



Digital Business Ecosystem

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*Task B4 SME Needs and functional requirements*

**Deliverable 15.7.1**

*Functional Requirements*



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## **PURPOSE OF THIS DOCUMENT**

This deliverable summarises the results of work that has been carried out in the first 18 project months in WP 15 *DBE Business Modelling Language* in the area of requirement analysis. The subtask B4 *SME Needs and functional requirements* - has been to provide an overview of the functional requirements. Because of some difficulties and delays, this deliverable gives a synopsis of the first impressions of the first 24 months project. The first difficulty faced was the gap between the call for drivers, which took place in June 2005, and the possibility to talk with them (September/October 2005), mostly because of the vacation months. The first code camps in June showed the ExE and the second code camps in October introduced the DBE Studio, which is part of the SF. The 2<sup>nd</sup> code camp was postponed from September to October because of some delay on the release of this component (DBE Studio). These code camps happened only in October 2005, although this component still not has a stable version.

This document begins with a description of possible eBusiness models, and gives a short explanation how DBE customers (drivers, implementers, and user) could use DBE platform. Its final goal is the identification of potential opportunities and models of future partnerships.

After, this document describes the general functional requirements of software applications, especially regarding the core functional requirements implied by a platform-driven approach and the different additional aspects yielded by further specialization and/or customization of the product to be delivered. Special emphasis is put on SMEs<sup>1</sup> as consumers and requesters of the elicited requirements.

Finally, a set of elicited requirements for DBE Platform is presented, whereupon approaches to fulfil these requirements are taken into consideration. The final objective of this document aims to identify the SMEs current status and their business requirements, and expectations about the DBE Marketplace.

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<sup>1</sup> In the deliverable D28.1, the SMEs have been classified into four groups according to their ability and willingness of collaboration with the DBE: drivers, implementers, discoverers, and users.

## **INTRODUCTION**

Electronic commerce can be defined loosely as "*doing business electronically*" (European Commission 1997). Electronic commerce includes electronic trading of physical goods and of intangibles such as information. This encompasses all the trading steps such as online marketing, ordering, payment, and support for delivery. Electronic commerce includes the electronic provision of services, such as after-sales support or online legal advice. Finally it also includes electronic support for collaboration between companies, such as collaborative design.

Some forms of electronic commerce exists already for over 20 years, e.g. electronic data interchange (EDI), in sectors such as retail and automotive, and CALS (Computer Assisted Lifecycle Support) in sectors such as defence and heavy manufacturing.

These forms of electronic commerce have been limited in their diffusion and take-up. Recently, however, we see an explosive development in electronic commerce. The reasons for that are, of course, the Internet and the World Wide Web, which are making electronic commerce much more accessible. They offer easily usable and low cost forms of electronic commerce. Electronic commerce on the basis of the Internet is set to become a very important way of doing business.

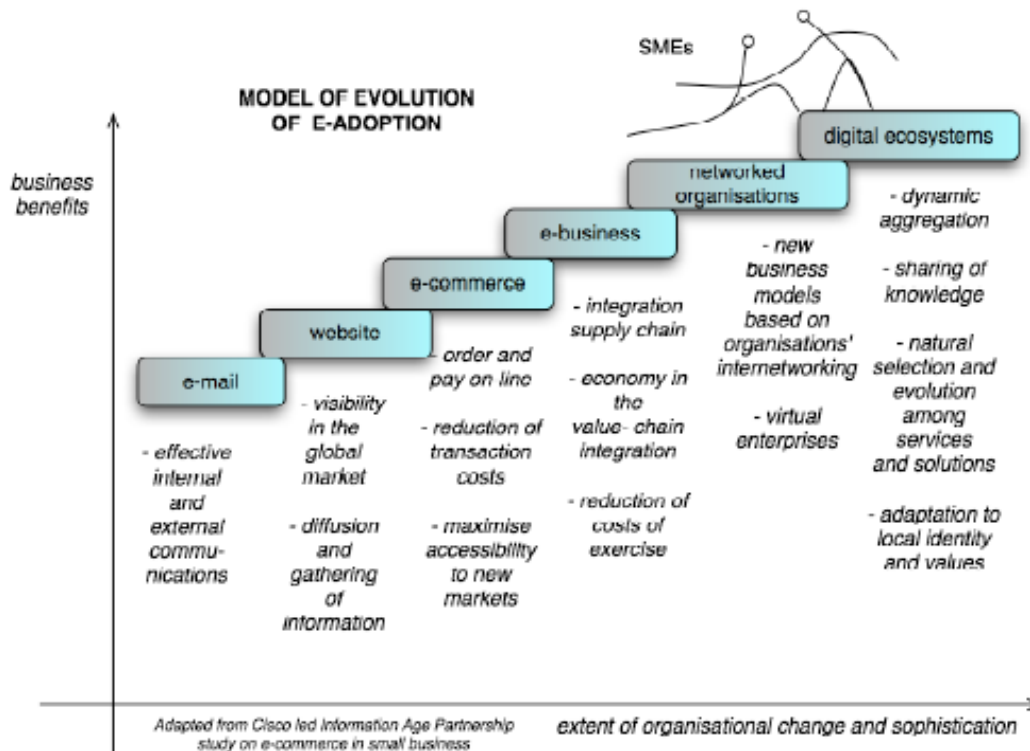
New forms of electronic commerce are being piloted in many sectors of industry, for business-to-business, business-to-consumer and business-public administrations relationships. Advanced pilot experiments in new business models are being supported by the European Commission in the ESPRIT and ACTS European research, technology development and demonstration programmes. This work is part of a more general framework of policy-making and programmes for global electronic commerce, which also addresses the legal and regulatory framework and other factors in the business environment.

The adoption of internet-based technologies for e-business is a continuous process, with sequential steps of evolution. The steps could be classified in 6 phases (Figure 1:): (1) e-Mail, (2) web-presence, (3) e-Commerce, (4) e-Business, (5) networked organizations, and (6) digital business ecosystems (DBEs).

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 (Del 31.1):

- *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)



**Figure 1: Evolution of ICT adoption**

As consequence of this evolution (DBEs), the dynamic networking of the organisations, drives to dynamic cooperation of the players on the territory and the connection of the resources in a system, building a community that shares business, knowledge, and infrastructure.

The business benefits of DBE become most visible in highly networked business environments. In the first real business scenarios, DBE technologies will provide a more cost-efficient and flexible way for existing business networks to get integrated at the level of information systems. In this way, DBE bootstrapping will utilise the existing social capital of business. In the latter phases, however, DBE has the potential to become the enabling technology for *new business networks* (Del.31.2). The adoption and development of scalable and adaptive technologies, allows *new models of business* based on the dynamic association of enterprises.

## **Business models**

The term business model is one that is a topic of hot debate and draws considerable comment and differing opinion in both academia and practice (Alt and Zimmermann, 2001; Applegate, 2001; Chandra et al., 2002; Chesbrough and Rosenbloom, 2001;



Hedman and Kalling, 2003; Oliva et al., 2003; Timmers, 1998; Rappa, 2003; Weill and Vitale, 2001).

A business model in itself does not yet provide understanding of how it will contribute to realise the business mission of any of the companies who is an actor within the model.

A systematic approach to identifying architectures for business models can be based on value chain de-construction and re-construction that is identifying value chain elements, and identifying possible ways of integrating information along the chain. It also takes into account the possible creation of electronic markets. These can be fully open, that is, with an arbitrary number of buyers and sellers, or 'semi-open' that is with one buyer and multiple sellers (as in public procurement) or vice-versa.

Possible architectures for business models are then constructed by combining interaction patterns with value chain integration. The *a priori* feasibility of technical implementation of the architecture of any business model depends very much upon the state-of-the-art of the technology. This holds for the integration dimension, for the realisation of the single functions, and for the support for interaction patterns. The commercial viability of any business model is a different matter altogether which is the domain of a marketing model analysis.

While the systematic approach above leads to a huge number of potential business models, we observe in practice only a small number of these being implemented. In the next section eleven such business models or generalisations of specific business models are included. Examples of all of these can be found on the Internet today. Some of these are still experimental while others are in fully commercial operation. The selection of eleven has been made on the basis of background and case study research.

#### **eBusiness models**

The wider group of business models for eBusiness provide descriptions for particular scenarios and situations. Moreover, eBusiness models aim to describe specific business models, which explain how businesses use the Internet to interact and how value is created for the customer and the other stakeholders (Applegate, 2001). There has been an explosion in the number of academic papers that outline a wide range of taxonomies for eBusiness models.

Afuah (2001) defines an eBusiness model as “*how a firm plans to make money long term using the Internet.*”

Timmers (1998) defines an eBusiness model as “*an architecture for the product, service, information flows, including a description of potential benefits for the various actors, and a description of the sources of revenue.*” He identified eleven eBusiness models: e-shop, e-mall, e-procurement, third-party marketplace, e-auction, virtual community, collaborative platform, value-chain service provider, value-chain integration, and information brokerage and trust service<sup>2</sup>.

Rappa (2003) extended this and classified nine categories for eBusiness models: brokerage, advertising, infomediary, merchant, manufacturer, affiliate, community,

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<sup>2</sup> For further information see Appendix 1.

subscription and utility. Under these Rappa identifies thirty-six models that can be classified under his nine categories. Interestingly both Timmers and Rappa highlight there is no single comprehensive taxonomy for classifying eBusiness models and yet they do provide taxonomies of eBusiness models<sup>3</sup>.

Applegate (2001) outlines taxonomy of business models for eBusiness by using: generic market role (i.e., producers, consumers, distributors and customers), digital business (if dependant of the Internet) and platform (i.e., infrastructure provider for 3rd party eBusiness). Applegate provides five general categories: focused distributor, portals, producers and infrastructure producers in which there are 22 individual instances of eBusiness models that fit within the classification of the taxonomy<sup>4</sup>.

Weill and Vitale (2001) propose a similar definition of: *“a business model is a description of the roles and relationships among a firm’s consumers, customers, allies and suppliers that identifies the major flows of product, information and money and the major benefits to participants.”* They define eight finite eBusiness models: direct customer, full service provider, intermediary, whole of enterprise, shared infrastructure, virtual community, value net integrator and content provider. These business models are based on a systematic and practical analysis of several case studies.

As we could see, business models have been defined and categorized in many different ways. A correlation between Timmers, Rappa and Aplegate business models taxonomies are presented at Appendix 4. At this work, we will use Timmers classification. He classified in his work eleven business models currently in use or being experimented, which are summarized at Table 1.

Name	Function	Example
e-Shop	Web marketing with reduced cost, increased sales, and possibly advertising	<a href="http://www.amazon.com">http://www.amazon.com</a>
e-Procurement	Electronic tendering and procurement of goods and services with reduced costs	<a href="http://www.ariba.com">http://www.ariba.com</a>
e-Auction	Electronic implementation of the bidding mechanism	<a href="http://www.ebay.com">http://www.ebay.com</a>
e-Mall	Collection of e-shops under one umbrella, usually enhanced by a common brand	<a href="http://www.e-mall.uk.net">http://www.e-mall.uk.net</a>
Third-party marketplace	Web marketing by a third party	<a href="http://www.amazon.com/zshops">http://www.amazon.com/zshops</a>
Virtual communities	Members add their information onto a basic environment provided by the virtual	<a href="http://www.amazon.com/community">http://www.amazon.com/community</a>

<sup>3</sup> For further information see Appendix 2.

<sup>4</sup> For further information see Appendix 3.

	community company	
Value-chain service provider	Specialise on a specific function for the value chain, such as electronic payments or logistics	Couriers such as FedEx and UPS web-based package shipping support
Value-chain integrators	Integrate multiple steps of the value chain, with the potential to exploit the information flow	<a href="http://www.dell.com">http://www.dell.com</a>
Collaboration platforms	Provide a set of tools and an information environment for collaboration between enterprises	<a href="http://www.collab.net">http://www.collab.net</a>
Information brokerage, trust and other services	Add value to the huge amounts of data available on the open networks	<a href="http://www.google.com">http://www.google.com</a>

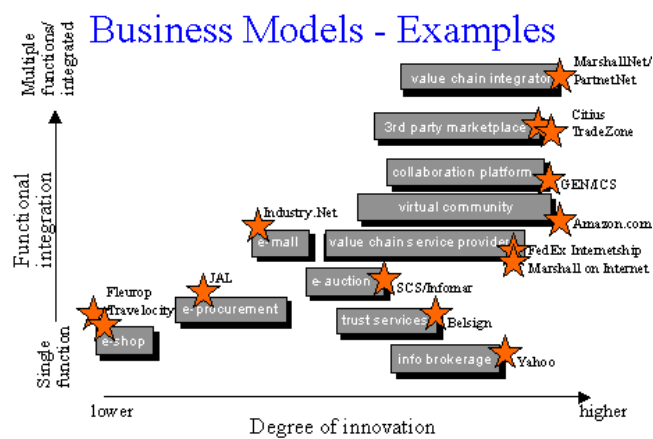
**Table 1: Business model classification with updated examples**

Source: [ReVä02]

We conclude with a qualitative mapping of the eleven business models along two dimensions. The first dimension gives the degree of innovation. This ranges from essentially an electronic version of a traditional way of doing business to more innovative ways, for example by externalising via the Internet functions that previously were performed within a company or by offering functions that did not exist before. The second dimension is the extent of integration of functions, ranging from single function business models (e.g. e-shops that only provide the marketing function over the Internet), to fully integrated functionality, e.g. value chain integration.

In the lower left-hand corner are basic e-shops, which are electronic version of traditional ways of selling only. On the other extreme, at the upper right hand corner is value chain integration, which cannot be done at all in a traditional form, is critically dependent upon information technology for letting information flow across networks, and creates added value from integrating these information flows. In between are business models that often find some degree of analogy in non-electronic business. For example, trust services have been provided since years by public notaries or by industry bodies. Their functionality is being re-implemented by electronic trust services. However, at the same time new trust functionality is being added, that intrinsically requires IT support, such as encryption and public and private key management. The same holds for value chain service provision, such as electronic payments support: partially this is a matter of offering by electronic means the same as what is already being offered non-electronically such as account management. At the same time new functionality is being provided such as Internet smart card support, e.g. for purchase cards in B-to-B trading.

Figure 2 summarises the classification and gives some examples. There seems to be a trend to gradually move towards increased integration of information flows.



**Figure 2: Examples of business models**

Source: [http://www.imse.hku.hk/imse2016/Readings/Essential/BusinessModel-Geoffrion/Timmers/98\\_21\\_n.html](http://www.imse.hku.hk/imse2016/Readings/Essential/BusinessModel-Geoffrion/Timmers/98_21_n.html)

## Conclusion

Based on Timmers classification, the DBE is a mix of business models. Each customer (drivers, implementers and final users - SMEs) can choose or use the DBE Platform every time – to each transaction – through a different business model. Therefore, DBE can be defined as *an electronic community (marketspace) that brings multiple customers, suppliers, distributors and commerce service providers in any geographical location together to conduct business with each other through the exchange of (e.g. XML based) messages (over the Internet) in order to produce value for end-customers and for each other.*

DBE is based on a large and complex set of advanced information and communication technologies (ICTs). DBE is a middleware, a platform where new business models can appear. The DBE must provide new technical features (service discovering, aggregator, advisor, evolution features, etc.), and then, new business models may take advantage of those new features. Some parts of the DBE technology family are well known mainstream components (like Eclipse), some have been under active development for years without so far reaching the mainstream (like FADA) and some are new innovation aiming to solve some of the most urgent challenges in software industry and computer science (like MDA and EvE) (Del 31.2).

The mix of the knowledge of a specific market by companies with high experience in a specific sector/domain together with the knowledge of the features provided by the new technologies makes appear new business models which exploit the advanced features provided by the base technology.

*A priori*, we can say that SMEs will use DBE under these three businesses models (Table 2):

Marketspace business models	Brief description
Collaboration platforms	Business process collaboration between enterprises, e.g. collaborating for marketing, using specialist online tools and shared information
Virtual communities	Customers and partners add their information to an Internet site that is provided by a company operating the virtual community
Third-party marketplace	The use of a third party to provide the web marketing

**Table 2: DBE business models (a priori)**

Source: (Timmers, 1999)

The SMEs for the first phase of DBE Project (first 24 months) intend to use DBE to connect to other SMEs (collaboration platform), develop virtual communities with new organisations, and add their services and products (3<sup>rd</sup>-party marketplace). In the future, they will be able to develop new business models to reach their goals within and throughout “*DBE Marketspace*”.

At this point of the project (month 24), we can not respond (at least not with a reasonable certainty) some important questions that are significant to a better comprehension and for future service development of the *DBE marketspace*, such as:

- What are the different business models particularly those being adopted in the three regions by SMEs?

- What capabilities and features are available now and what needs to be developed further?
- What services need to be made available to manage these different types of business models?
- How these different services will be helpful for the SMEs in the three regions?
- How can we benchmark outcomes based on the current actions being performed by the SME drivers in the three regions?

These questions we hope to be answered by the next deliverable (Del.15.7.2) at month 30.

## **GENERAL FUNCTIONAL REQUIREMENTS**

### ***Introduction***

*Functional requirements* capture the intended behaviour of the system. This behaviour may be expressed as services, tasks or functions the system is required to perform.

In product development, it is useful to distinguish between the baseline functionality necessary for any system to compete in that product domain, and *features* that differentiate the system from competitors' products, and from variants in a company's own product line/family. Features may be additional functionality, or differ from the basic functionality along some quality attribute (such as performance or memory utilization).

One strategy for quickly penetrating a market, is to produce the core, or stripped down, basic product, adding features to variants of the product to be released shortly thereafter. This release strategy is obviously also beneficial in information systems development, staging core functionality for early releases and adding features over the course of several subsequent releases.

In many industries, companies produce product lines with different cost/feature variations per product in the line, and product families that include a number of product lines targeted at somewhat different markets or usage situations. What makes these product lines part of a family, are some common elements of functionality and identity. A platform-based development approach leverages this commonality, utilizing a set of reusable assets across the family.

These strategies have important implications for software architecture. In particular, it is not just the functional requirements of the first product or release that must be supported by the architecture. The functional requirements of early (nearly concurrent) releases need to be explicitly taken into account. Later releases are accommodated through architectural qualities such as extensibility, flexibility, etc. The latter are expressed as non-functional requirements.

Use cases have quickly become a widespread practice for capturing functional requirements. This is especially true in the object-oriented community where they originated, but their applicability is not limited to object-oriented systems.

### ***General requirements for a marketplace***

On becoming and staying a successful marketplace like DBE, the participants have to be provided with the capability of executing their desired tasks and processes. In respect to the fact that neither of the participants - though maybe belonging to the same category of roles - is going to have exactly the same needs, a marketplace has to offer a superset of solutions. This set can be split into two categories: the *functional* and the *non-functional* requirements.

**Non-functional requirements** include all requirements that not cover the core behaviour of the system:

- Security - A marketplace must protect sensitive information from unauthorized access and disclosure, ensure secure transmission and maintenance of data and ensure the accuracy of information.
- Scalability - The workload a marketplace has to deal with may expand. Therefore it has to be able to be scaled to increasing demand easily so that important processes have enough resources.
- Reliability and availability - If a marketplace is not reliable and continuously available, this will have a negative influence on its popularity and therefore its benefit and added value.
- Robustness - This requirement describes a system's ability to offer control functions to perform maintenance, reconfigure or restart the devices from a remote location.

**Functional requirements** - as understood within this work - describe the intended behaviour of the system. Therefore they may be expressed as tasks, functions or services the system has to provide (Hurwitz, 2000):

- Buy-and-sell capabilities - These include mechanisms like stores, auctions, requests for quotes and exchanges. E.g. an appropriate catalogue system has to be provided.
- Negotiation
- Payment
- Logistics
- Tracking services - When using a marketplace for entering commercial relationships, it is a buyer's core requirement to be informed about e.g. the status of the orders.
- Integration - This includes metadata, protocols and tools for integration that have to be adaptable, secure and manageable. "The integration capabilities (...) should be standards-based for quick time-to-market."
- Analysis - Those capabilities include data, participants will want for internal business analysis.
- Management and monitoring - Once an electronic marketplace is established, its participants have to be able to rely on its service. Therefore the underlying computing service has to be managed and monitored, as this is the only way to deliver a continuously running infrastructure.
- Customer care - If something goes wrong or simply if a question arises, participants need to have someone to contact.
- Authentication

These functionalities show that a marketplace has to offer a wide variety of processes. These involve various systems (including offer's and requester's systems) to handle them. This implies a huge number of different software systems and services, relying on various data-formats. It has already been mentioned above that integration should be implemented using open standards.



## **Conclusion**

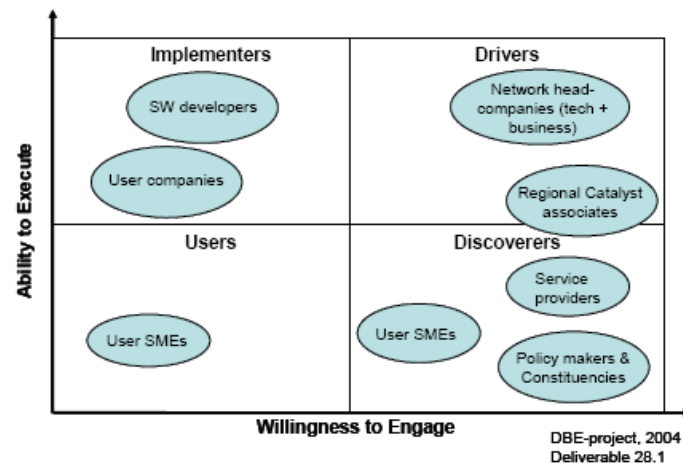
DBE should fulfil the general functional requirements of the most common e-business model, i.e. *DBE marketspace* should offer (at least):

- Buy-and-sell capabilities: e-catalogues, e-auctions, requests for quotes and proposal (RFQ/RFP), reverse auctions.
- Search capabilities
- Analysis of data from products and services
- Settlement and recommendation capabilities
- Payment functions: credit card payment, credit transfer
- Logistics capabilities: Tracking services e.g. order status.
- Customer care functions: FAQ, wikis, handbooks (installation, service development and deployment), help function
- Authentication
- Negotiation support function
- Management and monitoring capabilities
- Development environment: full version and wizard (DBE Studio)
- Installation function: handbooks and wizard
- DBE for final users capabilities: Desktop and Portal
- Small and simple services: your account, add to basket, get basket, wish list, top 10 (sellers, products, services, etc.)

## DBE PARTNERS, THEIR ROLES AND REQUIREMENTS

### Introduction

SMEs have been classified into four groups according to their ability and willingness of collaboration with the DBE. In the deliverable D28.1, the SMEs have been grouped in four clusters: drivers<sup>5</sup>, discoverers<sup>6</sup>, implementers<sup>7</sup>, and users<sup>8</sup> (see Figure 2).



**Figure 3: Examples of Regional Catalyst customers and customer segments.**

Source: Del.31.2

With the idea that the DBE architecture will enable the search & discovery and consumption of both software and real world services, the initial plan was to contact the User SMEs.

<sup>5</sup> Drivers have strong capabilities and interest to participate in the DBE at a very early stage. With a profound background in the relevant technological and business concepts, they can absorb the necessary DBE knowledge faster than other participants can. (Del.28.1)

<sup>6</sup> Discoverers have limited technological capabilities and other business interests than technology development. Therefore, they are mainly able to use DBE services and are not expected to contribute with components. (Del.28.1)

<sup>7</sup> Implementers have similar technological capabilities as drivers that allow them to develop components and contribute to the DBE. However, this larger fraction of developer SME is expected to show a less steep learning curve and reduced engagement when it comes to building the DBE community than the drivers. Implementers could be described as active collaborators. (Del.28.1)

<sup>8</sup> Users have similar initial capabilities to discoverers. But they are expected to be more focused on individual application and personal benefits and will initially ignore the networked character of the DBE. They are further expected to be less willing to contribute actively to the emerging DBE community or to provide own contacts. (Del.28.1)

Following this initial plan - to contact User SMEs – ITA and FZI visited the Benasque Valley. ITA wanted to get a feedback from Users about the project, and FZI surveyed User requirements<sup>9</sup>. FZI interviewed also other SMEs at Birmingham and Tampere<sup>10</sup>.

As a result, we realized that users are more impatient than SW Developers and they want concrete answers to their business needs in the very short term. Then, we changed our SME target group from user to SW developer, i.e. drivers and implementers. And we realized that *“our new approach fits very well, because we work with the SW providers of those companies directly who know very well their customer business needs and have a continuous update”* (Del.30.4.1).

In spring-winter 2005 a driver-centric strategy for DBE bootstrapping was introduced in all the DBE regions. One of the most successful and important events in this area so far has been the DBE Technology Workshop organised in Tampere Region in February 2005.

In the workshop the achieved results and future plans of the development of DBE platform components (Execution Environment<sup>11</sup>, Service Factory<sup>12</sup> and Evolutionary Environment<sup>13</sup>)<sup>14</sup> were presented to SMEs by the main architects of each of these components. As a result, the interested SMEs sent proposals about how they would like to take part on DBE Project, i.e. developing new DBE services (web-services<sup>15</sup>) or/and integrating their systems to DBE.

## Conclusion

The main original objective of this first phase was to select and enrol User from the selected opportunity spaces. But as told before, the users were more impatient than

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<sup>9</sup> For further information see Appendix 5 and Appendix C from Del.15.1.

<sup>10</sup> For further information see Appendix 6 and Appendix C from Del.15.1.

<sup>11</sup> Execution Environment (ExE) consists of the machinery that allows individual services to be dynamically registered, looked up, and accessed over the network (Del 31.4). Key elements: Semantic Registry and ServENT

<sup>12</sup> Service Factory (SF) is a set of development tools for defining and implementing services on top of the DBE platform (Del 31.4). Key elements: DBE Studio comprising of Business Modelling Language (BML) Authoring Tool and Wizard, BML Editor.

<sup>13</sup> Evolutionary environment (EvE) represents the most future oriented part of the DBE platform. EvE would basically reuse the outputs of SF and automatically hook up individual services to perform an optimized set of actions (Del 31.4). Key elements: Service Recommender and Fitness Landscape

<sup>14</sup> These baseline functionalities were developed during the first 18 months project by our DBE developer partners, such as Intel, SUN, Soluta, TUC, Trinity, etc.

<sup>15</sup> For further information see Appendix 7.

SW Developers and they wanted concrete answers to their business needs. Moreover, they have limited technological capabilities wanted to use DBE services but were not able to contribute with components. Therefore, the focus changed from SME Users to SME SW developers, which are able to develop the DBE Services (features) or integrate previous software (web services) to DBE.

## **SW Drivers**

In general, the Regional Catalysts (RC) looked for SMEs that were not entirely business service oriented (consulting, software development) but SMEs who preferably have their own software products or already provide ASP services. For existing applications to be migrated to the DBE the requirement is to develop a service adapter to enable access. The adapter (web services<sup>16</sup>) is a simple Java program.<sup>17</sup> The adapter may not be simple in all cases, it depends on the language and the design of the legacy system of the service application.

The SMEs Drivers share the ambitions of the project and they are self-motivated to take part of it, and work close to the RC. Drivers are the starting point to carry out the first learning and experimental work and to develop the initial demonstration services. They are in effect the pathfinders that work out to implement the DBE.

According to Del.30.1.1, Driver SMEs should have experience with Java and preferably Service Oriented Architectures (SOA) as well as Web Services or Message-oriented Middleware. And the activities to be performed by the Driver SMEs are:

1. Define 3-5 concrete software service scenarios (use cases) in the selected sector in each region. Define exactly those scenarios including complete value chain descriptions in terms of: agents, information flow, contents of each transaction, etc. The scenarios with a higher probability of success taking into account the “background” of these scenarios will be selected for deployment. It will be interesting that in the scenario definitions, different services developed by different Drivers will be connected through the DBE. In that way, it will start the creation of micro-networks and enabling a fluent interaction among them.
2. Define and develop the contents using the BML tool for the specific scenarios/use cases. This will allow the testing of the functionalities of the BML Tool.
3. Understand the system architecture and the main modules of the system and testing the Execution Environment.
4. Develop and adapt B2B services over the DBE platform, which comply with the scenarios previously designed.
5. Support the testing of the auto-generated code and the correctness of the services produced through testing supported by the Discoverers.
6. Develop an understanding of the software service needs of the value chains within the opportunity spaces. Also concentrating on the interoperability areas where there are frequent interactions with large number of external business

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<sup>16</sup> For further information see Appendix 7.

<sup>17</sup> <http://opensoa.blogspot.com/>

partners. Further expand the scope of the value chains to include inter-regional cooperation and to describe the software service needs.

7. Explore the opportunity areas and business drivers for the DBE in terms of performance, security, trust, management of current and demanding software inefficiencies.
8. Participate in various training programmes and support the development of learning content with the Regional Catalysts.
9. . Coordinate periodical reporting of progress in activities assigned and to support project risk management in terms of SME engagement.

Taking into account DBE Architecture, each driver will adapt their services to be accessible using Web-Services. One way to work is first to develop the web service, then the adaptor, and after all deploy it at the ExE component to create DBE services. The DBE technical team is planning to create a wizard to make this transformation automatically. However, if the SF is available and the integration is done working with the SF, then it is not needed to work directly over the ExE. The final objective is that in the end the drivers will have enough knowledge about the ExE Platform in order to deploy services and adaptors into the DBE. Once the SF is available, in the normal way of working with the DBE, the ExE will be transparent to the SW Developers and Users.

#### SW Drivers Proposals

This section presents general information about each SME Drivers, a short description of them and about their services. Moreover, information about their future developments (DBE features) are also presented.

The Table 3 summarizes the information about the SME Drivers and their plan to DBE platform<sup>18</sup>.

Country	SME	Short description	Proposal description
Spain	EON	<p>Eon is specialized in integral services for SME covering all the areas related to computing systems deployment:</p> <ul style="list-style-type: none"> <li>▪ Configuration, system integration and system start ups</li> <li>▪ Analysis, design, development and start up of ERP, such us GREENsys and EON.BS.</li> <li>▪ Communication installation (WAN, Intranet, ...)</li> <li>▪ Project analysis and development.</li> <li>▪ Organization audits.</li> </ul> <p>SW Applications for retailers and wholesalers in the tourism sector</p>	Integration of some clients (retailers and wholesalers) of its software through DBE Platform.

<sup>18</sup> Based on Del.30.1 and Addendum/Amendment Nr.4.

Country	SME	Short description	Proposal description
	DBS	DBS develops web applications to allow clients and customers of wholesales interact with the wholesaler. The application we called Webmin was orientated to Travel Agencies to allow them make tourist reservations in the wholesaler trough the Internet.	Integration of some clients (retailers and wholesalers) of its software through DBE Platform.
	Gábilos Software	Gábilos Software S.L. originates from an advising company with 20 years of experience in the market. Gabilos is placed in Sabiñánigo, next to The Pyrenees of Huesca. Sabiñánigo is a town with businesses, industries and in general, it is a centre of services of the called region "Comarca del Alto Gállego".	Among the programs of management that Gabilos Software has developed, it is a Rural Tourism Management product and another of Management of Hotels, already established in numerous clients. Those software products would be able to be adapted by means of an interface for the exchange of data among the program of Gábilos and the DBE of the European project.
	Barrabes Business Solutions	Barrabés acts as a communication link between IT developers and tourism businesses.	Barrabés wishes to collaborate in the DBE project because of their experience & background. It fits perfectly into the purpose of the project. During the past five years, they have been promoting the use of Information Technology (IT).
Finland	Nemein Oy	Nemein is a consultancy producing Open Source - based information management solutions. Nemein's solutions enable organizations to improve their web, sales, marketing, project and customer service operations. <ul style="list-style-type: none"> <li><a href="http://www.nemein.com/fi/">www.nemein.com/fi/</a></li> </ul>	Nemein will integrate the OpenPSA project management system into the framework. This will enable companies to share project information and expense reports automatically with their partners and contractors.
	Joinex	Joinex Oy provides services and develops tools to build high quality information systems efficiently. Focus is in demanding business critical systems, implemented using robust technologies, which are up to the challenge of today's business needs. <ul style="list-style-type: none"> <li><a href="http://joinex.com/">http://joinex.com/</a></li> </ul>	Joinex will integrate an XML message transfer service for large delivery channels in retail business.

Country	SME	Short description	Proposal description
	Integratum	<ul style="list-style-type: none"> <li><a href="http://www.integratum.fi/">www.integratum.fi/</a></li> </ul>	Integratum will integrate the CentraView Open source CRM-system into the DBE platform. Importing and exporting contact data using XML files
UK	Redenet	<p>Redenet has developed some of the most innovative software systems available. The unique design methodology and toolkit (GERM) enables us to build sophisticated systems rapidly, and most importantly, with a very high degree of reliability. Redenet has currently exclusive UK rights to the amazing GERM software toolkit.</p> <ul style="list-style-type: none"> <li><a href="http://www.redenet.co.uk">www.redenet.co.uk</a></li> </ul>	Multi Dimensional Category Search and <b>Data Analysis</b> and 2 further proposals.
	Domain Solutions	<p>Domain Solutions specialises in the application of Executable UML object-oriented software development and the use of the MDA CodeGenie code generation tool. The Company also offers a broad base of software and project management expertise.</p> <ul style="list-style-type: none"> <li><a href="http://www.oogenerator.com/">www.oogenerator.com/</a></li> </ul>	Domain Solutions offers the opportunity to work with SME enterprises to analyse common business domain spaces such as stock control and reservations that have dependencies on other organisations to produce UML analysis models that can be code generated to realise the system using the DBE.
	Openscape	<p>Openscape primarily concentrates on the delivery of IT solutions for business and the voluntary sector, using Open Source Software as a key component. Principle disciplines include web based facilities which include web sites, e-commerce, portals and intranets; cost effective network solutions and business administration databases.</p> <ul style="list-style-type: none"> <li><a href="http://www.openscape.co.uk/">www.openscape.co.uk/</a></li> </ul>	A web-based database administrated by the College or other Training establishment.
	Intelligent Commerce Enterprise	<p>World leading advanced technologies, systems and services for the online and multi-channel retailing and manufacturing consumer goods sector are the focus for the dynamic range of products and services from Intelligent Commerce Enterprises (ICE).</p>	The project proposed by ICE relates to a phased approach to developing an Internet based World Commerce Centre primarily focused on the manufacturing and retailing sectors of consumer goods.

Country	SME	Short description	Proposal description
	Meier Pollard	<p>Meier Pollard is a privately owned company formed in 2000 specifically to develop and market the InRax product within the UK.</p> <ul style="list-style-type: none"> <li>• Individual (Meier) DBE Involvement</li> <li>• <a href="http://www.meierpollard.co.uk">www.meierpollard.co.uk</a></li> </ul>	<p>An Application Framework which allows an application developer to register an application and levels of function and privilege for that application.</p> <ul style="list-style-type: none"> <li>• Address checker</li> <li>• InRax Accounting Service App</li> </ul>

**Table 3: Drivers and their proposals****SW Drivers porting efforts**

After all SW Drivers prepared their proposals, the Regional Catalysts (RC) analysed and defined and selected the best scenarios to be developed and deployed. Meanwhile, the status of the drivers works<sup>19</sup> are:

Country	SME	Proposal	Porting Efforts
UK	RedeNet	Data Analysis	Import filters / Output-Visualisation Adapters to/from GERM
	Paul Meier	Address checking	Address verification
	I-Commerce	Shopping assistant / SC	No idea of the efforts
	Domain Solutions	Generic Availability Service	Adapters
	OpenScape	ePortfolio	XML-RPC to web-services to DBE service
Finland	Nemein Oy	OpenPSA integration	Adapter
	Joinex	Manufacturing data integration	Adapter
	Integratum	CRM integration	No idea of the efforts
Spain	EON	Booking system integration	Adapter
	DBS	Booking system integration	Adapter
	Gábilos Software	Booking system integration	Adapter
	Barrabes Business Solutions	Communication between SMEs	Business integration

**Table 4: Drivers' porting efforts**<sup>19</sup> by September 2005



### SW Drivers problems and requirements

During the earlier development phase of DBE Features, the Drivers faced some problems, such as:

- Technology releases were lagging behind the companies. *Solution:* The Drivers needed to wait until the first public release of the ExE ServENT – component that was made in June 2005 (month 20). Thus, the Drivers really had to work from the scratch.
- Non-open source philosophy. Criticism about DBE intern development philosophy, which is not based on an open source concept, i.e. the drivers didn't have access to the codes since the beginning of their engagement. *Suggestion:* More open communication between drivers and DBE intern developers (computing team).
- The released technologies allowed only very simple services. The Drivers expectations were higher concerning the DBE technology.
- Identity and security features (authentication) were required but still under development. *Suggestion:* (1) Collaboration with other IP EU Projects, such as Prime and Trustcom, concerning these features; (2) a Driver could offer this authentication as a service (third-party service).
- Communication in the Sourceforge was initially non-existing. *Solution:* The computing team, i.e. intern DBE developers, begin developing content
- Documentation about installation (ExE) was initially non-existing. It was very difficult for the Drivers to install ExE, as a consequence the level of satisfaction was behind their expectations. *Solution:* (1) development of a kind of “handbook” available at web logs and web sites supported by ITA, UCE and <http://swallow.sourceforge.net>; (2) practical installation “exercise” during the first code camps, which took place in all three regions, supported by the RC and the computing team.
- Few or a non-existence of real services offered at DBE ExE. *Solution:* ITA developed eight different simple services, which service shows a different feature of the ExE, with the corresponding documented manuals and code (Oxygen), which can be found at [www.ita.es/dbe](http://www.ita.es/dbe). UCE developed also some services at <http://opensoa.blogspot.com>.
- No documentation about how to create a service at DBE ExE. *Solution:* ITA developed documentation, which shows how to create and adapt services to the ExE ([www.ita.es/dbe](http://www.ita.es/dbe)).
- No documentation (explanation) about each DBE component (ExE, EvE, and SF) and its functionalities. *Solution:* Explanation were given during the code camps, but they still being not enough. *Suggestion:* the Del. 24.1 should be available to the Drivers
- Communication difficulties; a more open, straightforward, and truthful communication between DBE intern developers, RC and Drivers was required. *Solution:* implementation of web logs, discussion forums, etc.

- There are too many places (web-sites, web logs, sourceforge, techideas, moodle) to get information about DBE. But they are not structured, and the Drivers loose many time searching for them. *Suggestion:* all these sites should be integrated into one.

#### Comments

- Some drivers don't have experiences with Java, they work with other technologies such as .NET, php, etc.. They need more explanations and examples on how to create an adapter, since the adapter has to be developed in Java.
- Some drivers still have some questions concerning how they will charge (e.g. monthly rate) their clients, which will use their services uploaded at DBE platform. Drivers will develop and propose new business models. The Aragon Drivers are going to include new features to their applications, and then they will offer an "added value" application to their customers. They suppose that it will help them to sell the new version of the applications to new customers easier.
- Some drivers desire to get as many services as possible from DBE (especially for free or at a low price), then to transform them for their purposes; finally they want to sell them as a new service and *maybe* upload this new service to DBE ExE. Some SMEs think that DBE should suggest or even oblige (by licensing) them to upload and offer this new service at DBE.
- The suggestion about identity and security features to be offered as a third party service was not welcome. Some SMEs think it has to be a basic DBE service. And other SMEs says it is acceptable to have this feature offered by another company as a extern service.
- The documentation about installation (ExE) should not be posted under a Blog but at a Wiki site.
- Most of the SMEs Drivers don't think that end-customers (e.g. Hotels) will be able to develop by their own a BML of their business at the DBE Studio, because it is not a self explainable tool. A pre understanding of Eclipse environment is necessary to be able to develop a BML, SSL Model with this tool. Therefore, they suggest to be offered a kind of DBE Studio Wizard.
- The most important aspect about DBE is the possibility for Networking.
- Some drivers think that with DBE technology, the features of their applications can be improved, and then they will *sell* it easier.

### **SW Implementers**

Once the Drivers' pilot services have been developed, the SW Implementers SMEs will implement new software services in the DBE Platform and adapt existing services that they have developed to the DBE Platform. The first call for Implementers will take place in month 25 (November 2005).

## ***User SMEs***

First, the Regional Catalysts got in touch with possible User SMEs from their region, but as it was written already before, they were not able to help the development of DBE Services. On the other way, the Drivers already own real Users for every application. Once the deployment of the service to DBE had been made, then we would have the following situation:

- Every SW Developer (both Drivers and Implementers) will bring 2 final users to the project and will enable them to use the updated application. User SMEs are introduced to the project by the agent they trust more from a technological point of view, namely, their TIC provider. User SMEs also know the application quite well and they have to learn how to use the new modifications introduced by the DBE project (Del. 30.4.1).

Probably, the user SMEs will be integrated in DBE platform by January 2006 (month 27).

## ***Conclusions***

The results of SME requirements, in this phase, didn't go as planned, because of the delays on DBE component releases. First, this deliverable should include the first requirements of drivers and implementers, but it was only possible to collect the first impressions and problems, which happened during the first phase (installation and first "days" of use - ExE and DBE Studio).

The DBE component – ExE – has already a stable version and a installation handbook, the component – EvE – doesn't have even an alpha-version. The DBE Studio, which is part of the SF has a current version 0.1.5 and its first stable version (alpha-version) will be probably launched by end of January 2006.

Since, DBE Project is developing a normal IST project, where the customers know what they want as a final product and about 90% of the requirements are provided by these customers. It is quite difficult to DBE customers (drivers, implementers and user SMEs) to request new features from DBE marketpace at this time of the project. Hence, DBE is developing state of the art SW system architecture, i.e. first the DBE customers need to understand the architecture and components offered at DBE marketpace to be able to ask for or suggest new features.

A detailed user requirements will be developed during the next months from drivers, implementers and user SMEs and they will be presented at the Deliverable 15.7.2 by the month 30 (April 2006).

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## **APPENDIX 1**

**Timmers** defined eleven business models currently in use or being experimented with, which are listed below<sup>20</sup>:

**E-shop:** This is Web marketing of a company or a shop. In first instance this is done to promote the company and its goods or services. Increasingly added is the possibility to order and possibly to pay, often combined with traditional marketing channels. Benefits sought for the company are increased demand, a low-cost route to global presence, and cost-reduction of promotion and sales. Benefits for the customers can be lower prices compared to the traditional offer, wider choice, better information, and convenience of selecting, buying and delivery, including 24-hour availability. Where repeat visits to the e-shop are done, one-to-one marketing can increase those benefits for both seller and buyer. Seller revenues are from reduced cost, increased sales, and possibly advertising. Most commercial Web sites are business-to-consumer electronic shops, selling for example flowers by Fleurop (<http://www.fleurop.com>) or air tickets by Travelocity ([www.travelocity.com](http://www.travelocity.com)).

**E-procurement:** This is electronic tendering and procurement of goods and services. Large companies or public authorities implement some form of e-procurement on the Web (an example is Japan Airlines at [www.jal.co.jp/](http://www.jal.co.jp/)). Benefits sought are to have a wider choice of suppliers which is expected to lead to lower cost, better quality, improved delivery, reduced cost of procurement (e.g. tendering specs are downloaded by suppliers rather than mailed by post). Electronic negotiation and contracting and possibly collaborative work in specification can further enhance time- and cost saving and convenience. For suppliers the benefits are in more tendering opportunities, possibly on a global scale, lower cost of submitting a tender, and possibly tendering in parts which may be better suited for smaller enterprises, or collaborative tendering (if the e-procurement site supports forms of collaboration). The main source of income is reduction of cost (automated tender processing, more cost-effective offers).

**E-auction:** Electronic auctions (on the Internet) offer an electronic implementation of the bidding mechanism also known from traditional auctions. This can be accompanied by multimedia presentation of the goods. Usually they are not restricted to this single function. They may also offer integration of the bidding process with contracting, payments and delivery. The sources of income for the auction provider are in selling the technology platform, in transaction fees, and in advertising. Benefits for suppliers and buyers are increased efficiency and time-savings, no need for physical transport until the deal has been established, global sourcing. Because of the lower cost it becomes feasible to also offer for sale small quantities of low value, e.g. surplus goods. Sources of income for suppliers are in reduced surplus stock, better utilisation of production capacity, lower sales overheads. Sources of income for buyers are in reduced purchasing overhead cost and reduced cost of goods or services purchased. Examples of electronic auctions are the ESPRIT project Infomar

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<sup>20</sup> [http://www.imse.hku.hk/imse2016/Readings/Essential/BusinessModel-Geoffrion/Timmers/98\\_21\\_n.html](http://www.imse.hku.hk/imse2016/Readings/Essential/BusinessModel-Geoffrion/Timmers/98_21_n.html)

(for ESPRIT and ACTS projects see [www.ispo.cec.be/ecommerce/ecomproj.htm](http://www.ispo.cec.be/ecommerce/ecomproj.htm)) and FastParts ([www.fastparts.com](http://www.fastparts.com) ).

**E-mall:** An electronic mall, in its basic form, consists of a collection of e-shops, usually enhanced by a common umbrella, for example of a well-known brand. It might be enriched by a common - guaranteed - payment method. An example is Electronic Mall Bodensee ([www.emb.ch](http://www.emb.ch)), giving entry to individual e-shops. When they specialise on a certain market segment such malls become more of an industry marketplace, like Industry.Net ([www.industry.net/](http://www.industry.net/)), which can add value by virtual community features (FAQ, discussion forums, closed user groups, etc.). The e-mall operator may not have an interest in an individual business that is being hosted. Instead the operator may seek benefits in enhanced sales of the supporting technologies (e.g. IBM with World Avenue). Alternatively benefits are sought in services (e.g. Barclays with BarclaySquare), or in advertising space and/or brand reinforcement or in collective benefits for the e-shops that are hosted such as increased traffic, with the expectation that visiting one shop on the e-mall will lead to visits to 'neighbouring' shops.

Benefits for the customer (real or hoped for) are the benefits for each individual e-shop (see above) with additional convenience of easy access to other e-shops and ease of use through a common user interface. When a brand name is used to host the e-mall, this should lead to more trust, and therefore increased readiness to buy.

Benefits for the e-mall members (the e-shops) are lower cost and complexity to be on the Web, with sophisticated hosting facilities such as electronic payments, and additional traffic generated from other e-shops on the mall, or from the attraction of the hosting brand. Revenues are from membership fee (which can include a contribution to software/hardware and set-up cost as well as a service fee), advertising, and possibly a fee on transactions (if the mall provider processes payments).

The commercial viability of the e-mall model has been questioned in its current implementation and in the current state-of-the-market. IBM World Avenue, for example, has folded. One of the reasons may be that the 'neighbour' concept does not translate into physical distance in cyberspace, where each location is only one click away. Therefore, not much additional convenience in finding shops is delivered. Furthermore, the sophisticated user (i.e. the majority of those on the Web today!) is able to handle a variety of seller-buyer user interfaces and therefore may be less attached to a uniform user interface. On the other hand, there are also indications that an increasing number of companies wish to outsource their Web-operations, which may increase the opportunity for e-malls or 3rd party marketplaces (see below). Possibly this reflects the shift from early adopters to mass-market use of the Internet amongst businesses.

**Third-party marketplace:** This is an emerging model that is suitable in case companies wish to leave the Web marketing to a 3rd party (possibly as an add-on to their other channels). They all have in common that they offer at least a user interface to the suppliers' product catalogues. Several additional features like branding, payment; logistics, ordering, and ultimately the full scale of secure transactions are added to 3rd party marketplaces. An example for business-to-consumers is to provide a common marketing around a special one-off event profiled

by well-known brand names, such as the recent e-Christmas experiment. ISPs may be interested in this model for business-to-business, using their Web builder expertise. However, it may equally appeal to banks or other value chain service providers. Revenues can be generated on the basis of one-off membership fee, service fees, transaction fee, or percentage on transaction value. Examples of 3rd party marketplace providers are Citius (as described by Jellasi and Lai 1996), TradeZone (<http://tradezone.onyx.net>), and to some extent FedEx VirtualOrder ([www.fedex.com](http://www.fedex.com)).

**Virtual communities:** The ultimate value of virtual communities is coming from the members (customers or partners), who add their information onto a basic environment provided by the virtual community company. The membership fees as well as advertising generate revenues. A virtual community can also be an important add-on to other marketing operations in order to build customer loyalty and receive customer feedback, (see Hagel and Armstrong 1997).

Virtual communities are already abundant within specific market sectors for example in books such as Amazon.com, apparel/garments (<http://apparelex.com/bbs/index.htm>), steel industry ([www.indconnect.com/steelweb](http://www.indconnect.com/steelweb)), nanotechnology ([www.nanothinc.com](http://www.nanothinc.com)), and many others. Firefly provides an interesting case of virtual community building, adding value to the community by building customer profiles ([www.firefly.net](http://www.firefly.net)). Virtual communities are also becoming an additional function to enhance the attractiveness and opportunities for new services of several of the other business models listed here (e.g. e-malls, collaborative platforms, or 3rd party marketplaces).

**Value-chain service provider:** These specialise on a specific function for the value chain, such as electronic payments or logistics, with the intention to make that into their distinct competitive advantage. Banks for example have been positioning themselves as such since long, but may find new opportunities using networks. New approaches are also emerging in production/stock management where the specialised expertise needed to analyse and fine-tune production is offered by new intermediaries. A fee- or percentage based scheme is the basis for revenues. Examples of value chain service providers are the FedEx or UPS ([www.ups.com](http://www.ups.com)) Web-based package shipping support.

**Value-chain integrators:** These focus on integrating multiple steps of the value chain, with the potential to exploit the information flow between those steps as further added value. Revenues are coming from consultancy fees or possibly transaction fees. An example value chain integrator is the ESPRIT project.

TRANS2000 is in the area of multi-modal transport. Marshall offers its customers added value from transaction information, which is provided through Extranet solutions like PartnerNet and MarshallNet (see Young et al 1996, Mougayar 1997, and G7-10 WG 1997). Some of the 3rd party marketplace providers are moving into the direction of value chain integration.

**Collaboration platforms:** These provide a set of tools and an information environment for collaboration between enterprises. This can focus on specific functions, such as collaborative design and engineering, or in providing project support with a virtual team of consultants. Business opportunities are in managing



the platform (membership/usage fees), and in selling the specialist tools (e.g. for design, workflow, document management). Examples are in the products and projects spun off from the Global Engineering Network concept (Rethfeldt 1994) such as Deutsche Telekom/Globana's ICS and the ESPRIT GENIAL project and in experimental projects for 3D collaborative design and simulation.

**Information brokerage, trust and other services:** A whole range of new information services are emerging, to add value to the huge amounts of data available on the open networks or coming from integrated business operations, such as information search, e.g. Yahoo ([www.yahoo.com](http://www.yahoo.com)), customer profiling, business opportunities brokerage, investment advice, etc. Usually information and consultancy have to be directly paid for either through subscription or on a pay-per-use basis, although advertising schemes are also conceivable. A special category is trust services, as provided by certification authorities and electronic notaries and other trusted third parties. Subscription fees combined with one-off service fees as well as software sales and consultancy are the sources of revenue.

An example of a trust service provider is Belsign ([www.belsign.be](http://www.belsign.be)). Many consultancy and market research companies are now offering commercial business information services via the Internet. Search engines are a special category of information services, with the public Internet facility (rather than intranet versions) usually based on advertising as a source of revenue. Advanced information brokerage to support negotiation between businesses is being developed by the ESPRIT CASBA and MEMO projects.

## APPENDIX 2

**Michael Rappa**<sup>21</sup> attempts to present a comprehensive and cogent taxonomy of business models observable on the web. The proposed taxonomy is not meant to be exhaustive or definitive. Internet business models continue to evolve. New and interesting variations can be expected in the future.

The basic categories of business models discussed in the table below include:

Type of Model:	Description:
<b>Brokerage Model</b>	<p>Brokers are market-makers: they bring buyers and sellers together and facilitate transactions. Brokers play a frequent role in business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C) markets. Usually a broker charges a fee or commission for each transaction it enables. The formula for fees can vary. Brokerage models include:</p> <p><b>Marketplace Exchange</b> -- offers a full range of services covering the transaction process, from market assessment to negotiation and fulfilment. Exchanges operate independently or are backed by an industry consortium. [<a href="#">Orbitz</a>, <a href="#">ChemConnect</a>]</p> <p><b>Buy/Sell Fulfillment</b> -- takes customer orders to buy or sell a product or service, including terms like price and delivery. [<a href="#">CarsDirect</a>, <a href="#">Respond.com</a>]</p> <p><b>Demand Collection System</b> -- the patented "name-your-price" model pioneered by Priceline.com. Prospective buyer makes a final (binding) bid for a specified good or service, and the broker arranges fulfilment. [<a href="#">Priceline.com</a>]</p> <p><b>Auction Broker</b> -- conducts auctions for sellers (individuals or merchants). Broker charges the seller a listing fee and commission scaled with the value of the transaction. Auctions vary widely in terms of the offering and bidding rules. [<a href="#">eBay</a>]</p> <p><b>Transaction Broker</b> -- provides a third-party payment mechanism for buyers and sellers to settle a transaction. [<a href="#">PayPal</a>, <a href="#">Escrow.com</a>]</p> <p><b>Distributor</b> -- is a catalogue operation that connects a large number of product manufacturers with volume and retail buyers. Broker facilitates business transactions between franchised distributors and their trading partners.</p> <p><b>Search Agent</b> -- a software agent or "robot" used to search-out the price and availability for a good or service specified by the buyer, or to locate hard to find information. [<a href="#">MySimon</a>]</p> <p><b>Virtual Marketplace</b> -- or virtual mall, a hosting service for online merchants that charges setup, monthly listing, and/or transaction fees. May also provide automated transaction and relationship marketing services. [zShops and Merchant Services at <a href="#">Amazon.com</a>]</p>
<b>Advertising Model</b>	<p>The web advertising model is an extension of the traditional media broadcast model. The broadcaster, in this case, a web site, provides content (usually, but not necessarily, for free) and services (like email, IM, blogs) mixed with advertising messages in the form of banner ads. The banner ads may be the major or sole source of revenue for the broadcaster. The broadcaster may be a content creator or a distributor of content created elsewhere. The advertising model works best when the volume of viewer traffic is large or highly specialized.</p> <p><b>Portal</b> -- usually a search engine that may include varied content or services. A high volume of user traffic makes advertising profitable and permits further diversification of site services. A <u>personalized portal</u> allows customization of the interface and content to the user. A <u>niche portal</u></p>

<sup>21</sup> <http://digitalenterprise.org/models/models.html>

	<p>cultivates a well-defined user demographic. [<a href="#">Yahoo!</a>]</p> <p><b><u>Classifieds</u></b> -- list items for sale or wanted for purchase. Listing fees are common, but there also may be a membership fee. [<a href="#">Monster.com</a>, <a href="#">Craigslist</a>, <a href="#">Match.com</a>]</p> <p><b><u>User Registration</u></b> -- content-based sites that are free to access but require users to register and provide demographic data. Registration allows inter-session tracking of user surfing habits and thereby generates data of potential value in targeted advertising campaigns. [<a href="#">NYTimes Digital</a>]</p> <p><b><u>Query-based Paid Placement</u></b> -- sells favourable link positioning (i.e., sponsored links) or advertising keyed to particular search terms in a user query, such as Overture's trademark "pay-for-performance" model. [<a href="#">Google</a>, <a href="#">Overture</a>]</p> <p><b><u>Contextual Advertising / Behavioural Marketing</u></b> -- freeware developers who bundle ad ware with their product. For example, a browser extension that automates authentication and form fill-ins, also delivers advertising links or pop-ups as the user surfs the web. Contextual advertisers can sell targeted advertising based on an individual user's surfing activity. [<a href="#">Claria</a>]</p> <p><b><u>Content-Targeted Advertising</u></b> -- pioneered by Google, it extends the precision of search advertising to the rest of the web. Google identifies the meaning of a web page and then automatically delivers relevant ads when a user visits that page. [<a href="#">Google</a>]</p> <p><b><u>Intromercials</u></b> -- animated full-screen ads placed at the entry of a site before a user reaches the intended content. [<a href="#">CBS MarketWatch</a>]</p> <p><b><u>Ultramercials</u></b> -- interactive online ads that require the user to respond intermittently in order to wade through the message before reaching the intended content. [<a href="#">Salon</a> in cooperation with Mercedes-Benz]</p>
<b>Infomediary Model</b>	<p>Data about consumers and their consumption habits are valuable, especially when that information is carefully analyzed and used to target marketing campaigns. Independently collected data about producers and their products are useful to consumers when considering a purchase. Some firms function as infomediaries (information intermediaries) assisting buyers and/or sellers understand a given market.</p> <p><b><u>Advertising Networks</u></b> -- feed banner ads to a network of member sites, thereby enabling advertisers to deploy large marketing campaigns. Ad networks collect data about web users that can be used to analyze marketing effectiveness. [<a href="#">DoubleClick</a>]</p> <p><b><u>Audience Measurement Services</u></b> -- online audience market research agencies. [<a href="#">Nielsen//Netratings</a>]</p> <p><b><u>Incentive Marketing</u></b> -- customer loyalty program that provides incentives to customers such as redeemable points or coupons for making purchases from associated retailers. Data collected about users is sold for targeted advertising. [<a href="#">Coolsavings</a>, <a href="#">MyPoints</a>, <a href="#">Greenpoints</a>]</p> <p><b><u>Metamediary</u></b> -- facilitates transactions between buyer and sellers by providing comprehensive information and ancillary services, without being involved in the actual exchange of goods or services between the parties. [<a href="#">Edmunds</a>]</p>
<b>Merchant Model</b>	<p>Wholesalers and retailers of goods and services. Sales may be made based on list prices or through auction.</p> <p><b><u>Virtual Merchant</u></b> --or e-tailer, is a retail merchant that operates solely over the web. [<a href="#">Amazon.com</a>]</p> <p><b><u>Catalog Merchant</u></b> -- mail-order business with a web-based catalog. Combines mail, telephone and online ordering. [<a href="#">Lands' End</a>]</p> <p><b><u>Click and Mortar</u></b> -- traditional brick-and-mortar retail establishment with web storefront.</p>

	<p><a href="#">[Barnes &amp; Noble]</a></p> <p><b>Bit Vendor</b> -- a merchant that deals strictly in digital products and services and, in its purest form, conducts both sales and distribution over the web. <a href="#">[Apple iTunes Music Store]</a></p>
<b>Manufacturer (Direct) Model</b>	<p>The manufacturer or "direct model", it is predicated on the power of the web to allow a manufacturer (i.e., a company that creates a product or service) to reach buyers directly and thereby compress the distribution channel. The manufacturer model can be based on efficiency, improved customer service, and a better understanding of customer preferences. <a href="#">[Dell Computer]</a></p> <p><b>Purchase</b> -- the sale of a product in which the right of ownership is transferred to the buyer.</p> <p><b>Lease</b> -- in exchange for a rental fee, the buyer receives the right to use the product under a "terms of use" agreement. The product is returned to the seller upon expiration or default of the lease agreement. One type of agreement may include a right of purchase upon expiration of the lease.</p> <p><b>License</b> -- the sale of a product that involves only the transfer of usage rights to the buyer, in accordance with a "terms of use" agreement. Ownership rights remain with the manufacturer (e.g., with software licensing).</p> <p><b>Brand Integrated Content</b> -- in contrast to the sponsored-content approach (i.e., the advertising model), brand-integrated content is created by the manufacturer itself for the sole basis of product placement. <a href="#">[bmwfilms]</a>.</p>
<b>Affiliate Model</b>	<p>In contrast to the generalized portal, which seeks to drive a high volume of traffic to one site, the affiliate model, provides purchase opportunities wherever people may be surfing. It does this by offering financial incentives (in the form of a percentage of revenue) to affiliated partner sites. The affiliates provide purchase-point click-through to the merchant. It is a pay-for-performance model -- if an affiliate does not generate sales, it represents no cost to the merchant. The affiliate model is inherently well-suited to the web, which explains its popularity. Variations include, banner exchange, pay-per-click, and revenue sharing programs. <a href="#">[Barnes &amp; Noble, Amazon.com]</a></p> <p><b>Banner Exchange</b> -- trades banner placement among a network of affiliated sites.</p> <p><b>Pay-per-click</b> -- site that pays affiliates for a user click-through.</p> <p><b>Revenue Sharing</b> -- offers a percent-of-sale commission based on a user click-through in which the user subsequently purchases a product.</p>
<b>Community Model</b>	<p>The viability of the community model is based on user loyalty. Users have a high investment in both time and emotion. Revenue can be based on the sale of ancillary products and services or voluntary contributions.</p> <p><b>Open Source</b> -- software developed voluntarily by a global community of programmers who share code openly. Instead of licensing code for a fee, open source relies on revenue generated from related services like systems integration, product support, tutorials and user documentation. <a href="#">[Red Hat]</a></p> <p><b>Public Broadcasting</b> -- user contributor model used by not-for-profit radio and television broadcasting extended to the web. The model is based on the creation of a community of users who support the site through voluntary donations. <a href="#">[The Classical Station (WCPE.org)]</a></p> <p><b>Knowledge Networks</b> -- discussion sites that provide a source of information based on the sharing of expertise among professionals. <a href="#">[AllExperts]</a></p>

### Subscription Model

Users are charged a periodic -- daily, monthly or annual -- fee to subscribe to a service. It is not uncommon for sites to combine free content with "premium" (i.e., subscriber- or member-only) content. Subscription fees are incurred irrespective of actual usage rates. Subscription and advertising models are frequently combined.

**Content Services** -- provide text, audio, or video content to users who subscribe for a fee to gain access to the service. [[Listen.com](#), [Netflix](#)]

**Person-to-Person Networking Services** -- are conduits for the distribution of user-submitted information, such as individuals searching for former schoolmates. [[Classmates](#)]

**Trust Services** -- come in the form of membership associations that abide by an explicit code of conduct, and in which members pay a subscription fee. [[Truste](#)]

**Internet Services Providers** -- offer network connectivity and related services on a monthly subscription. [[America Online](#)]

### Utility Model

The utility or "on-demand" model is based on metering usage, or a "pay as you go" approach. Unlike subscriber services, metered services are based on actual usage rates. Traditionally, metering has been used for essential services (e.g., electricity water, long-distance telephone services). Internet service providers (ISPs) in some parts of the world operate as utilities, charging customers for connection minutes, as opposed to the subscriber model common in the U.S. [[IBM](#)]

**Metered Usage** -- measures and bills users based on actual usage of a service.

**Metered Subscriptions** -- allows subscribers to purchase access to content in metered portions (e.g., numbers of pages viewed). [[Slashdot](#)]

## APPENDIX 3

Business models by Applegate et al. (Applegate et al. 1999) with examples.

Name	Function	Example
e-Tailer	Product sales (transactional commerce) – selling physical goods. Digital goods sales (transactional commerce) – “content” – magazines, music, software, etc.	<a href="http://www.amazon.com">http://www.amazon.com</a> <a href="http://www.amazon.com/ebooks">http://www.amazon.com/ebooks</a>
Advertising supported	Banner ads sold to generate revenues – usually with free content	<a href="http://www.yahoo.com/">http://www.yahoo.com/</a>
Subscription fee	Periodic charge from membership or access to content	<a href="http://www.economist.com/">http://www.economist.com/</a>
Commission or transaction (usage) fee	Agent, broker, or intermediary charge	<a href="http://www.ebay.com/">http://www.ebay.com/</a>
Logistics / fulfilment value added	Integrated supply chain	Couriers such as FedEx and UPS web-based package shipping support
Data mining analysis sales	Free content, but sell data about virtual visitors	
Affiliate model	Pay to drive traffic to a site	<a href="http://www.amazon.com/associates">http://www.amazon.com/associates</a>
Community model/expertise database	Subscription or brokerage fee	<a href="http://www.nber.org">http://www.nber.org</a>
Utility model	Metered usage (pay per byte or minute)	<a href="http://www.emma.fin/">http://www.emma.fin/</a>

**APPENDIX 4**

<b>Timmer's</b>	<b>Rappa</b>	<b>Applegate et al.</b>
E-Auction	Brokerage	Commission fee
-	Advertising	Advertising-supported
E-Shop	Merchant	E-Tailer
Information brokerage	Infomediary	-
-	Utility	Utility model
-	Subscription	Subscription fee
Virtual communities, collaboration tools	Community	Community model

## APPENDIX 5

This document summarizes the interviews with the SMEs in Spain, which took place during 2004. The SMEs requirements for future software are presented under the Table IT-Infrastructure - Item 4. The business models match SMEs “wishes” concerning DBE Platform, i.e. how they see and want to work with DBE Project.

### SMEs Interviewees:

N°	Type of organisation	Name	Contact
1	Travel Agency	Viajes Orienta Siete Mares	Javier Lozano Pérez
2.	Hotel	Hospedaria Hospital de Benasque	Fernando Panart
3.	Hotel	Hotel Ciria	José María Ciria
4	Sport service provider	Equipo Barrabés Guías de Montana	Gaby Mur
5	Sport service provider	Radical Snowboard	Jordi Casas
6	Sport service provider	Escuela de Parapente Pirineos	Mariano Ucedo Rufat
7	Real estate business	Habitat Benasque	Manuel Martín Gimeno
8	Food and Handcraft gifts	Sabores de Pueblo	Miguel Chéliz
9	Governmental association	Aramón Montanas de Aragón	Christóbal Roldán Ramirez

The information below summarizes the information from the first six SMEs interviewed.

### General Information:

1	Country:	▪ Spain
2	Address:	▪ Benasque (Huesca)
3	Contact:	▪ Manager/Owner
4	Sector:	▪ Tourism (Hotel, Restaurant or sport service provider)
5	Outsourced service	▪ Accounting
6	Clients	▪ Most from Spain (around 90%); Private and travel agencies

### IT-Infrastructure:

1	Connection	▪ ADSL; Mobile
	Technological platform	▪ Windows NT/2000
	Database in use	▪ Access (client data) ▪ Excel (client data)
2	Software in use	▪ MS Office; Adobe reader ▪ Hotel reservation system (reservation + billing)



3	The use of Internet for	<ul style="list-style-type: none"> <li>Information</li> <li>Presentation of products and services</li> <li>Email external (with clients)</li> <li>Weather forecast</li> </ul>
	Web-site used for	<ul style="list-style-type: none"> <li>Information</li> <li>Spanish (English)</li> <li>Maps</li> <li>Rates (summer and winter)</li> <li>Booking Form (but not saved in any DB)</li> </ul>
4	Future software acquisitions	<ul style="list-style-type: none"> <li>CRM<sup>22</sup> + Instant Messaging System<sup>23</sup></li> <li>Reservation System; Billing system<sup>24</sup></li> <li>Stock control system<sup>25</sup></li> </ul>

**IT-Purchase process:**

1	Purchase decision maker	<ul style="list-style-type: none"> <li>Manager</li> </ul>
2	Software vendor selection through/by	<ul style="list-style-type: none"> <li>Consultancy: friend; software house</li> <li>Price</li> </ul>

**DBE eBusiness model:**

1	Business model	<ul style="list-style-type: none"> <li>Collaboration platform (communication and data exchange between companies – hotel &amp; travel agencies – B2B)</li> <li>eMall; 3rd party marketplace (“sell” rooms &amp; “buy” services or eServices – B2C and B2B)</li> </ul>
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<sup>22</sup> Travel Agency + Hotel

<sup>23</sup> Travel Agency

<sup>24</sup> Sport service providers

<sup>25</sup> Hotel

## APPENDIX 6

N°	Type of organisations	Name	Contact
1	e-Business Researcher	eBRC	Ms. Hanna Martin
2	Science Park Administrator	Technology Centre Hermia	Ms. Johanna Salomaa-Valkama
3	Conference Manager	SuviSoft	

The information below summarizes the information from the first three SMEs interviewed.

### General Information:

1	Country:	▪ Finland
2	Address:	▪ Tampere
3	Contact:	▪ Manager
4	Sector:	▪ Event organizer (SW provider)
5	Outsourced service	▪
6	Clients	▪ Most from Finland

### IT-Infrastructure:

1	Connection	▪ ADSL; WLAN
	Technological platform	▪ Windows NT/2000
	Database in use	▪ Access ▪ MySQL
2	Software in use	▪ MS Office; Adobe reader
3	The use of Internet for	▪ Information ▪ Presentation of products and services ▪ Email external (with clients)
	Web-site used for	▪ Finish (English) ▪ Information (services) ▪ References, involved events ▪ Feedback

### IT-Purchase process:

1	Purchase decision maker	▪ Manager
2	Software vendor selection through/by	▪ Software house

		▪ Price
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**DBE eBusiness model:**

1	Business model	<ul style="list-style-type: none"><li>▪ Collaboration platform (communication and data exchange between companies)</li><li>▪ eMail</li></ul>
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## **APPENDIX 7**

From a historical perspective, Web Services represent the convergence between the service-oriented architecture (SOA) and the Web. The Web Services architecture takes all the best features of the service oriented architecture and combines it with the Web. The Web supports universal communication using loosely coupled connections. Web protocols are completely vendor-, platform-, and language-independent. The resulting effect is an architecture that eliminates the usual constraints of DCOM, CORBA, or RMI. Web Services support Web-based access, easy integration, and service reusability.

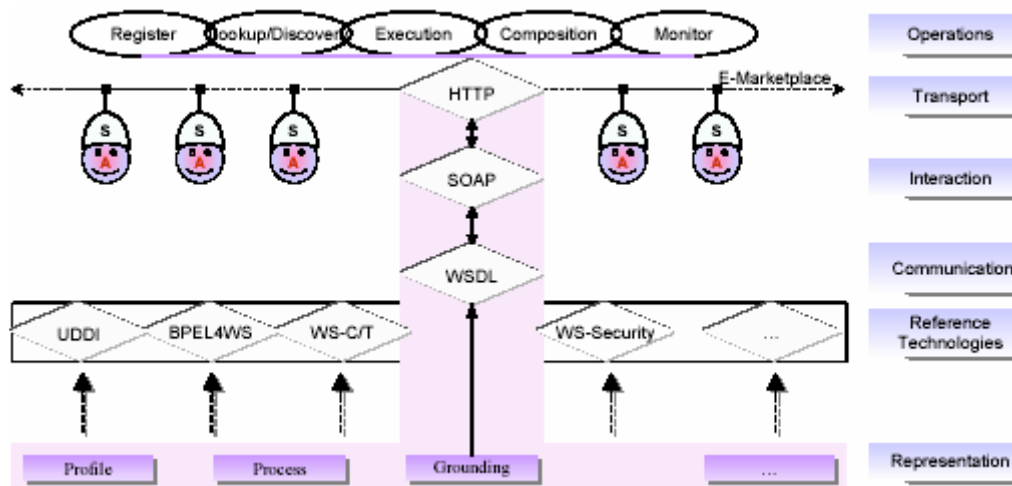
Taking the definition of the WWW-Consortium (<http://www.w3.org/>) we may define a Web service as follows:

*“A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards”.*

In practical business terms, Web Services have emerged as a powerful mechanism for integrating disparate IT systems and assets. They work using widely accepted technologies and are governed by commonly adopted standards. Web Services can be adopted incrementally with little risk and at low cost. Today, enterprises use Web Services for point-to-point application integration, to reuse existing IT assets, and to securely connect to business partners or customers. Independent Software Vendors (ISVs) embed Web Services functionality in their software products so they are easier to deploy (N.N., 2003).

Web services is a highly productive and cost-effective way to integrate incompatible applications, reuse legacy IT assets, and securely connect to business partners and customers. A complete solution regarding these functional requirements has to deliver: faultless interoperability, end-to end security, best-in-class performance and platform neutrality.

The goal of Web services, when used within the context of e-marketplaces, is to enable business solutions by assembling and programming pre-built software services offering business functionality on the Web. Each of these services behaves like a self-contained, modular mini-application with its own interface described in WSDL, in such a way that can be published and invoked over the Internet. This allows companies to conduct electronic business, by invoking Web services, with all partners in a marketplace rather than with just the ones with whom they have collaborative business agreements. Service offers are described in such a way (e.g., WSDL over UDDI) that allows automated discovery to take place and offer request matching on functional and non-functional service descriptions (Papazoglou, et al., 2003).



**Figure 4: Integrated View on Web Services and E-Marketplaces**

The Web services approach is an appropriate paradigm for open large-scale environment applications, especially e-marketplaces (Lia, Ghenniweb & Shena, 2003). Figure 5 shows the correlation between the Web services paradigm and e-marketplaces, which purchase and sell Web services encapsulating functionality.

The integrated view of figure 5 also aims at clarifying the different business usage and operational areas of Web services. At the bottom, the different representations of Web services are shown. Further up, the reference technologies on which different implementation aspects of Web services are grounded can be seen. Special emphasis lies on the standards WSDL, SOAP and HTTP, which enable the basic Web service usage capabilities of Communication, Interaction and Transport respectively. HTTP here is the standard medium which enables easy access to Web services, making the paradigm attractive for an e-marketplace. The Operations layer finally describes the handling of Web services, such as composing, executing (as part of a process), registering and more.