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The eBusiness Navigator: Implementing A Classification Scheme For The eDomain

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Abstract

The paper describes research activity for the development of the "e-business navigator" – a graphical representation of a classification scheme for the e-business domain. The need for a common understanding of e-business terms evolved in the publicly funded project "eXperience" where case studies were to be classified according to a common standard. The authors of this paper developed a common classification scheme in order to structure relevant knowledge and make it publicly available for all interested researchers and practitioners. One of the objectives was the creation of a common language among all parties involved. A network project of European perspective is in the making and will advance the discussion about the common e-language and e-understanding. Above all, this network will work with the classification scheme and validate its use and implementation in the time to come.

1 Motivation

Over the last years, the domain of e-business research in Europe has evolved into a self-contained community. There is a growing number of mini tracks dedicated to "E-Topics" at all major IS conferences (e.g. ECIS, ICIS, AMCIS, Bled). Even though many publications on the basics of e-business and especially e-commerce have been written, e-business as a research field still lacks a common structure and language both among researchers and lecturers as well as practitioners. The perceived deficiency was the starting point for this paper. We collected existing literature and common practice from e-business case studies for the development of a general research topology. In fact, there are several projects and institutions in Europe concentrating on disseminating e-business knowledge and experience accumulated through academic research and business projects: (1) The Best eEurope Practices Project [BEEP 2004], (2) the IESE Business School [IESE 2004] and (3) the European Case Clearing House [ECCH 2004]. The latter two write and collect case studies on a professional basis supplying various recipients. However, the classification of their case studies is based on different categorization

schemes and the case language makes use of an inconsistent terminology. This impedes an easy access to the contained knowledge.

1.1 Background

The following chapters deal with the areas which we looked at during the development of the e-business navigator. First, we will discuss the basic principles of the Semantic Web which helped us understand the accessibility of content on the Web. Furthermore, we looked at ontologies and classification schemes, which could be used to classify and store our case studies and which would later allow to retrieve the information using multiple ways of structured queries.

1.2 Research Methodology

The research methodology for the e-business navigator is a very practical approach and a case study itself. The problems mentioned above became fully aware to the authors when they were put in charge of the development of a Web-based case study database for e-business cases [eXperience 2004]. In this project called "eXperience" we were faced with the challenge of "easy access to e-business experiences". The question arose: how do we describe the processes and functions that help companies increase their productivity; their capability to innovate; or to reduce their costs or cost structures by means of deploying the "e-"? This was the starting point of the e-business navigator proposed in this paper. In order to build an optimized database, we needed to come up with a classification scheme in combination with multidimensional ontologies including graphical representations and entry points. The final objective was the introduction of a standard for e-business classification in general. Moreover, the common classification scheme was intended to foster further research in this area such as the identification of clusters and cross-case analysis.

1.3 Managing Content And Meaning

The management of information is a pivotal aspect of success or failure of any undertaking, be it of private, academic, or commercial nature [Rickards/French 2003]. There are many terms related to information management: content management, enterprise content management, knowledge management, workflow management, etc., all of which try to frame a specific problem and match it with a specific solution. As is the case of many Internet related issues, the World Wide Web Consortium tried to tackle the problems on a technical and conceptual level by means of adding meta-information to Web content. The concept was introduced back in 2001 and is known as the Semantic Web.

Berners-Lee et al. [2001] describe the Semantic Web as a new form of Web content that is meaningful to computers. We believe that we will only be able to fully unleash the potential of information published on the Web once electronic agents will be able to interpret the data automatically and independently enabling them to fulfil information needs defined by the user. Today, most Web pages are only meaningful to human readers. HTML is a means to describe the format of displaying information leaving content

information unfathomable for computers. Adding mark-up information to Web pages is a basic prerequisite for the fulfilment of complex user tasks by electronic agents. The Semantic Web will bring structure to the meaningful content of Web pages. But the idea of the Semantic Web does not stop at adding tags and putting formerly HTML-written pages into XML pages. It also entails a language for defining rules – thus adding logic for the processing of data. A basic component of the Semantic Web is the concept of ontologies, containing taxonomies with defined classes and relations among the classes and inference rules that describe semantic relationships between content classes. The e-business navigator (cf. Fig. 2) is intended to help understand the processes and entities involved and deduct relationships among them.

1.4 Ontologies And Meta Data

Many definitions evolved during the past years as to what defines the term "ontologies", a term which originally emerged from a philosophical context. This paper concurs with Fensel's definition [Fensel 2001, 11]: "An ontology is a formal, explicit specification of a shared conceptualization." (cf. Fig. 1)

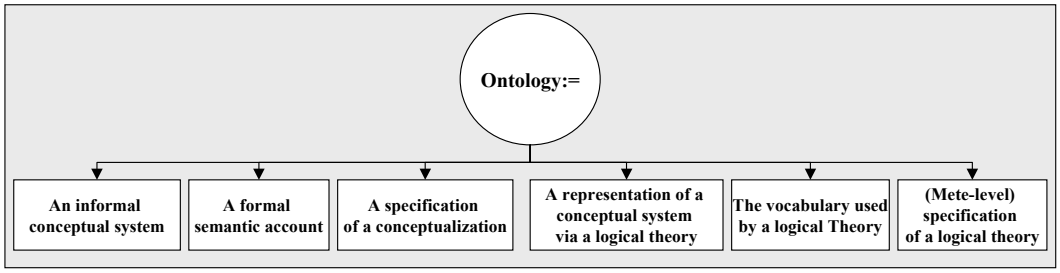

Figure 1: *A Basic Clarification Of Ontology [Lytras Et Al. 2003]*

With an ontology, implicit and explicit knowledge can be connected by means of knowledge management tools. Taking into consideration the structure and logical architecture of information containers, concentrating on ontologies bears the strategic advantage of not abandoning any digital asset. On the contrary, businesses will have a set of processes at hand with which a conceptualisation (e-business, e-government) can be shared in a planned and controlled manner. Above all, the ontology schemes must be kept as open as possible in order to allow future ontologies to dock in.

As discussed in detail by Staab [2002], the development process should start with a feasibility study, continue with an in-depth analysis, proceed with the development of specifications, then introduce a semi-formal description of one or more ontologies, continue with an evaluation of the concepts and rules, and end with a full-grown application. Existing metadata will be taken and transformed into one ontology for unspecific documents. Metadata generation usually involves either automatic, manual, or semi-automatic methods [Staab 2002].

The emergence of the Semantic Web and the connected technical specifications (XML, RDF) set the direction for further web development in general. A common set of ontologies alleviates the unresolved intra-enterprise and inter-company discussions as to how data is to be stored, retrieved, and displayed. The e-business navigator in section 0 is a concept for an e-business ontology.

Promising application areas and helper programs with reasonable market readiness have emerged in recent years: KAON [KAON 2003] and OntoEdit [OntoEdit 2003] are but two examples.

1.5 Case Studies

Case studies are by definition "an intensive, detailed description and analysis of a single project, programme, or instructional material in the context of its environment" [Frechtling 1997]. A case study can be applied in almost any setting where the curriculum spans parts of real world phenomena. Case studies foster online and offline collaboration on problems discussed and therefore lend themselves to being used in traditional and blended learning. Researchers can easily get access to case experts and tacit knowledge that otherwise remains undocumented.

For many years, researches in these fields have recognized the shortcomings of rather traditional research strategies in dealing with the high complexity and richness of phenomena in real world business scenarios. Today, case study research goes far beyond portraying isolated pieces of evidence, but has become an established methodology of theory building (for an early, but very comprehensive review see [Eisenhardt 1989]). Especially European research with its tendency to a more qualitative analysis has extensively embraced the case study approach. A common classification scheme groups these case studies and makes them accessible from different entry points. The e-business navigator and its first implementation as a prototype (cf. screenshots and explanations in section 0) illustrate this concept.

2 The E-Business Navigator

The e-business navigator is the result and of a publicly funded project called "eXperience". eXperience is a platform that currently holds about 240 fully qualified case studies about e-business best practice and is intended for research and practitioners alike. All case studies are classified according to a common categorization scheme. This scheme is the basis of the e-business navigator which is the central navigation aid of eXperience. Current web statistics show that the database is frequently used (homepage: about 16'000 page impressions in 2003).

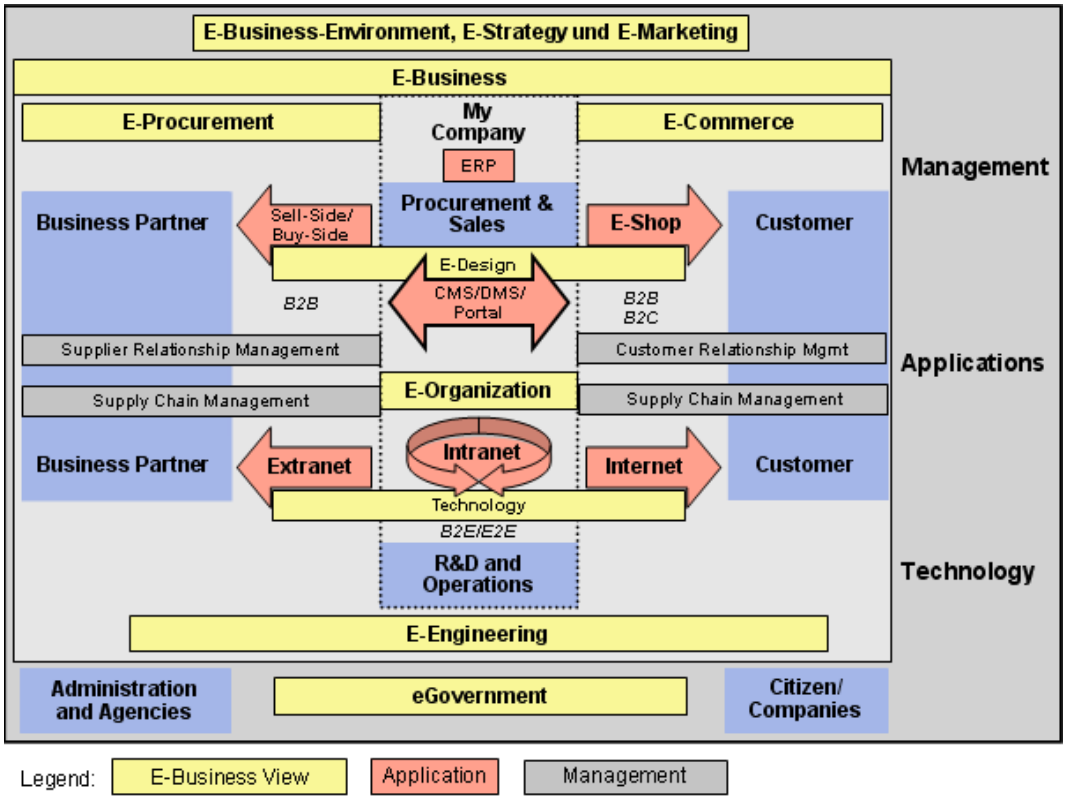

Figure 2: *The eBusiness Navigator: Classification Scheme [Schubert/Wölfle 2000]*

2.1 Terms And Definitions

This chapter describes the content and purpose of the e-business navigator in the context of eXperience and future European project initiatives. The navigator resolves case study classification ambiguities among different projects and institutions with regards to standardization of terminology and language used when talking about e-business. Furthermore, it facilitates knowledge exchange among practitioners and academics.

The E-Business navigator is a graphical representation of the different e-business disciplines. The terms contained in the navigator are linked to the following definitions:

E-Business entails the support of enterprise relationships and processes among business partners, customers, and employees by means of electronic media. [Schubert/Wölfle 2000]. Usually, the term "e-business" is related to the deployment of new media and internet technology.

E-commerce is a specific part of e-business and is focused on the selling of products and services. E-commerce applications support sales processes, traditionally subdivided into information phase, agreement phase, and transaction phase [Schubert et al. 2001].

E-procurement is the electronic support of buying processes (purchases) of a company [Schubert et al. 2002]. Enterprise Resource Systems (ERP) are usually optimised for the procurement of direct goods, while e-procurement solutions also support the purchase of indirect goods.

E-organization focuses on the electronic communication support among employees or between employees and business partners. Software packages are used for the collaboration with partners (collaboration tools and internet groupware). Furthermore, companies establish and expand content management systems in order to manage increasing information in portals, web sites, and e-shops. Mobile applications support field staff and facilitate remote access to product catalogues and customer data including mobile order entry.

Specialized software abets management concepts such as *Customer Relationship Management (CRM)* and *Supplier Relationship Management (SRM)*. CRM is sales oriented and targets customer needs and satisfaction. Its objectives are an increase of customers and the optimization of the customers' lifetime value (sales volume of cumulated purchases). SRM, on the other hand, is geared to procurement. The focus lies on extensive support of the relationships and processes in conjunction with suppliers. Supply Chain Management (SCM) is the integrated management of the value chain starting from raw material purchase and processing to recycling.

Within the scope of this paper, we presented only a few selected topics contained in the e-business navigator. All entities and processes have been defined and are publicly available on the Ecademy's web site [2004].

2.2 Classification Scheme

In order to comply with the e-business navigator, all case studies in the eXperience database are organized according to a classification scheme. The top hierarchy contains information about the e-business area, the relationship between businesses, customers, and administrations; the software applications deployed; and the sectors in which the businesses operate (cf. Table 1). The next level in the hierarchy contains information about specific aspects of a case study combined with the focus and intensity (cf. Table 2). The lowest level of the classification scheme contains information about the reach and the emphasis of the businesses discussed (cf. Table 3).

Table 1: *Classification Scheme Top Hierarchy*

Notion	Content	List Type
EB Area	E-commerce, e-fulfilment, e-learning, e-organization, …	Open
Relationship	B2B, B2C, C2C, A2B, A2C, A2A	Closed
Software Application	CRM, E-Shop, ERP Systems, …	Open
Sector	Agriculture / mining / generation of energy; Chemical industry / Plastic goods; Metal products; Engineering / Precision engineering; Vehicle construction / Aviation / Shipping; Electrics / electronics industry / Optics; Consumer goods production; Wood processing / Paper and cardboard; Other manufacturing industries; Construction and interior work; Banks / Insurance companies / Full-service finance; Auditing / trust / consulting; Real estate; Wholesale & retail trade; Haulage contractors / Transport / Logistics; Energy and water supply; IT & Communication; Marketing / Advertising / Media / Publishers; Education / Science / Law; Health / Medicine; Catering trade / Leisure / Tourism / Culture / Sport; Other services; Public authorities / Social insurance / Police / Armed forces; Charity organisations / churches / developmental aid; Private households	Closed (NOGA code[1])

Each case study deals with specific aspects of a different yet individual kind. This level is designed to represent the focus and intensity of an aspect. Each case study has a maximum of three specific aspects assigned.

Table 2: *Classification Scheme Second Level*

Notion	Content	List Type
Specific Aspect	E-Fulfilment, Payment Transaction, …	Open, 1 only
Focus	Payment and Logistics, Payment using Cash and VISA, …	Open, 1 only
Intensity	High, middle, low	Closed, 1 only

Each case study is written about businesses and processes within a regional setting. The lowest classification level is designed to hold information about the geographic reach and the textual emphasis.

[1] see NOGA (1995)

Table 3: *Classification Scheme Third Level*

Notion	*Content*	*List Type*
Reach	*Regional, Switzerland, national, several nations, global*	*Closed*
Emphasis	*Economy & Management, Functions & Processes, Technology, Design & Interaction*	*Closed*

The scheme was developed specifically for the domain of e-business and e-government. The classification scheme is being imprinted on a case study during the editing process. The editors – in the process of formatting and publishing the case study – attribute special keywords to the case study. The classification scheme is represented in the keyword lists of the classification tab (cf. Fig. 3).

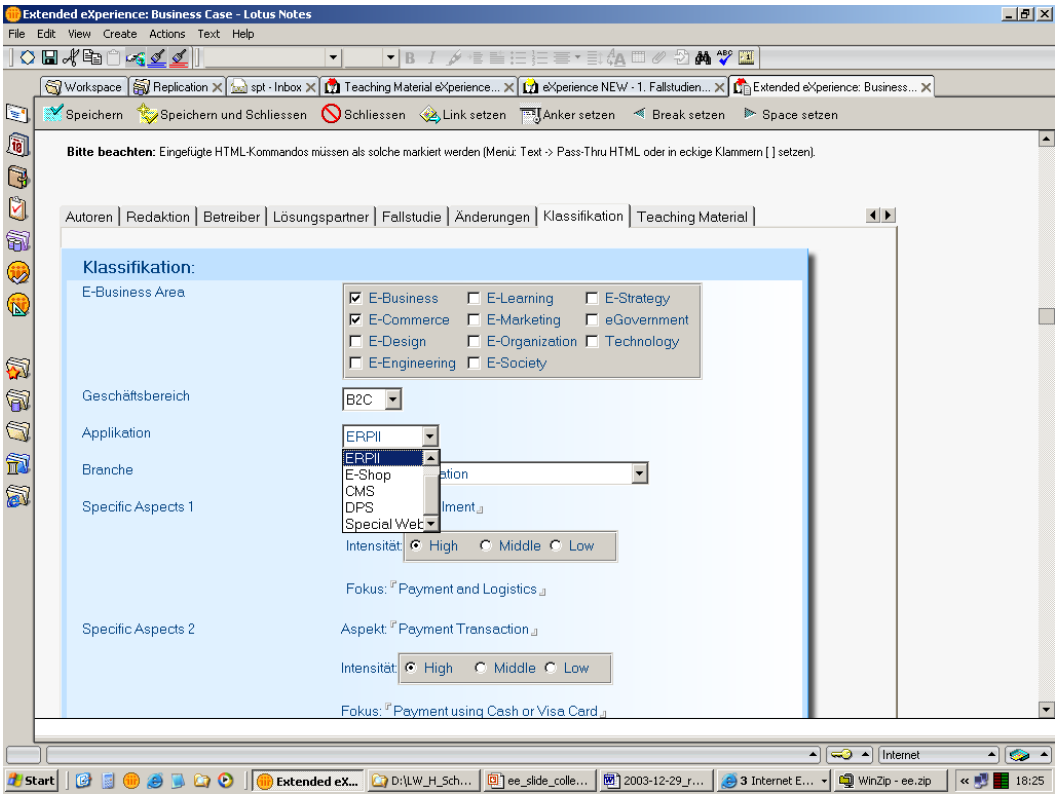

Figure 3: *Interface For Classification Of Case Studies (In German)*

The selected classification values are dynamically linked to the navigation. The navigation dynamically adapts to new case studies and their classifications.

There are different ways of drilling down into the teaching cases. The easiest way is the e-business navigator (the central graphic on the homepage) (cf. Fig. 4). The graphic represents the main focus topics of the classification scheme. Users choose their desired detail level. "E-Commerce" for example leads them to a high level in the hierarchy,

whereas "E-Shop" displays case studies that deal specifically with electronic shop applications on a more detailed level of the classification hierarchy.

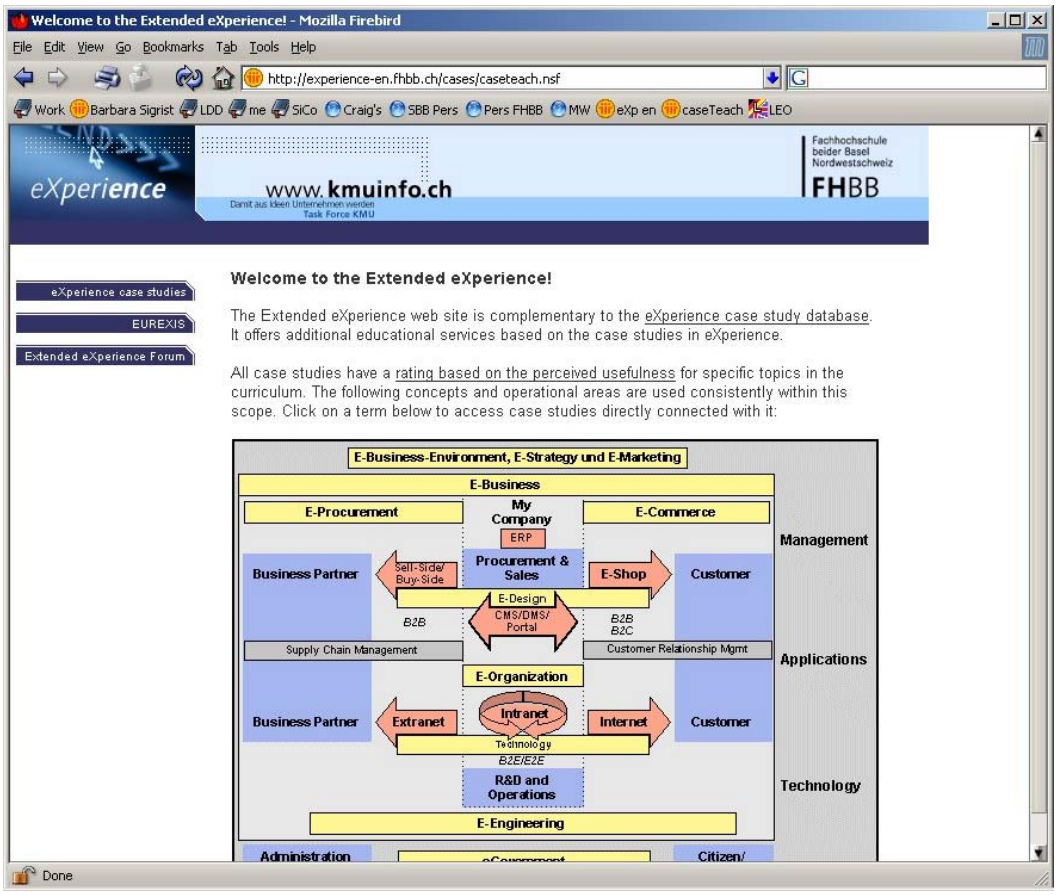

Figure 4: *Dynamic Graphical Navigation*

Fig. 5 displays the hierarchy behind the eXperience classification scheme. In this example, the drill down follows the tree "E-Business" – "E-Commerce" – "B2B" – "E-Shop" – "Retail" and displays case studies for specific industry sectors.

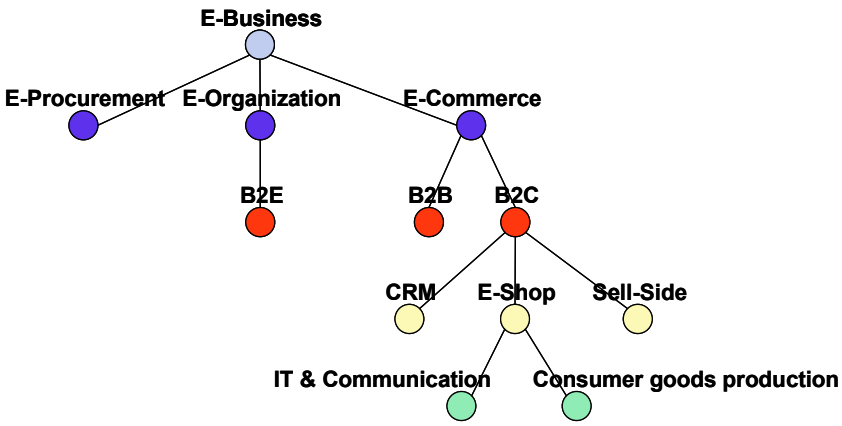

Figure 5: *Hierarchy Of Classification Values*

All specific topics that are not covered by the principal map of e-business/ e-government can be found in a dynamic listing on the homepage. Every time a specific content is added to the list of keywords, the list generates a new entry linked to the respective case study.

The specific topic "E-Procurement" leads the user dynamically to the case studies "City of Mainz" and "UBS AG", which contain information about the implementation of e-procurement.

2.3 The eXperience Platform

The concept and implementation of the platform is ultimately based on the core case study. The case study follows a pre-defined structure and adheres to a set of quality requirements. The Web front end informs the visitor about availability of slides, instructions, sample tests, solutions, and teaching instructions. In addition, information about target markets as well as the language and the year of publication are displayed. The extended material also encompasses discussion possibilities and update/feedback services.

The Web front end has a powerful back-end input interface. Editors and selected authors provide their input via an elaborate form, segmented into different sub sections: general information; information about authors and editors; details about providers and operators; the case study text and its meta data; change history; the case study classification; and teaching material uploads.

In order to illustrate the path of a possible user query, the example of a teacher looking for a case study with supplemental class instructions and test questions / solutions is chosen. The case study which he is looking for should focus on the implementation of an e-shop in the retail industry in Switzerland.

Via the homepage (cf. Fig. 4), the teacher looks for the keyword that matches closest his focus: "e-shop". He clicks on the word on the chart displayed on the e-business navigator. He is then directed to a list of possible case studies with detailed classification and meta-information for each entry of the list. He chooses the one matching best his needs in terms of content and availability of didactical and dissemination material. He is then allowed to print and/or download the material and use it in class. The copyright of eXperience is included in the material and must not be removed (user agreement). The copyright remains with the platform operators and the authors of the case studies.

3 Conclusions And Further Research

The e-business navigator is an approach for a common terminology that serves a specific purpose: to foster structured storage and accessibility of knowledge about e-business best practice. Representatives of the Ecademy member schools in Switzerland are already using the classification scheme on a national level in classes and projects. Furthermore, the eXperience project successfully implemented the e-business navigator as an access interface to case studies. The growing number of case study queries to the database gives evidence of its usefulness for research and practice.

The navigator approach will be taken a step further into the European research area through EUREXIS (*EUR*opean *EX*perience *I*n e-busines*S*). EUREXIS is an international network of research institutions in Europe that takes the e-business navigator as its basis

for further discussion and refinement of the proposed classification schemes. In addition, EUREXIS will carry out meta-research on case studies and cross-analyse the accumulated knowledge, for which the e-business navigator lays out the structured core.

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