communication technology
  e.g. "information superhighway", investments in ICT

- Development projects

- Single organisations and businesses
  e,g, a park or commercial area, arts centre, harbour, universities, research institutes or educational institutes, a prominent co-ordinating organisation, company headquarters, entrepreneurs

- Premises
  e.g. the International Convention Centre in Birmingham

- Events
  e.g. the EXPO.

The nature of the regional economic catalysts presented above differs quite a lot form each other. Considering the operator perspective chosen for the study (the reasoning presented at the beginning of this study), the term Regional Economic Catalyst is used in this study to refer to regional *organisations* that accelerate regional economic growth and business development (technology adoption being one tool to foster business development).

In most of the above-mentioned cases the regional catalyst has similar characteristics to the catalysts in natural sciences (see previous chapter); facilitating or accelerating a reaction. In these cases the reaction is some economic development or transformation process. However, the other aspect of natural ecosystems, the unchanging nature of a catalyst, does not quite apply for these examples. For example, policy actions change, ICT develops rapidly, and organisations change. In addition, the changing nature of these instances is preferred, even while the "reaction" takes place. Considering the operator or organisation perspective of the catalyst, it is also argued later on in this study that the regional catalyst in the DBE must change and develop during the process. In this respect it could be even argued that the term "catalyst" is not appropriate in this study. Close terms could be "accelerator" or "facilitator". However, the term catalyst will be used later on in this study, with the notion that the regional catalyst is expected to change during the transformation process.

3 Expectations of the DBE project for Regional Catalysts

3.1 Expectations for Regional Catalysts

Regional Catalysts are referred to in various contexts in the DBE project. There are several expectations for the characteristics of Regional Catalysts. Regional Catalysts should be regional head-cluster organisations. They should have profound knowledge and experiences of the local SMEs. Thirdly, Regional Catalysts should have knowledge both of business development and technologies. Hence they should be able to involve SMEs in integrating business and technical processes.

On a more precise level, the following requirements for Regional Catalysts are listed in the project's Technical Annex:

- Able to recruit about 80-100 SMEs per region. This is an agreed target which regional catalysts are able to capture considering their local role and the resources allocated for that purpose.
- Have sound experience in SMEs' perspective and behaviour.
- Demonstrate a good knowledge of their local environment
- Demonstrate solid past experience in recruiting SMEs and in regional connector of SMEs needs.

"In DBE approach a Regional Catalysts is a regional head-cluster organisation with deep knowledge of the SMEs and their local environment, able to involve SMEs in integration business and technical processes. Regional Catalyst is an aggregation of connected organisations concentrated within a particular region. Its aim is to enable them to competing or collaborating on world markets. We assume, considering the core concepts of the project, high knowledge of diverse combinations of ICTs within the Catalyst, in order to support the technology advanced solution expected by the project." (ibid.).

3.2 Regional Catalyst Activities

3.2.1 DBE Technical Annex

Concerning the Regional Catalyst activities, several activities are identified by the DBE project (DBE Technical Annex):

Recruit the local SMEs (software developers and DBE users)

"Regional catalysts will recruit SMEs members according to roles established by the DBE Consortium through European wide calls for tender to form the first local digital ecosystem based on the DBE approach. The definition of a valuable grid for the

selection of the most adaptable SMEs for the DBE platform will be the result of more than one year of research on business analysis and computing implementation."

SME support and populating the ecosystem

"… and on the other to help involved SMEs in populating the DBE with services and application needed for the local ecosystem and extending the market reach of their local small businesses."

"Regional Catalyst roles: Become a business facilitator both from DBE to SME and vice versa."

" Support SMEs in their integration inside the DBE."

Network building

"The attracting role of the Regional Catalysts and technology transfer centres involved in the project will increase the enterprise network collaboration enabling, through the DBE technology, SME software users to access external economies of scale, while new distribution and larger market opportunities will become available to SME software providers"

"Regional Catalyst roles: Define a picture of the industrial domains of the involved regions and SMEs role inside them."

Disseminate results, transfer and adoption

"…one side the catalyst will work with the local SMEs community to disseminate DBE results and opportunities…"

"Regional Catalysts, will look after the transfer and adoption in regional innovation clusters"

Access control

"The DBE will be self-managing with the exception of access control that will be provided by SME catalysts acting as gatekeepers and certification authorities for the platform."

"The DBE will have no central authority responsible for its maintenance and administration after the end of the project. Responsibility for this will be distributed amongst SME member and SME catalysts"

"We propose the use of SME catalysts for the roles of gatekeepers and disseminators of the DBE. Their role as entry points and certification authorities for SMEs will have

a direct correlation in the DBE architecture: they will act as super-peers in the scale-free P2P architecture."

Policy actions

"The DBE will provide a new means of linking up local places and regions within networks of organisations. The direct involvement of regional catalysts will proactively activate local policy makers to integrate advanced DBE solutions and to link local geographically clustered firms and other organisations beyond their immediate regional surroundings."

National level funding

"The participation of Regional Catalysts acting as local innovation centres and enterprise accelerators will improve co-ordination of national research activities, strategies and policies as we plan to mobilise local indirect funds as well as national funds around the DBE."

Training and community building

"The cornerstone of the DBE training approach is that catalysts can deliver learning modules at the local level, while SMEs are empowered to learn at the individual level in their own sites."

"Regional Catalysts (TTC, ITA, UCE) act as internal DBE training recipients. The regional catalyst coordinates regional training and community (including SMEs, and local actors that take part in the DBE) building activities, thus it catalyzes the process of regional DBE community building as well as knowledge creation and dissemination."

"Each regional catalyst coaches and selects a group of SMEs in their realisation of a project with the DBE."

"Regional Catalysts will also evaluate content available in the regional network that could be used for initial knowledge sharing and for assessing regional and national initiatives and programmes."

"Regional catalysts are involved in evaluating training."

3.2.2 Recent Project Documentation

During the execution of the project the activities of regional catalyst have been further elaborated and structured. In the kick-off meeting of the project the foreseen activities of RCs in the course of the project were divided into three categories (Presentation of the WP leader Petri Räsänen):

1. Tasks performer
   Regional catalysts are conducting some parts of the research and development work

2. Match-Maker
   Regional catalysts link local businesses and DBE technology development by communicating and marketing activities, organising requirements gathering, recruiting users and developers, providing training and support and ensuring political support in the regions

3. Collaborator
   Regional catalysts enable the concurrent development by providing support to other work packages and linking regional actors to the tasks of the project.

Later on, in the project deliverable 28.1. DBE preliminary training resource plans and needs, the role of regional catalysts as a regional match-maker and community builder, was further developed. In this document an important notion about the dynamic nature of the regional catalyst activity was made explicit. The development and adoption of DBE is now seen as a dynamic process where the emergence of the DBE takes place in five evolutionary phases:

1. regional initiation
2. encouragement of self-dynamic sub-communities
3. cross-community integration
4. sustain
5. transfer

In each of these phases the catalysing consists of different kinds of activities. Training, as a core instrument of catalysing activities, takes multiple forms and target groups that are different in each of these stages. Evaluation has an important role when moving from one stage to another.

4 Conceptual Conclusions in the DBE Context

4.1 Regional Catalyst vs. DBE Project Partner

The term Regional Catalyst is used for different purposes in the DBE project. On some occasions it refers to the regional partners of the DBE project and on other occasions to the Regional Catalysts in the DBE context. Three levels for purposes of use of Regional Catalysts can be defined. For the sake of clear communication, the terminology has been specified in the following way. (The definition and specification of terms were carried out during spring 2004 by the responsible partner of the WP 31: "Regional Catalyst Action" and this deliverable, and it has been communicated to the project partners via e-mail and the DBE bulletin.)

1) Regional Business/Economic Catalysts
- the overall term for regional organisations that accelerate regional economic growth, and business development (technology adoption being one tool to foster business development)

2) Regional Catalyst in the DBE
- DBE –specific; the concept of regional catalyst in the context of the DBE

3) DBE Regional Partners
- partners in the consortium representing the three target locations (TTC, ITA, UCE) and fulfilling the specified project tasks.

This study concerns the second level, 2) Regional Catalyst in the DBE. It should be noted that the DBE project regional partners might not be the ultimate Regional Catalysts in the Digital Business Ecosystem. As will be presented in this study later on, it is most probable that none of the DBE Regional Partners alone will fulfil the specifications of Regional Catalyst in the DBE. Also, this study is not to find ways to develop the DBE regional partners to fulfil the specifications of Regional Catalyst in the DBE, but to create an optimal concept for Regional Catalysts in the DBE.

4.2 DBE Project vs. Sustained DBE

The time scale should be taken into consideration when specifying Regional Catalysts. Some of the activities and catalyst organisation refer to the actual DBE project phase, and some to the state where the DBE is sustainable. The catalyst activities and the organisations carrying out the activities differ quite a lot with regard to the DBE phase (project vs. sustained situation). "Sustained" here refers to the time scale after the DBE project. Another way to define the time scale is to distinguish between the build-up phase and sustained phase of the DBE.

Three different time scales or conditions can be defined: 1) the DBE project, 2) build-up of a DBE (not connected to this DBE project), and 3) sustained DBE (either after

this DBE project or after some other form of build-up of a DBE). All of these conditions have different impacts on the regional catalyst activity. With regard to the research framework (Figure 2), this path can be considered as the path or axes of the level of electronization (see Chapter 1.4.2).

4.3 Region vs. Domain Specific Catalyst

According to the regional catalysts analysed earlier in this study, the catalysts can be divided into two categories: **domain specific** catalysts and **region specific** catalysts. Domain specificity means that the activities are directed at a certain industry, domain, or as stated in the DBE project, opportunity space. The reach of these activities, and thus the target organisations are not limited to a certain geographic area. For example, a company (e.g. a system integrator or network head) could accelerate and facilitate (catalyse) business development and technology adoption, and in a more specific way, the digitalisation of business processes, of (a) certain network(s) in an industry. The need for industry or sector specific networks is emphasised in the experiences from previous e-business initiatives (see e.g. European Commission, Information Society, 2004). The region specificity means that the catalyst activities are directed to, and hence the target organisations of a catalyst are located in, a region or specified geographical area. For example, a city's business development agency might provide services to companies located in the region, regardless of the domain or industry of the company.

4.4 Digital Ecosystem vs. Business Ecosystem

With regard to the digital business ecosystem concept, the outcome of the conceptual analysis is that a digital business ecosystem is a DBE project related concept (at least for now). In the DBE project the acronym "DBE" usually refers to the technological infrastructure to be built on the project. In a wider context, it can be concluded that a digital business ecosystem is based on a co-evolution or co-existence of different ecosystems -- co-evolution of digital ecosystem and business ecosystem -- not a totally new ecosystem but, at least partly, a merger of other, co-existing ecosystems.

There are experiences and examples of region specific catalysing of (local) business ecosystems (see the example in 4.3), and also domain specific catalysing of digital ecosystems (see the example in 4.3). In addition, some of the region specific catalyst activities have influenced and been targeted in catalysing the digital ecosystems, for example, in the creation of new software as illustrated in level A) in Figure 5.

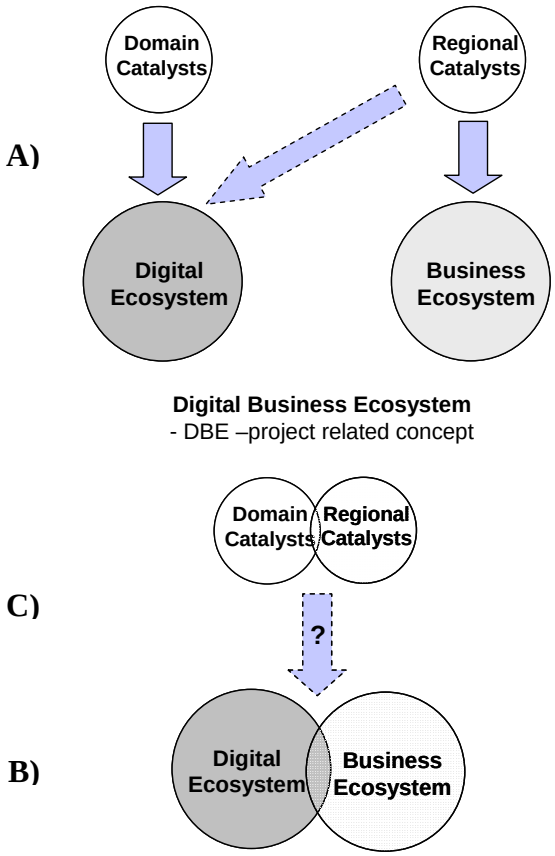


Figure 5. The conceptual structure of Regional Catalysts and Digital Business Ecosystems

With regard to level B) in Figure 5, the relationship of business ecosystem and digital ecosystem can also be seen as a digital ecosystem being one part of the business ecosystem. In fact, the digital ecosystem circle could be placed inside the business ecosystem circle. This visual solution would emphasise the facilitating role of the digital ecosystem. The purpose is that the digital ecosystem (technology, digital solutions) is a facilitator or means to influence the business ecosystem, not the other way around. With regard to this, Eve Mitleton-Kelly states that the relationship, or co-evolution, of the information systems (digital ecosystem) and the business domain (business ecosystem) including technology, strategy changes and relationships between individuals faces problems that are rather socio-technical than technical in nature (Keskinen et al., 2003). In addition, it could be argued that there are also other ecosystems, for example, social ecosystem, that should be taken into account in the figure.

What is being specified in this study is the concept of the Regional Catalyst in the context of the Digital Business Ecosystem. This involves a parallel study of domain catalysts and regional catalysts as illustrated by level C) in Figure 5. According to the previous analysis, the specification is: ***co-catalysing (domain and regional) of the co-evolving and co-existing ecosystems (digital ecosystem and business ecosystem)***, see Figure 5. The catalysing should include domain specific and region specific catalysing and it should be directed at 1) both ecosystems and 2) the co-evolvement or co-existence of the ecosystems. What is meant by this catalysing is defined later in this study.

5 Case study

As part of the empirical research, case studies were conducted for the purposes of this study in the Tampere Region. The chapter starts by presenting an overview of the region and local innovation system. A more detailed analysis of the target regions (Tampere, West Midlands and Aragon) and local innovation systems is carried out in a separate deliverable (Benchmark Report) by CENSIS.

5.1 Local innovation systems

With its approx. 455 000 inhabitants the Tampere region is the second largest region in Finland. The region comprises 33 municipalities and 6 sub-regions and has an area of 14 292 km. The largest city of the region is the City of Tampere. Tampere has 200 470 inhabitants and is located 170 km north of Helsinki.

The Tampere Region is the historic industrial powerhouse of Finland. The key strengths of Tampere lie in the wood and metal processing industries, especially in the demanding mechanical engineering and automation technologies, and in rising areas such as ICT, health and biotechnologies. It has grown into a dynamic area of high-class education and efficient research. High technology accounts for a remarkable share of the added value in the Tampere region. The education level is higher than the average in Finland and the contribution to R&D is quite high. With regard to the distribution of the workforce by occupation, services form the major proportion with 62%, manufacturing the second highest with 33%, and primary production with others the smallest proportion with about 5%.

The economic development policy of the region has been based on the reinforcement and development of achieved and existing strengths. These strengths include e.g. world-class infrastructure, accessibility, safety and environment and investment in research and education. The strategic development of the region has been guided by a cluster-based approach that is operationalised in the local implementation of the centre of expertise programme.

The Tampere Region Centre of Expertise programme is part of the national economic development programme. The defined fields of expertise in the Tampere Region are mechanical engineering and automation, information and communications technology, health care technology and media services. Further important areas of development included knowledge-intensive business services (KIBS) and the meetings industry. The centre of expertise programme is realised by organising jointly funded technology and business development project, establishing networking structures between companies and research and training institutions, building innovative operating environments and creating opportunities for international cooperation.

The results of the chosen strategy have been widely recognised. In international comparison the Tampere Region has been seen as a good example of how regions can

get out of path dependency and create new growth-oriented development paths, not only by modernising traditional industries but also by developing new high-tech industries. The most significant factors explaining this success included the ample provision of workforce with tertiary education related to ICT and a number of financial and intermediary institutions bridging the gap between industry and research institutions.

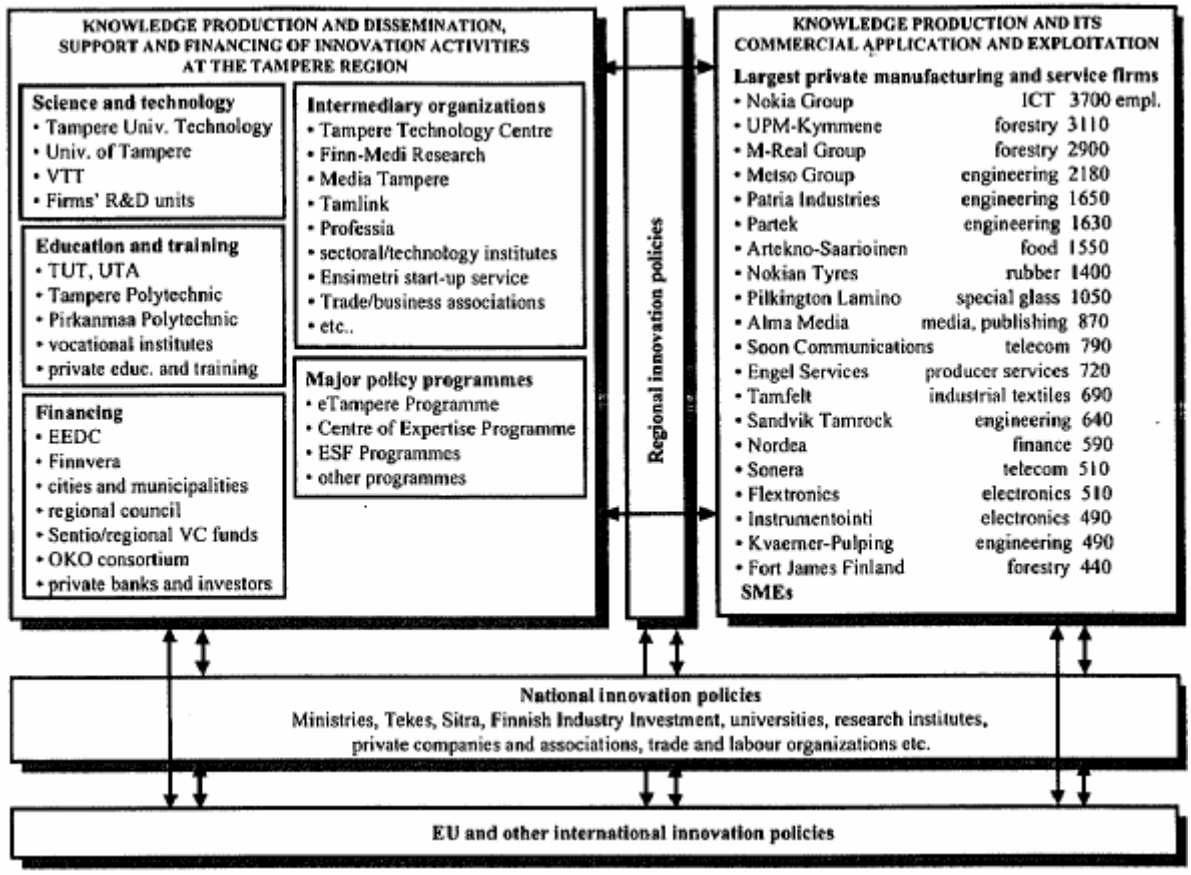


Figure 6. The regional innovation system of the Tampere Region.

However, the transformation process from traditional resource based economy to knowledge-based economy is still ongoing and is faced with some major problems - internationalisation of businesses (seen in the shortage of skilled personnel in international business and in the lack of knowledge of international markets) and the number of newly established businesses in general and within the growing industries in particular being the most challenging ones. To face the challenges new actions are continuously being planned and executed, eTampere, BioNext, and a foresight-based development programme being examples of these actions.

5.2 Case interviews

The interviews were carried out to study the "current regional catalysts". The interview targets were in regard to the classification presented in Chapter 4.1. "Regional Business/Economic Catalysts", i.e. organisations that operate regionally and foster or accelerate business development and ICT adoption in local SMEs. The interviews were aimed at studying the operational model of these organisations following the framework presented in Chapter 1. The questions comprised issues related to customers, services and organisation (with the extended viewpoints), see interview outline in Appendix 1. The interviews were expert interviews so that the interviewees were CEOs or managing directors of these organisations. The data gathered in the interviews in Tampere is analysed in this study.

5.2.1 Organisation A

Organisation A is a science park and a development corporation specialised in technology transfer. It was established in 1990 and employs 20 persons. The interviewee is the Managing Director of the organisation and has worked in the organisation for 14 years. The mission of the organisation is to create new jobs by facilitating the creation of new businesses from the Tampere University of Technology. It is a non-profit corporation (Ltd) and 100% owned by the City of Tampere. 50% of the funding comes from the turnover and 50% from public subsidies. The organisation operates in co-operation with businesses, universities and governmental bodies.

The main customer segments are companies in the local ICT cluster and in mechanical engineering. The public sector is seen as a tool to push development in the companies. The services provided for the customers include development activities and educational programmes. These services are given to a group of companies (cluster) rather than to single companies in one-on-one services. Regarding service provision organisation A is organised in an ICT team and a mechanical engineering and automation team. Most of the services are provided by coordination activities. These coordination activities include coordination of educational programmes. In these education programmes, the actual expertise and education is usually outsourced. Such coordination activities are rather standardised. Some of the development activities are provided by their own teams and are not that standardised in nature. Most of the business development services are outsourced to a development company which is aimed at helping businesses to commercialise technology based products and business innovations, and to develop the business of technology-based companies.

According to the interviewee, the main challenges in working with the SMEs in business development and fostering ICT adoption is the time range; SMEs are not willing to invest for the future, but want to have the results immediately. The interviewee sees the DBE project as a new paradigm in the software industry (open source software) reducing the digital divide by better serving the SMEs with OSS offerings (including ICT services). Also, the DBE project cannot afford to wait for the

results, but needs immediate communication with the SMEs. Some kind of pilots or preliminary results are needed to show the potential for the SMEs

5.2.2 Organisation B

Organisation B is a local chamber of commerce. It employs 6 persons and was established as early as in 1918. The position of the interviewee is Assistant Manager and she has worked in this organisation for 15 years. The mission of the organisation is to promote the interests of businesses in the region, including lobbying the interests of companies to authorities. The members of the chamber own 100% of the organisation and the legal form is association. The funding structure is private; 95% of the members (owners) are businesses and the rest includes associations, universities and municipalities.

The customer segments (members of the organisation) follow the distribution of business sectors in the region. Private services form about 45% of the customers, industry about 30%, trade about 15% and construction about 5%. Thus the customers are from different industries and domain areas. The services include promotion of interests of regional businesses, information for members, authorization of auditors and foreign trade documents. Training services are usually coordination activities in such a way that the organisation organises the training but uses experts to provide the content. Communication and network services are provided e.g. by providing forums for discussions and publishing the chamber magazine and yearbook. Some of the development services, e.g. expanded reports for internationalisation purposes, are provided on a one-on-one basis. The revenue is mainly generated by membership fees with a small proportion by service fees from educational services.

The organisation has organised some of its activities into projects, one example being the Tampere Business Campus project (TBC). The TBC was initiated by local businesses. Its aim is to enhance the competitiveness of the businesses and individuals in the region by promoting competence and expertise. The project implementation emphasises co-operation while increasing interaction between businesses themselves and between businesses and training organisations. The project started in 2002, and it has experienced a rapid take-off involving a respectable number of local businesses in educational programmes.

The main challenge, in the interviewee's view, in working with the SMEs in developing their business and fostering ICT adoption is to explain concretely how the SME would benefit from the ICT in question. This also applies to the DBE project: it would be important to understand the (SMEs') businesses and have concrete descriptions of the services to show the influence of the DBE to their (an SME's) business.

5.2.3 Organisation C

Organisation C is a development organisation specialised in knowledge transfer. It was established in 2000 and employs 8 persons. The interviewee has worked in the organisation for 2 years and is the Managing Director. The mission of the organisation is to develop and consult companies in knowledge intensive business services (KIBS). The ownership structure of organisation C is: City of Tampere 25%, University of Tampere Foundation 25%, Finnvera 25% (a specialised financial and export credit guarantee company owned by the state) and regional venture capital fund 25%. The legal structure is corporation (Ltd). 95% of the funding is income from the public sector in which 10-15% is budget-based, in the form of grants, and the rest is market-based from services sold.

The customer segment is knowledge intensive businesses and companies/ organisations offering knowledge intensive business services (KIBSs). The services include business development activities to either start-ups or existing organisations. The idea in producing the services is to keep organisation C small. The so-called incubator services are partly standardized and partly tailored. Many of the other services (e.g. projects) are outsourced. One example of the development projects is the eSME programme. The aim of the eSME is to facilitate SMEs in their process of electronization. The programme integrates or intermediates the SMEs and ICT providers (including ICT service providers) with the help of eSME consultants. These consultants are special selected consultants who have operated in the field for recognised experience and expertise. The typical process of the eSME concept goes as follows: an SME entrepreneur contacts the service, needs are assessed with the help of the consultants, a path of advancement is constructed, help is provided in seeking potential supplier candidates, the measures implemented for the SME entrepreneur are reported and entered in statistics (needs assessment, implementation plan, customer survey). The specification or needs assessment is free of charge for the entrepreneur. The actual ICT implementation takes place between the SME and the service provider with “usual business”. The concept is publicly funded, but there are considerations of forming the concept into a self-sustainable format. So far there are about 170 service providers involved in the concept, about 330 needs assessments and about 240 consultants’ reports have been carried out. The experiences of this new concept (started spring 2004) have been promising and the future objectives in involving SMEs in the concept are set high.

According to the interviewee, the main concerns in working with business development among SMEs are to demonstrate the actual profit of the development actions to the SMEs. Knowing the businesses should be the starting point, then trying to find solutions where ICT would help. The challenge concerns whether the SMEs will take action or not, and this is part of the challenge of change management.

5.3 Quantitative questioning

A research presentation concerning regional catalysts in the DBE was given by the authors of this deliverable at a conference in Tampere in September 2004. This eBRF 2004 conference is an academic research conference focusing on understanding business in a knowledge society. The conference participants were given a voter device which enabled on-line voting. Each of the research presentations had an opportunity to pose questions to the audience after the presentation. The two questions or statements posed after the presentation of "the Concept of Regional Catalysts in the Context of the Digital Business Ecosystem" were:

1) Software (components) can have fully evolutionary, self-organising and self-adaptive behaviour.

2) A regional intermediator (regional catalyst) is needed to reach such a status of the matter successfully.

The choices for answers for both of the questions were:

1. Totally agree
2. Partially agree
3. Neither agree or disagree
4. Partially disagree
5. Totally disagree

The respondents seemed to have a varying vision of the evolutionary, self-organising and self-adaptive nature of software components. In question 1, a majority (2/3) of the respondents partially agreed with the statement. However, 1/3 of the respondents partially disagreed with the statement.

The respondents seemed to have a more stable vision of the need for an intermediator or regional catalyst. In question 2, a clear majority of the respondents (3/4) either totally or partially agreed with the statement. The rest of the respondents either partially disagreed or did not have an opinion on the matter.

5.4 Conclusions

It is evident from the case studies, and from the single regional case study focusing on Tampere, that catalysing activity is needed and it is experiencing significant and rather rapid changes even outside (and without having introduced) the DBE context. According to the quantitative questioning (see Chapter 5.3), it seems that the academic business researchers take the ecosystem characteristics of the digital world with doubts, but consider a regional catalyst action necessary to create a digital ecosystem, should it be attainable.

Electronization of business creates pressures for the catalysts to change. There are significant pressures towards outsourcing, increased Business-University-Government interaction and new forms of private-public-partnerships. Each of the case studies conducted and introduced for the purposes of this study demonstrate this vividly.

Even outside the DBE context, there appear to be significant experiments and discussion ongoing as to who should own, operate and control which operation, what the targets and purposes of each operation should be and how the operations should be legally organised.

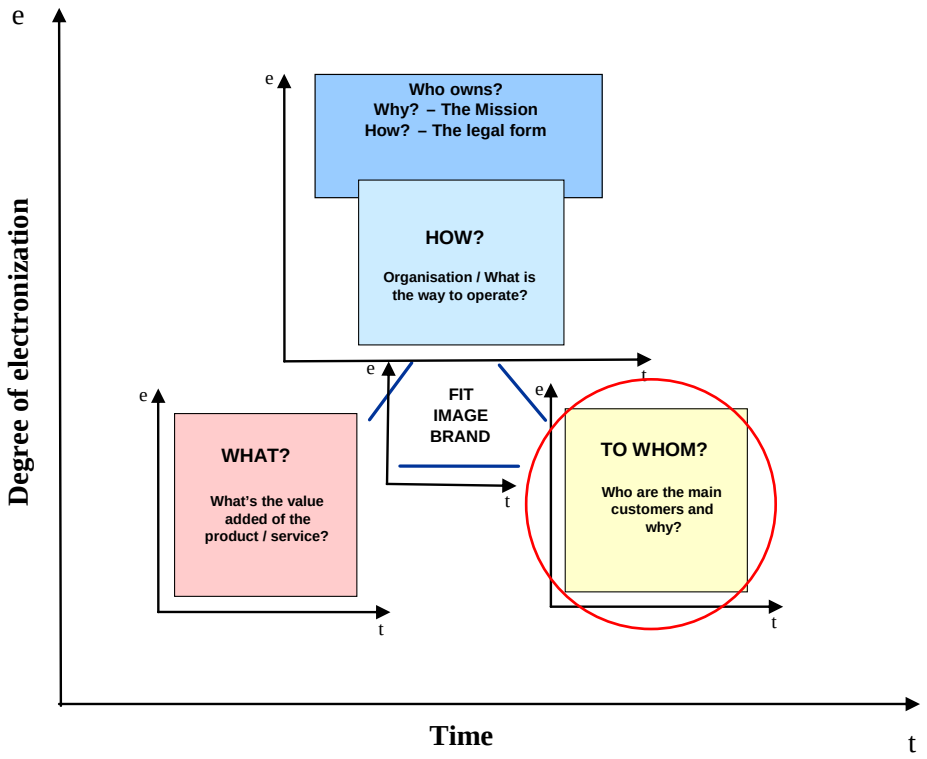
Nevertheless, the various modes of operation, in place in this one region alone, provide a rich platform of catalyst activities to draw on when conceptualising Regional Catalyst activity in the DBE context.

6 Outcomes

Before this study, in the Technical Annex, project meetings etc. the customers and services of regional catalysts in the DBE project, the classic product-market decisions, were under discussion. The unsolved, and also scarcely addressed issue, has been what kind of an actor the Regional Catalyst in the DBE should be. This viewpoint emphasises the organisation, ownership, mission and legal form of regional catalysts, see the framework presented in Chapter 1. The outcomes of the conceptual and DBE project specific analysis with the input from the interviews are presented following the framework chosen for this study. While discussing and presenting the outcomes, the concept of the Regional Catalyst in the DBE is formed.

6.1 The Concept

6.1.1 Customers



It has been stated that the main target groups of the DBE project, and accordingly regional catalysts are 1) the software provider companies (including software service provider companies) and 2) the software user companies. However, in order for the regional catalysts to fulfil the objectives and DBE requirements (see Chapter 3 in this document) regional catalysts have to interact, and in one sense provide services, also to regional catalyst associates and policy influencers/makers. The target groups were

categorized into four groups in the training deliverable (D 28.1. DBE preliminary training resource plans and needs) according to their willingness to engage and ability to execute. The same categorizing can be used in segmenting the customers of regional catalysts. Examples of the customer groups and segmentation are presented in the following figure.

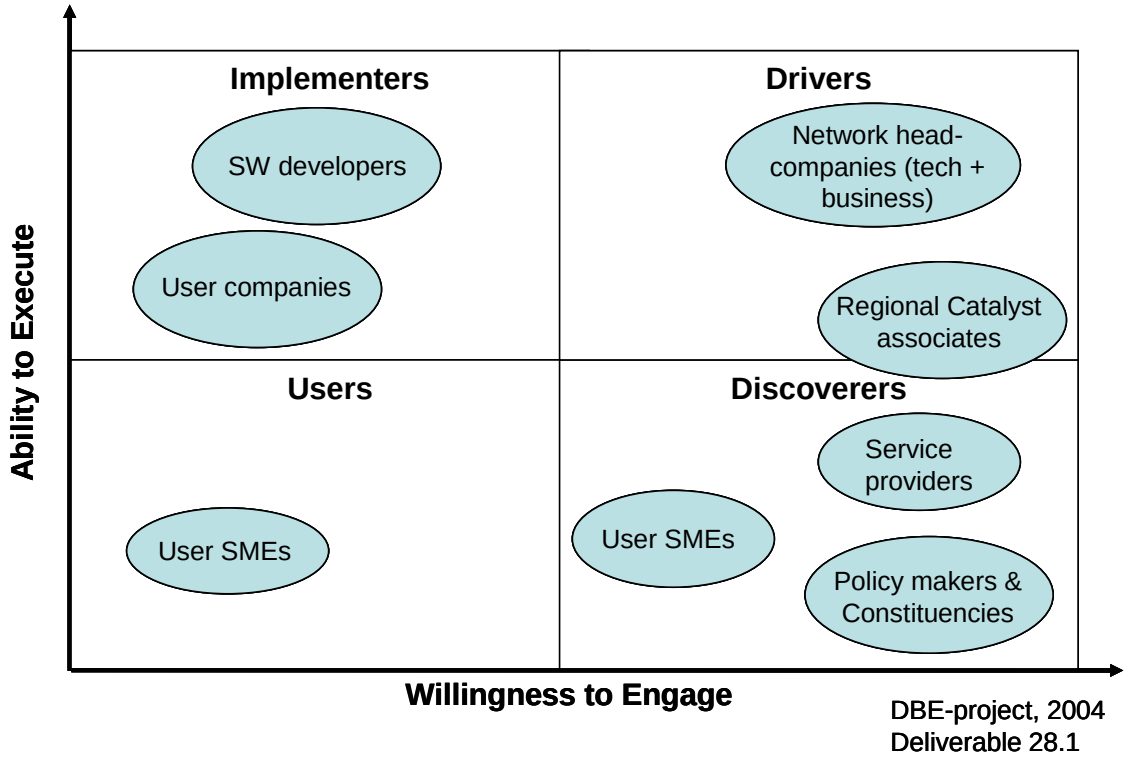
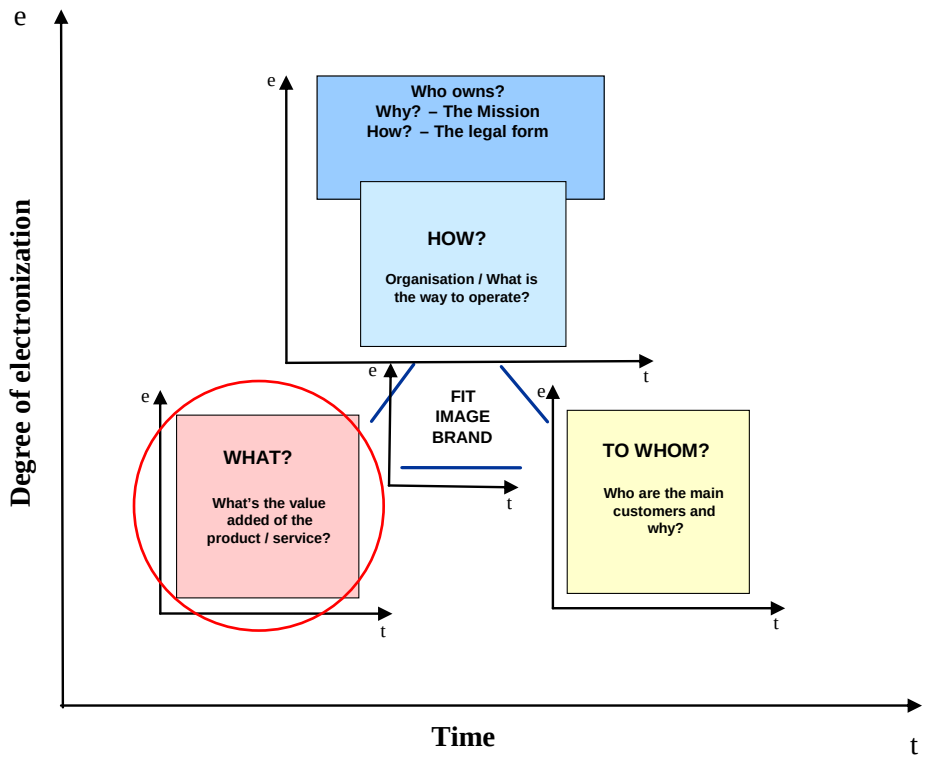


Figure 7. Examples of customers and customer segments.

Interactions of regional catalysts and the customer segments follow the sequence also identified in the training deliverable. First, the main customer segments will be the drivers and discoverers. Later in the DBE development phase the target groups are implementers and finally users. Thus, the target segments vary across the project phases (DBE maturity).

The target customers also depend on the scope (domain vs. region specificity) of the regional catalysts. The influence is not so much on the target segments (drivers, discoverers, implementers, users) but the actual target organisations. The region specific catalysts and catalyst activities are directed to the local organisations, whereas the domain specific catalysts and catalyst activities are directed to organisations in a certain domain, opportunity space or industry. Thus, the target customers vary with regard to the domain vs. region specificity of the catalysts.

6.1.2 Services



The regional catalyst services are defined based on the DBE project's preliminary expectations of the regional catalysts (see Chapter 3.2.1), nature of regional catalysts discussed earlier, earlier experiences in practice and evolving needs for regional catalysts specified during the DBE project (see e.g. Chapter 3.2.2). The services of regional catalyst include:

- network (community) building
- user & developer recruitment
- marketing & awareness raising
- communication between the DBE project and local SMEs
- training & support
- evaluation of training, community building and ecosystem evolution
- access control
- R&D tasks and collaboration during the project
- regional policy impact
- assisting with additional (national) funding

The major changes in the service offering presented above compared to the service offering presented in the project preparation phase (Technical Annex) concern marketing, awareness raising and communication (between the DBE project and

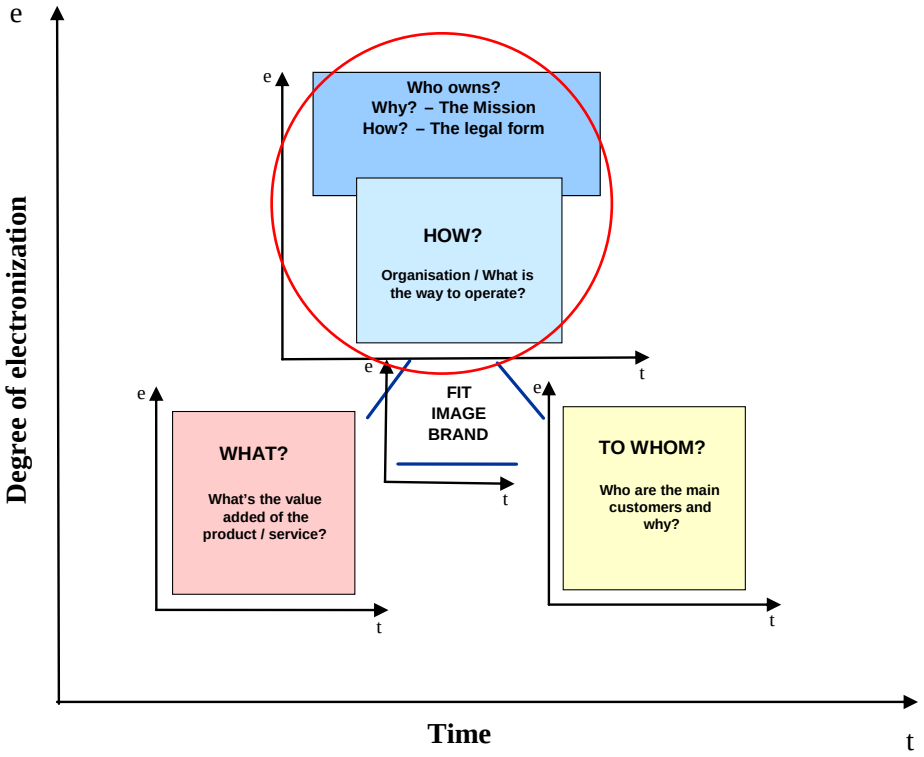
SMEs). The need for these services or tasks has been articulated by several instances. First, the experiences and lessons from previous studies and e-business initiatives emphasise consultation with the business community and raising awareness through e.g. sharing good practices. (see e.g. European Commission, DG Enterprise. 2002 or Perogianni, M. 2003). The need for two-way communication with the SMEs has also been articulated in the project meetings. It has been realised on the DBE project, that the DBE must not be technology driven but business driven. In order to have a business driven focus, the project needs 1) to know the SMEs business and 2) to find solutions to the business needs. The importance of marketing and awareness raising has been discussed in the Training deliverable as part of the community building. A third indicator for emphasising the communication aspect was the interviews with the "current regional catalysts", see Chapter 5. According to the interviewees, the biggest challenges in working with the SMEs in business development and fostering ICT adoption is to communicate the actual business benefits, especially in the short run, of such initiatives to the SMEs in a concrete level.

Another addition to the service offering is evaluation. The importance of evaluation is discussed in the Training deliverable. Evaluation refers to evaluating training itself but more importantly to evaluating the community building (ecosystem formation) and making the evolution of the ecosystem more transparent.

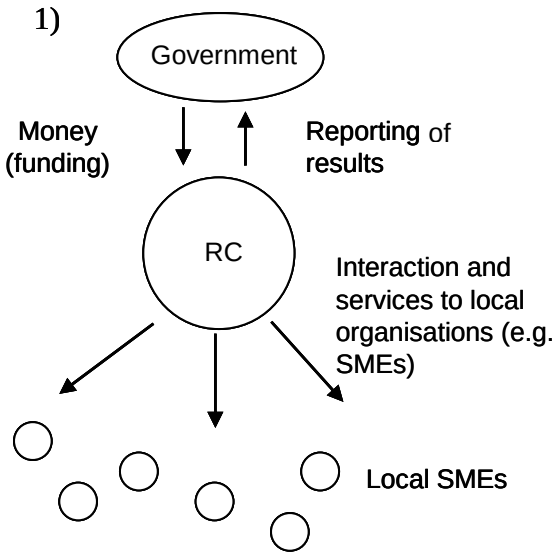
The third major addition to the service offering is the R&D tasks. This point was raised by the project partners and is a DBE project phase specific concern.

These tasks vary according to the project phase, or maturation of the DBE. For example, R&D tasks are project-related tasks, marketing and awareness raising is emphasised in the build-up phase, and access control while the DBE is up and running. The tasks also vary according to the target customers and target segments. Driver SMEs need quite different services than user SMEs. The tasks also vary according to the domain vs. region specificity of a catalyst. For example, the task of policy impact is more of a task to be carried out by a region specific catalyst.

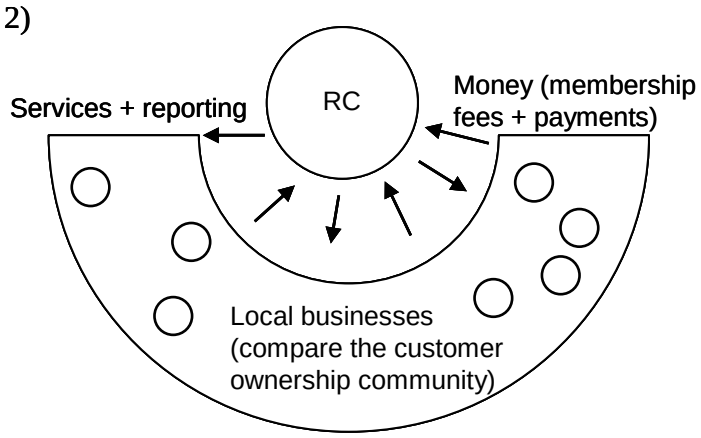
6.1.3 Organisation



As one conclusion from the interviews with current regional catalysts and discussions with some driver SMEs, we identified four models for regional catalysts. These models present the current operations of the regional catalysts. The models describe different types of regional catalysts in a higher perspective rather than from inside the organisation. However, the basic issues behind the selection and formation of these models rely on the organisation issues. The customer groups and service offering are somewhat similar between the organisations but the differentiating factors are in the governance issues: ownership, mission and legal form.

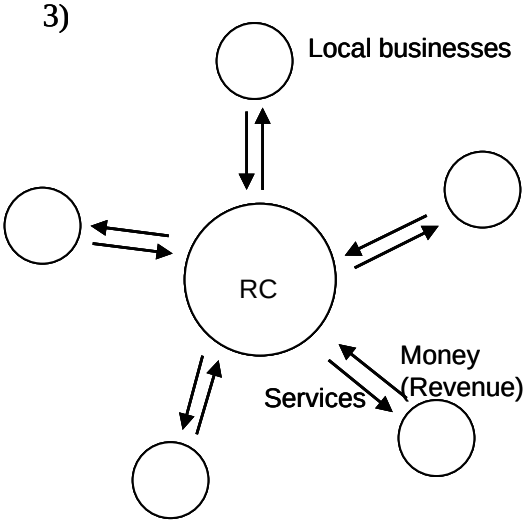


In the first organisational model the regional catalyst organisation works closely with governmental bodies. “Government” here refers to either local, national or European government or a governmental body. The regional catalyst gets funding from the government and reports on the results to the government. The services are provided to local companies, SMEs. The SMEs may or may not pay for the services. However, the actual client is the government.



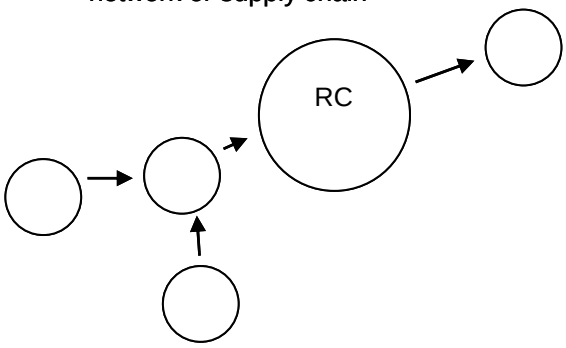
In the second organisation model the regional catalyst interacts with a community of local companies. The community could refer to a customer ownership model or association. The regional catalyst provides services and reports results to the customer community. The companies pay membership fees and possibly also for some services to the regional catalyst.

3)



In the third model, the regional catalyst interacts with local businesses providing services to companies and companies pay for these services. The regional catalyst activity is purely market driven.

4) Businesses/companies function as regional catalysts, e.g. in a network or supply chain



All the models above have included a third party carrying out the catalyst activities. In the fourth model, the regional catalyst is a local business itself. It may be a network head company influencing and catalysing the whole network (e.g. a systems integrator or a driver company in a network). In this model, business "catalyses itself". This alternative for a model of regional catalysts was articulated by some driver SMEs.

The roles of catalyst organisations may differ according to DBE maturity; one model (and thus an organisation) might be most suitable for the DBE project phase, another for the build-up phase and a third for the sustained DBE. It may be that none of these organisational models (and thus an organisation) fulfil the expectations for regional

catalyst even in different phases. Catalyst activities might be carried out better by a dynamic or evolving network of organisations than a single organisation: a changing combination (the combination changes with regard to the DBE maturity and domain vs. region specificity) of regional catalyst organisations with different models.

6.2 Summary

Concerning the research framework (Figure 8), the most open viewpoint to be studied in this study was the **how question** (organisation). The most new input (within the viewpoints) was given to the organisation issues. However, the most important outcomes and findings besides the organisational issue are the evolving and changing characteristics of the Concept of Regional Catalyst in the DBE.

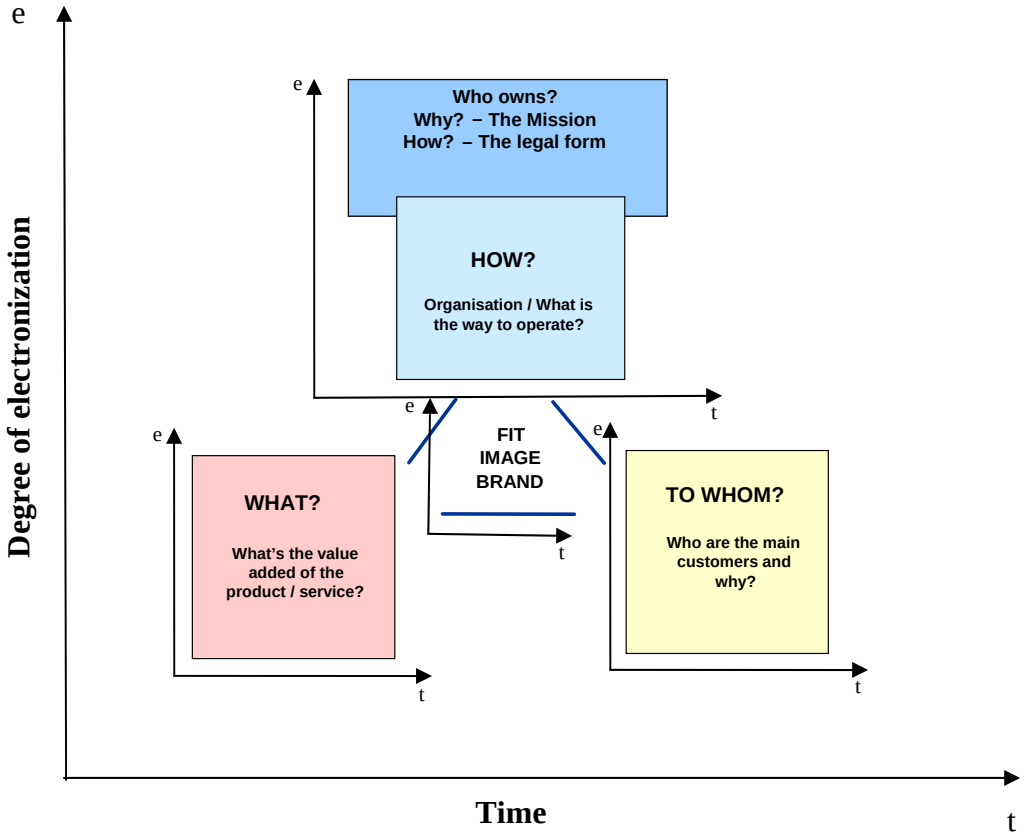


Figure 8. Research framework

There are three axes along which the regional catalyst concept can be defined. The axes are the scope or specificity of regional catalyst (see Chapter 4.3.), DBE phases (see Chapter 4.2) and business model (see Chapter 6.). These axes each include 2-3 parameters. The next figure illustrates these axes and parameters.

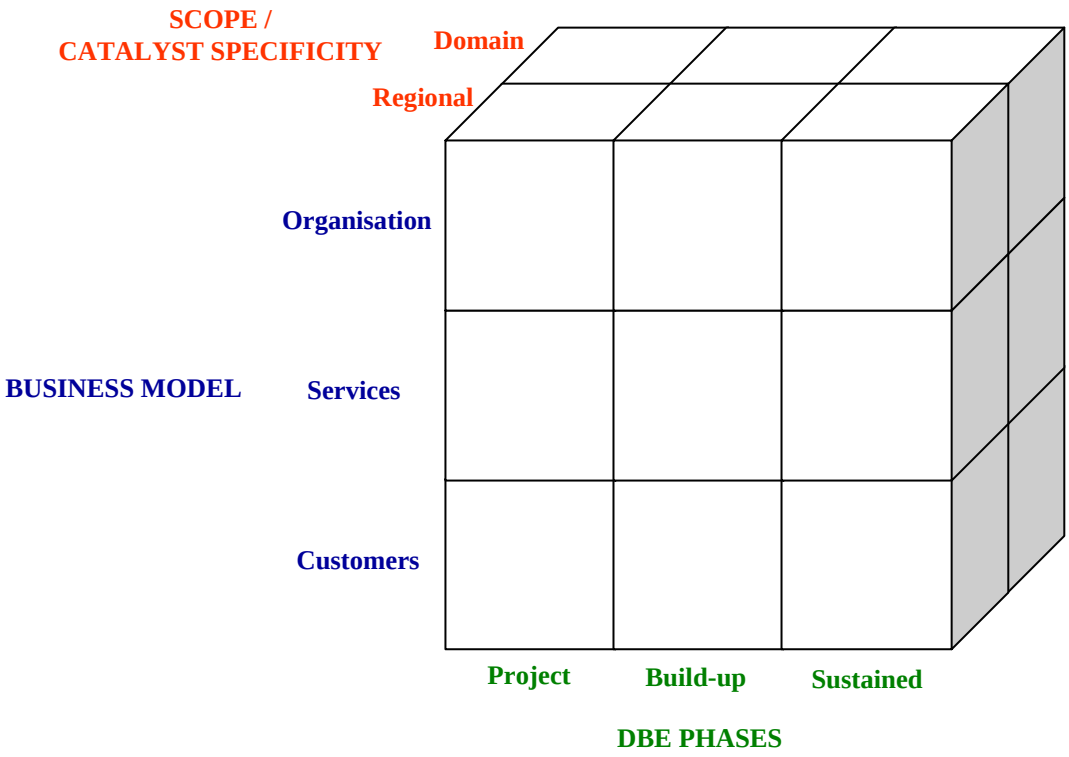


Figure 9. The Concept of Regional Catalyst in the DBE

"Scope" and "DBE phases" set parameters in which the regional catalyst concept can be defined: the DBE phase is either in 1) project phase 2) build-up or 3) sustained and the regional catalyst scope is 1) domain specific 2) regional specific. In contrast to this, the parameters of the third axis change with regard to the two other axes: e.g. target customers change with regard to the scope and DBE phase and the (optimal) service range changes with regard to the scope and DBE phase (see Figure 8). The optimal values of the parameters on the business model axis also change with regard to each other: e.g. services vary according to the target customers. Each of the parameters of the business model axis also needs to have values at the same time: a regional catalyst must have a set of services, target customers and a model for organisation. Thus regarding cause effect relations, the DBE phases axis is the primary dominating axis, the scope is secondary dominating (scope is dependent on the phases) and the business model is the most dynamic (all of the parameters of this axis depend on the two other axes).

Due to the complexity expected from the Regional Catalyst entity illustrated in Figure 9, catalyst activities might be carried out better by a dynamic or evolving network of

organisations than a single organisation unit. The Regional Catalyst concept sets requirements of dynamic and evolving characteristics for the regional catalyst activity. A single organisation most probably will not meet these characteristics. However, a network or combination of regional catalyst organisations could form a Regional Catalyst entity meeting the features of complexity of the concept of the Regional Catalyst in the DBE presented in Figure 9. Hence a single organisation may not have extensive changes, e.g. changes in its organisational model or organisational form, while the catalyst activity takes place but the whole regional catalyst activity or regional catalyst entity evolves as illustrated above. This changing combination of regional catalyst organisations sets new challenges for the next step in the research process: constructing the operational construct for the Regional Catalyst in the DBE.

7 Conclusions

This deliverable provides a conceptualisation of Regional Catalyst activity in the context of the DBE. The exploratory research process behind the conceptualisation included an analysis of the central foundational concepts originating in the natural sciences. In addition, it worked to integrate the catalysing theme into the context of the DBE project by conducting and introducing case studies from one of the DBE regions. This deliverable prepares the ground for the work to be carried out next in the research process (see 1.4.3) in constructing the "proposition", i.e. the first version of the operational construct of Regional Catalyst in DBE

The foundation of the DBE project lies in natural science metaphors such as ecosystems and catalysts. The use of these metaphors in the business context is faced with a number challenges, as noted in this study. However, it can be concluded based on this study that these metaphors can indeed be applied to the business context, but only with due caution and modification.

In the context of the natural sciences, the concept of a catalyst can be referred to as static. In the business context (if not the context of economics), i.e., in the context of the social sciences, the concept of a catalyst is dynamic by definition. The key difference between catalysts, the living organisms, in natural versus social sciences relates to rationale: Cause-effects versus choice. Human decision-based organisms can only be partially rationale, on the macro-level. On the micro-level, or individual level, such organisms are very rationale in seeking to maximise utility. The concern arises when the combined utility of individuals is not that of them as a group entity.

Aligning interest is the core challenge of a strategist and this is also the core challenge in creating and conceptualising a Regional Catalyst. The interests of the owners of such an entity need to be sufficiently aligned and their joint interests need to be sufficiently aligned with operative management. The interests and the mission of the organisation of the Regional Catalyst need to be sufficiently aligned with the other stakeholders (suppliers, clients and customers) of the DBE and the products and services need to create enough value added in order to comprise an image or brand for a sustainable evolution and development of the DBE. Image, brand and sustainability are well linked with the work in the overall "DBE Business and Marketing plan" to be conducted on the DBE project.

Based on the findings of this seminal study, the concept of Regional Catalyst in the context of the DBE is of a changing nature. The challenge is to envision well enough both (1) the basic nature of the Regional Catalyst and (2) the magnitude and types of changes required in each of the elements of the Regional Catalyst.

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CASE QUESTIONS

Besides the deliverable 31.1, work package 31 includes a benchmarking report conducted by CENSIS. This deliverable and the benchmarking report both involved an interview study, partly overlapping in target groups and questions. Due to the overlapping parts, the interviews were decided to be conducted in co-operation as one interview outline. The benchmarking study included a large number of questions where as the questions directed to this deliverable 31.1 formed a minority of the questions. Also the target audience of the benchmarking interview study was larger in scope than that of this deliverable. The target group of this deliverable was "current regional economic catalysts" as defined in the deliverable 31.1 itself (see chapter 5.2. in the deliverable 31.1).

The following questions were asked for the purpose of Deliverable 31.1. "Analysis and specification of current and potential regional catalysts":

- Organisation
- Type of organisation
- Interviewee
- Date
- Contact information, address, e-mail, www-pages
- How many people are employed in this company/organisation?
- When did this company/organisation first started to operate?
- How many years have you worked with the company/organisation?
- What is your position within the company/organisation and how long have you held it?
- What is the mission (including for profit / non-profit organisation) of your company/organisation?
- What is the ownership structure of your company/organisation (who owns)?
- What is your company's/organisation's legal structure (e.g. corporation, management company, association)

- What is the structure of your company's/organisation's funding (e.g. proportion of public funding and private funding)?
- Who are your customers (certain domains/industry areas, or cross domain/industry areas)?
- Very briefly explain the products or services produced by your company /organisation.
- How are these services produced, what is the way to operate (including activities, processes and resources)?
- How is your company's/organisation's revenue distributed by source (the percentage of budget-based public funding, market-based funding, and risk/profit sharing)?
- What are your main concerns in working with SMEs in developing their business and fostering technology adoption?
- What are your first insights of DBE / how DBE would influence your work?