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### **DBE Regulatory Framework**

**Task B11: Knowledge Base of Regulatory Issues**

### **Deliverable 32.2**

### **Taxonomy**



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## Table of contents

|   |    |
|---|----|
| Executive summary .....   | 4  |
| Introduction .....  | 6  |
| 1. Taxonomy .....   | 8  |
| 1.1 Trust Types.....  | 9  |
| 1.1.1 Trust type X .....  | 9  |
| 1.1.2 Trust type Y .....  | 9  |
| 1.1.3 Trust type Z .....  | 9  |
| 1.1.4 Trust Types Table .....                                       | 10 |
| 1.2 Building Blocks and Regulatory Issues .....                     | 11 |
| 1.2.1 Privacy and consumer protection.....                          | 11 |
| 1.2.2 E-signatures and security .....                               | 12 |
| 1.2.3 Jurisdiction and consumer protection .....                    | 12 |
| 1.2.4 Building Blocks and Issues identified in the literature ..... | 12 |
| 1.3 Operational Perspectives.....                                   | 13 |
| 1.3.1 DBE relationships .....                                       | 14 |
| 1.3.2 DBE actors .....  | 15 |
| 1.3.3 Software Lifecycles .....                                     | 16 |
| 1.3.4 Perspectives and sub-categories table.....                    | 17 |
| 2. Taxonomy Applied to a Sample Use Case .....                      | 18 |
| 2.1 Use case: tourism sector.....                                   | 19 |
| 2.1.1 B2C tourism service order .....                               | 19 |
| 2.1.2 B2B hotel accommodation for a tourism service package .....   | 21 |
| 3. Summary .....  | 24 |
| Bibliography .....  | 25 |

### **Executive summary**

The taxonomy presented in this document complements Deliverable 32.1 Literature Review in the context of WP32, Task B11 Knowledge Base of Regulatory Issues. It presents a transposition of the main findings of the literature review into a basic taxonomy intended to identify, classify and assess regulatory issues relevant to the DBE vision. The taxonomy will be used as a framework for investigating regulatory issues arising in sector-specific and local implementation cases and is intended to evolve with the research findings from these stages. It is also intended to facilitate knowledge transfer with other tasks and work packages in the DBE project for which regulatory issues are relevant.

The taxonomy is comprised of three basic dimensions used for categorising and organizing research inquiry into regulatory concerns relevant to the DBE vision. The first dimension is that of *trust types* (X, Y and Z), further subdivided by the DBE layer facets (service and technological solutions, business activities and knowledge) and types of commercial relationships (B2B or B2C). The second dimension uses the *building blocks* of regulatory trust (privacy and consumer protection, e-signatures and security, jurisdiction and consumer protection), further narrowed down to the specific regulatory issues identified as relevant for the DBE generic layer in Deliverable 32.1. The final dimension of the taxonomy draws on the various *operational perspectives* from which the regulatory issues may be considered in the DBE context. These include the perspective of DBE relationships (external, internal, both), DBE actors (SME Service Providers, SME Users, Business Analysts) and software lifecycles (RAD, ISP, XP and OS).

The last section of this report illustrates an application of the taxonomy. A summary of the taxonomy is presented, linking together its three dimensions. Two brief use cases of applying the taxonomy are presented, drawing on a scenario developed for the tourism opportunity space in the DBE: online contracting process requirements in a B2C tourism service order, and the issue of personal data protection in a B2B hotel accommodation transactions for a tourism service package.

## **Introduction**

This document is a companion report to Task B11 Deliverable 32.1 Literature Review. It presents a transposition of the main findings of that literature review into a basic taxonomy that is intended to evolve with findings that will come from subsequent activities of Task B11. A description of the literature review and methodology can be found in D32.1.

The objectives of the taxonomy are:

- To set out an analytical framework for classifying and analysing regulatory issues arising in generic layer, sector-specific and local implementations of the DBE vision.
- To facilitate knowledge transfer with other tasks and work packages within the DBE project for which regulatory issues are relevant.

The taxonomy completes the initial stage of task B11 (activity B11.1) aimed at creating a generic layer knowledge base of regulatory issues relevant to the DBE vision. It is important for readers to keep in mind, however, that the taxonomy is a ‘living’ document, in the sense that it is expected to evolve in conjunction with research findings from activities in Task B11.

This report is divided in two main sections. Following this introduction, Section 1 provides the background for the use of the taxonomy for capturing the regulatory environment and sets out characteristics of the taxonomy developed based on the research into the regulatory issues applicable at a generic layer of a digital business ecosystem. Section 2 suggests the implications for the use of the taxonomy in the DBE project, summarises its main features in a three-dimensional matrix, and provides a brief sample case scenario applying the taxonomy as a tool for analysis for the DBE case

developed previously in the project to describe the network architecture (Ferronato 2004).

## **1. Taxonomy**

The taxonomy developed for identifying and classifying regulatory issues relevant to the DBE vision draws its working definition from an approach adopted by ALIVE project on legal issues for virtual organisations (IST 2000-25459):

[A] taxonomy should be regarded as a quest, setting out the boundaries of the main research subject and providing a preliminary framework of guidelines for an in-depth analysis of the [regulatory] issues related to the [project]. The taxonomy... initiates further research by... pointing out the most problematic legal questions, clarifying and illustrating the significance of certain [regulatory] issues. The taxonomy does not present [regulatory or legal] solutions to these issues. (Schoubroeck et al 2001a).

The main aim of the taxonomy is to serve as a basic starting point for identifying, classifying and assessing the relevance of different regulatory issues relevant to the DBE vision. It serves both as a tool for directing the research activities in the next stages of Task B11 while at the same time provides baseline knowledge and a common point of reference for other tasks and work packages where regulatory issues may be relevant. In this sense, the taxonomy contributes to work of the project by serving as a common point of reference ‘to guide further discussions and the distillation of findings and existing knowledge’ (Schoubroeck et al 2001b).

The following sections set out the taxonomy developed for analysing the regulatory issues relevant within a digital business ecosystem environment, where issues are classified according to trust types, regulatory building blocks and operational perspectives.



## **1.1 Trust Types**

The first classification adopted for the taxonomy is based on the notion of trust as a critical enabler of e-business activities adopted as the starting point for approaching regulatory issues in the DBE context. As described in deliverable D32., the regulatory domain is central to building trust relationships between partners. Three main types of *regulatory trust* in a digital business ecosystem environment were identified based on the model of trust suggested by Meents et al (2002) and serve as the initial point of classification of regulatory issues.

### *1.1.1 Trust type X*

This type of trust refers to trust (perceived or actual) on the side of joining companies towards the DBE. From a regulatory perspective, the expectation is that technical architecture and basic services incorporate the existing e-business regulations, and provide facilities for carrying out transactions in a way that will ensure compliance with established laws and norms.

### *1.1.2 Trust type Y*

This type of trust refers to the expectation from established DBE participants towards joining companies. In order to establish good trust relationships, companies are expected to comply with existing laws and norms, and to avoid creating unnecessary risks for their DBE counterparts.

### *1.1.3 Trust type Z*

Trust type Z refers to the trust relationships between DBE participants themselves. This type of trust is supported by confidence in the ability of norms and

laws to govern the interactions resulting in part from the self-organisation and evolution of the DBE environment.

#### *1.1.4 Trust Types Table*

A further breakdown of regulatory issues has been adopted based on types of trust based on DBE layers and types of DBE transactions, as presented in Table 1 below.

The distinction between different facets of trust in the DBE draws on the DBE vision layers suggested by Nachira (2002) and elaborated as follows:

- ***Trust in services and in technological solutions*** is a measure of confidence expressed in terms of security and reliability.
- ***Trust in business activities*** is a measure of confidence expressed in terms of the mutual recognition of accepted practices and procedures for specific sectors and local contexts.
- ***Trust in knowledge*** is a measure of confidence expressed in terms of symmetric access to information.

A further subcategory used for classifying regulatory issues based on the type of trust is that of a type of business interactions expected from the DBE vision, where a distinction is made between business to business (B2B) and business to consumer (B2C) transactions as both the nature of business relationships and the applicable regulation can differ substantially between B2B and B2C settings.

| Trust Types |                                     |                      |
|-------------|-------------------------------------|----------------------|
| Trust Type  | Sub-categories for trust in         | Business Interaction |
| X           | service and technological solutions | B2B<br>B2C           |
|             | business activities                 | B2B<br>B2C           |
|             | knowledge                           | B2B<br>B2C           |
| Y           | service and technological solutions | B2B<br>B2C           |
|             | business activities                 | B2B<br>B2C           |
|             | knowledge                           | B2B<br>B2C           |
| Z           | service and technological solutions | B2B<br>B2C           |
|             | business activities                 | B2B<br>B2C           |
|             | knowledge                           | B2B<br>B2C           |

**Table 1: Classification of regulatory issues based on trust types**

## **1.2 Building Blocks and Regulatory Issues**

The literature review in D32.1 refers to the *building blocks of regulatory trust*, representing the domains of regulatory environment that are priority concerns when developing e-business initiatives. These are generic layer building blocks serving to identify a broad set of regulatory issues without specifying how those issues are relevant to any specific set of circumstances.

### *1.2.1 Privacy and consumer protection*

The building block of privacy and consumer protection refers to the regulatory issues in processing, control and distribution of personal and consumer data over

electronic formats, taking into account the individual rights and freedoms of the e-business users.

#### *1.2.2 E-signatures and security*

This building block refers to the issues created by the sharing of information over digital media. It is a concern to ensure autonomy and cross-border interoperability through authentication, integrity and non-repudiation.

#### *1.2.3 Jurisdiction and consumer protection*

The building block of jurisdiction and consumer protection refers to the issues resulting from the cross-border nature of many e-business services, and the associated challenges in contractual relationships between goods or service providers and customers, such as jurisdictional issues and means for resolving cross-border disputes.

#### *1.2.4 Building Blocks and Issues identified in the literature*

The building blocks on their own cannot explain the complexity of the regulatory environment within which the DBE vision will come to exist. The research carried out and reported in D32.1 Literature review has identified a number of regulatory issues within the defined building blocks that are relevant to the generic layer of the DBE vision. The actual regulatory issues identified in each of the building blocks represent the second level classification, as presented in the table below. These issues will be used as a starting point for exploring the regulatory constraints in the following stages of research in task B11, and the taxonomy will be further refined and populated by the regulatory issues arising in particular sector-specific and local settings.



| Building Blocks and Issues identified in D32.1 |   |
|--|---|
| Privacy and consumer protection                | Jurisdiction, standards, third-party countries, reputation, compliance with data protection legislation, unauthorised disclosure, traceability or record keeping  |
| E-signatures and security                      | Authentication, invoicing and payments systems, certification authorities, validity of contracts, encryption technologies, electronic storage, notification when using e-invoices, compatibility of payment systems   |
| Jurisdiction and consumer protection           | Cross-border online contracting, legal recognition of electronic contracts, legal validity of B2B contracts, jurisdiction, information requirements for online contracts, verification of orders, notification of receipt, SME education and awareness, dispute resolution. |

**Table 1: Classification of issues based on regulatory building blocks**

### **1.3 Operational Perspectives**

The taxonomy can also be classified from different angles or operational perspectives as a modality of analysis. This approach has an added value for analysing regulatory issues. As Schoubroek et al (2001b) argue, the approach based on angles are useful because

... they provide a better insight into certain [regulatory] issues, for example to whom they are important and at what time during the lifecycle they become crucial.

The following perspectives have been adopted in for the taxonomy of regulatory issues relevant for the DBE: classification according to DBE relationship, distinctions based on the types of DBE actors, and, finally, the models of software development lifecycle potentially used in DBE environment.

### 1.3.1 DBE relationships

Regulatory issues can be classified based on the degree of relation to the DBE environment. Two main types of relationships can be identified in this context: internal and external. In some cases both internal and external perspectives may apply simultaneously.

Regulatory issues classified as **internal** refer to issues that either

- arise in the DBE environment and are specific to the DBE type of setting (e.g. issues related to the DBE legal identity and applicable rules within DBE, issues arising from governance arrangements, legal challenges associated with the envisioned self-organising processes in software creation);
- or, are issues directly linked to DBE participants and their activities in the DBE environment (e.g. issues related to transactions carried out within the DBE, copyright questions in regard to the integrated software, security and data exchange in the DBE, identity of DBE members).

**External issues** are those that are not in the power of the DBE members or governors to effect – i.e. the external regulations applicable to e-business activities, such as tax rules, consumer and data protection regulations, contract and competition law provisions and so on. These rules exist irrespectively of the DBE, and, while the DBE environment has to facilitate compliance with the rules, DBE actors themselves cannot influence the existence of these provisions.

In some cases, regulatory issues will be classified as **both external and internal** – for example, data protection requirements is an external legal issue that cannot be influenced by the DBE. However, the use of personal data stored in the distributed DBE databases as a result of transactions within the DBE is constrained by the existing regulation, hence the issues related to internal data handling processes will be limited by externally existing regulations. Likewise, drawing on an example from the ALIVE project (Schoubroeck et al 2001a), the use of digital signatures by the DBE members as

part of authentication procedures is effected by the certification regulations and externally existing certification arrangements.

### *1.3.2 DBE actors*

The classification based on the DBE actors is useful as it helps to both identify issues relevant to particular DBE parties and to analyse the same issues from the perspectives of different DBE actors. For the current purposes, the definitions developed by the DBE Business Domain and presented in the Business Domain meeting<sup>1</sup> are adopted. These are as follows:

- ***SME Service Providers***: provide digital (software component) services that use the DBE as an infrastructure platform. The digital services that these providers contribute to the DBE determine the core of what the DBE will be able to offer for Users. SME Service Providers are the party responsible for the technical integration of their services with the execution environment and the (technical) description of their digital services in SDL;
- ***SME Users***: use digital DBE services for their own business needs in a "self-consumption" way or in order to undertake transactions with other DBE users of the same or a compatible service. For this - they also leave a "fingerprint" on the DBE platform which is their BML description;
- ***Business Analysts***: have a bridging function between both sides. They help users getting connected and establish their BML profiles. They also help DBE service providers to integrate into service chains and make DBE services compatible. In that sense they perform manually what would be the task of the evolutionary environment.

An alternative set of definitions adopted from a more technical perspective (see Ferronato 2004), which distinguish between SME SW Developer, SME Run-time User (Service Provider or Service Consumer) and Business Analyst. However, as task B11 is more closely related to the business domain, definitions used by the business domain are

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<sup>1</sup> The definitions had been presented and discussed in the second day of the DBE Business Domain meeting in London (10.03.05). Minutes of the meetings are currently in preparation and not yet available for referencing.

adopted in the taxonomy in the meanwhile and can be adjusted as soon as a common set of definitions is agreed between technical and business domain tasks.

### *1.3.3 Software Lifecycles*

The software lifecycle perspective is adopted in the taxonomy in order to capture the different regulatory concerns that arise during software development, deployment, upgrade, expansion and discontinuation. Four main models of software development lifecycles are distinguished for the purposes of the taxonomy, based on the literature in the field (see e.g. Jones 2003; Presmann 2000). While the DBE vision is established on open source principles, it may be the case that important features of other models of software development may be adopted or even prevail in some areas at the point of implementation.

In summary these four models are:

- ***RAD (Rapid Application Development)*** refers to a development cycle designed to give much faster development and higher quality results than the traditional life cycle and has been adapted to take maximum advantage of powerful software development environments, which has evolved recently. In this model, the users and the developers work together - the user has an input to the development process and the patching is carried out as part of the development process.
- ***ISP (Internet Development Tool)***: in a market with faster and faster release cycles companies must deploy new features quickly or competitors will get there first. To increase speed they can overlap parallel development–releases are developed in parallel or staged onto the market such that design, development and quality assurance occur simultaneously.
- ***XP (Extreme Programming)*** is a discipline of software development based on values of simplicity, communication, feedback, and courage. It works by bringing the whole team together in the presence of simple practices, with enough feedback to enable the team to see where they are and to tune the practices to their unique situation.



- **OS (Open Source)** is a way of developing software by consensus, with open access for developers to source code. Communication takes place through the Internet and collaboration is carried out by the use of Internet based collaboration tools (such as CBS). However there is no clear proprietary ownership of the source code by developers or companies.

The four models summarised above are based on the common software lifecycle classification, however, other software development methodologies may prove significant in the DBE context (such as Unified Process or Agile Methods) and may be included into the taxonomy at a later stage depending on the evolution of the DBE project.

#### 1.3.4 Perspectives and sub-categories table

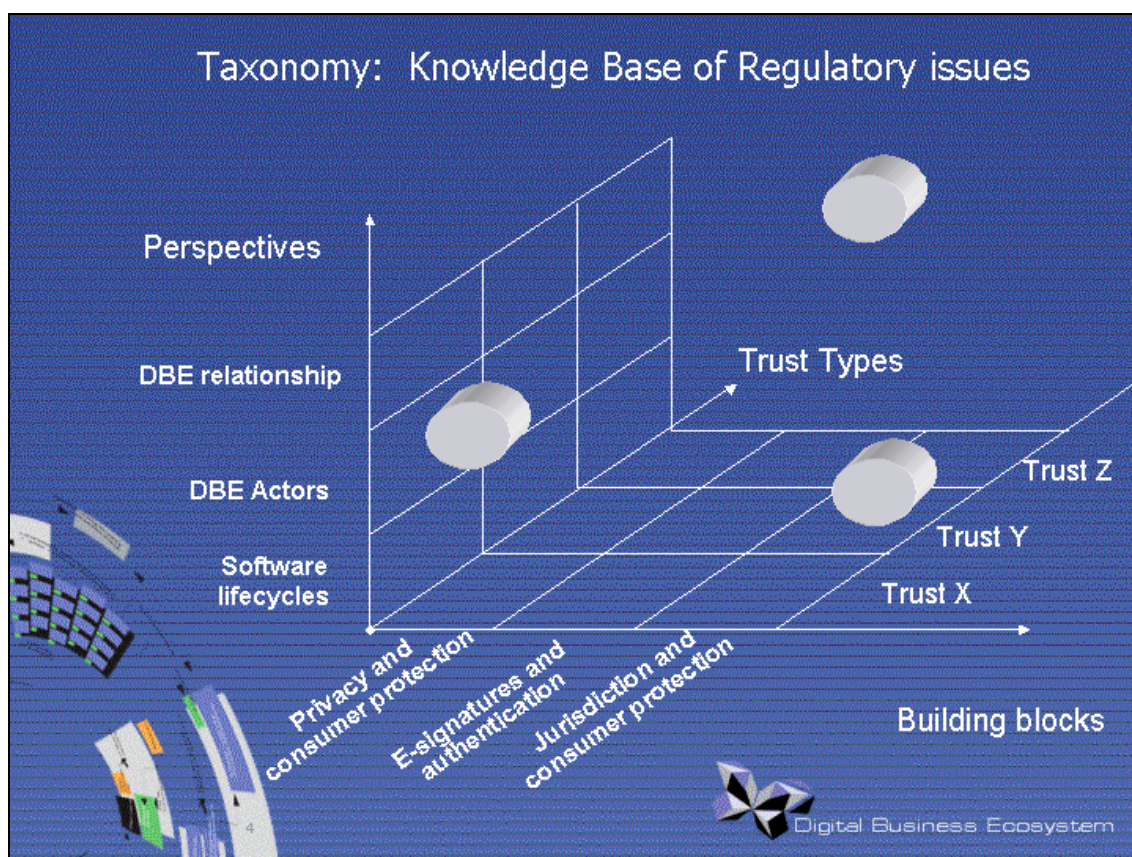
The following table summarises the classification of regulatory issues based on operational perspectives relevant for the DBE vision.

| Perspectives and Sub categories |                                     |
|---------------------------------|-------------------------------------|
| Perspective                     | Sub-Categories                      |
| <b>DBE Relationship</b>         | Internal                            |
|                                 | External                            |
|                                 | Both                                |
| <b>Actors</b>                   | Users                               |
|                                 | Developers                          |
|                                 | Business Analysts                   |
| <b>Software Lifecycles</b>      | RAD (Rapid Application Development) |
|                                 | ISP (Internet Speed Development)    |
|                                 | XP (Extreme Programming)            |
|                                 | OS (Open Source Model)              |

**Table 2: Classification based on operational perspectives**

## 2. Taxonomy Applied to a Sample Use Case

Following the introduction of classifications in section 2, it is possible to portray the taxonomy as a three-dimensional matrix, in which all these elements interact as presented on the graph below. The matrix links together the classifications based on trust types, building blocks of regulatory issues and the operational perspectives within DBE. Thus, any regulatory issue identified in the further stages of analysis can be placed along the dimensions of the matrix and examined for its relevance in any of the elements of the classifications adopted. Using the taxonomy, it is thus possible to narrow down the area to which particular regulatory issues belong and in which they are most relevant in order to carry out further analysis.



**Table 3: A three-dimensional representation of the taxonomy**

## **2.1 Use case: tourism sector**

In this section two examples of applying the taxonomy model to a DBE use case are presented. The examples draw on cases developed for the DBE Architecture requirements (Ferronato 2004). The scenarios envision possible use cases in the tourism sector opportunity space, which include specification of the service in BML, Yellow Page mode service lookup function, an Interaction Form for submitting orders, and several types of basic services (payment, invoicing, information carrier, secure identification). The particular example used here is for a provision of service for attending a forthcoming music group concert by a travel agency (Ferronato 2004:31)

### *2.1.1 B2C tourism service order*

In the case scenario, a travel agency decided to offer a service for attending a forthcoming concert of a music group. For the purposes of the example, the SME offering the service, which includes travel, accommodation and tickets to the concert, is located and registered in Spain. Ordering the service involves the use of the interaction form, which allows customers to place orders and execute payments. An example of a regulatory issue here are the requirements related to online contracting process.

If we start by applying the dimension of Trust types, we can first place the issue into the category of Trust type X (trust towards the DBE). Following the taxonomy further, the issue is placed in the facet of Services and Technological solutions, and the type of transaction is B2C. Some questions that arise along this dimension include:

- To what extent is it necessary and feasible to embed the requirements related to the B2C ordering process in the Interaction Form?
- How does the facilitation of these requirements effect the willingness of the travel agency to offer the service though the DBE?



From the second dimension of the taxonomy, the issue is placed in the Jurisdiction & Consumer Protection building block. As the main generic level issues in relation to cross-border contract requirements have been identified in D32.1, this can guide further enquiry by asking:

- Are there any constraints to the validity of electronically concluded order in this kind of transaction in Spain? Do any constraints to validity apply in the other jurisdictions in which potential customers are located? If so, how should this be taken into account when offering the service through DBE?
- Does the Interaction Form take account of the regulations about B2C contracting laid down in the E-commerce directive? Are there any specific requirements applicable to the ordering process at sector level, the jurisdictions of ordering customers or in the jurisdiction of the travel agency (Spain)?
- Are there specific consumer protection rules applicable to these kinds of transactions that the travel agency needs to follow (e.g. insurance, special needs requirements or consumer security related concerns)?
- What are the potential liabilities of the travel agency in case of failure to ensure availability of travel and/or tickets to the concert after the order has been processed?
- What are the ODR mechanisms available for resolving the B2C dispute that can potentially arise in this transaction?

In the Operational Perspectives dimension, the issue may be categorised as External (DBE Relationships category), affecting all DBE actors (DBE Actors), and potentially relevant in all software lifecycle models (SW Lifecycles). The following questions may be asked:

- Which DBE actors are responsible for ensuring the requirements related to contracts are in place (i.e. is it a responsibility of the SME Service Providers or SME Users? Is the responsibility shared, what is the degree of sharing and how is this organised? Which of DBE actors would be most affected if contracting process requirements were not accommodated and in what ways?
- At what stage of software development process should the requirements be taken into account? How can this be done in the different software lifecycle models?

*2.1.2 B2B hotel accommodation for a tourism service package*

A part of the service chain in this scenario involves transactions between the travel agency, providing the travel and ticket package for the concertgoers, and a small hotel providing accommodation in Madrid, where the concert takes place. The hotel accommodation booking service runs on the DBE platform, and the register of clients' feeds automatically into the hotel's database, which is also based on a DBE supported application. One of the regulatory issues arising in this case concerns personal data protection requirements when exchanging and storing data related to end consumers as a result of transactions between the travel agency and the hotel. For the purposes of the example, the assumption is that the travel agency and the hotel have not co-operated in the past.

Applying the Trust dimension, the issue may be placed in Trust Y category (trust towards the accommodation provider to comply with the data protection requirements and not aim to misuse the personal data acquired). Applying further sub-categories, we can analyse the issue in the facet of trust relating to business activities (mutual recognition of accepted practices and procedures when handling personal data related to end customers), and, finally, transaction type is B2B in this case (trust considerations relevant to B2B relationships thus apply). The following questions may be asked in this dimension:

- Are there any mechanisms for verifying the reputation of the hotel SME conduct in the past? Is this seen as an important factor by the travel agency? Does this affect the willingness of the travel agency to transact with the previously unfamiliar hotel SME?

- Is there a common understanding about the practices of data use in this context? Are DBE-wide rules needed to facilitate a common approach that is in line with existing regulations? Are both companies aware of the applicable regulations and any internal DBE requirements?

Applying the Building Blocks dimension, the regulatory issue of data protection requirements belongs to the category of Privacy and Consumer Protection. Questions arising here include:

- What are the basic requirements concerning data protection applicable to these kinds of transactions?
- Are there requirements laid down by the professional organisations in which the travel agency and/or the hotel participate?
- Are there specific rules about the use of data in Spain or potential end consumer jurisdictions that go beyond the EU-level specifications?
- Are end consumers from non-EU countries involved? If so, what are the potential risks resulting from differences in personal data protection regulation between EU and third countries? Should the third-country requirements related to personal data protection be taken into account?
- Are mechanisms for tracing and identifying misuse of personal data available in the DBE?

In the dimension of Operational Perspectives, this issue can be seen as both external and internal (DBE Relationships category), it concerns mainly SME-users (DBE Actors) and can potentially apply to all models of software lifecycle (SW Lifecycles). The following questions may be asked applying this category:

- Should the external data protection requirements relevant to this scenario be accommodated by a DBE internal policy?
- Is there a need to evaluate data sensitivity in relation to the hotel accommodation orders between the two SMEs? If so, how can this be done?

- Which DBE actors are responsible in this case for facilitating the protection of personal data? Is it the responsibility of SME providing the software employed in the process (designing the ordering application and/or the databases which may contain personal data as the result of these transactions)?
- If the data protection controls are to be embedded in the architecture, at which point in the software lifecycle of the applications used in this transaction should this issue be taken into account?

### **3. Summary**

The taxonomy presented in this document is intended to identify, classify and assess regulatory issues relevant to the DBE vision. Drawing on the literature review reported in D32.1, the taxonomy presented is based on three main categories – trust types, building blocks and operational perspectives – which are further subdivided into lower level classifications in each of these categories. Two examples of applying the taxonomy in order to classify regulatory issues and inform questions aimed at particular sector-specific and local contexts demonstrate the use of the taxonomy in structuring further research to be undertaken in Task B11.

Following the method adopted in task B11, this generic level taxonomy will be used as a framework for approaching regulatory issues arising in sector-specific and local implementation cases. At the same time the taxonomy will be further modified and refined based on the empirical data gathered in the field through engagement with DBE partners involved in the initial implementations and the joining SMEs.



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