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THE ROLE OF BOUNDARY OBJECTS AND BOUNDARY SPANNING IN DATA WAREHOUSING – A RESEARCH-IN-PROGRESS REPORT

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Abstract

Data warehouse projects bring together different communities of practice, with the primary objective of producing one body of information which is capable of comparative advantages in business analysis. Due to the number of involved communities and the complexity of their collaboration, data warehouse projects are costly. In this paper we give a closer look at communication problems on boundaries between participating data warehouse projects' communities. Our analysis enlightens the potential relation between the early creation of language communities of the involved communities and lowering data warehouse project development costs. As today, there is hardly any methodology available for analyzing and aligning mutual understanding between data warehouse project participants. In this paper, we propose a data warehouse development scheme for project improvement based on our discussion as a first step in a design science project.

Keywords: Data warehouse, Boundary Objects, Community of Practice, Design Science.

1 INTRODUCTION

Since business environments and information technology (IT) are now changing at an extremely fast pace, management information systems (MIS) become a crucial prerequisite for the long-term efficiency of any organization. Well-informed actions (i. e., those based on true beliefs) are more likely to achieve desired ends, and information is valuable insofar as it helps individuals form true beliefs which, in turn, promote effective, goal achieving action (March and Smith 1995, p. 251). The central purpose of MIS is to provide information for the management activities carried out within an organization (Curtis and Cobham 2005, p. 27 f.). Thus MIS are systems that assist management in decision making and in forming true beliefs. This includes both, executive information systems (EIS) and decision support systems (DSS) that allow ad hoc queries, and analytical reporting systems. Those IS are among one of the most prominent subjects in IS research (Claver, Gonzalez and Llopis 2000, p. 183).

It is general consensus that state-of-the-art MIS are based on data warehouses (DWH) and online analytical processing (OLAP) (Codd, Codd and Salley 1993; Devlin 1997; Inmon 2005). DWHs support the management perspective on business processes technically, but their implementation is extremely complex and costly (Vassiliadis 2000). The complexity manifests itself in the high failure rate of projects and increasing development costs (BCS 2004; Kimball and Caserta 2004; SGI 2001). Therefore, a clean design and specification of the system is of great importance. Consequently, the involvement of the management users and management's support are deemed key factors for MIS quality and system success (Wixom and Watson 2001, p. 35 f.). One of the major issues in the conceptual specification of management views relates to the bridging of the so-called "communication gap" that originates from differences in semantic understanding (e. g., homonyms and synonyms) (McDavid 1996). This gap exists between business units using a MIS and computer departments designing and implementing the MIS within an enterprise (Alter 2001; Peppard 2001). As Alter (2001) puts it: "Of course most IT professionals know more about computer hardware and software, but the communication gap is about the difficulty business and IT professionals have in establishing mutual understanding that helps them communicate in both directions about their views and concerns" (p. 46).

In DWH projects, *IT professionals developing DWHs* (DWH professionals) are confronted with communication gaps on boundaries towards two communities of practice (Wenger 1998): *business experts in decision-making fields* (BEDF), who define business requirements, and *operative system professionals* (OSP) in charge of data required for fulfilling those requirements. According to several authors (Brown and Duguid 2001, p. 209; Star and Griesemer 1989, p. 393; Wenger 1998, p. 105), there are two forms of boundary connections: (1) boundary objects and (2) brokering. Therefore, DWH professionals in these circumstances have brokering roles in closing the communication gap on both boundaries. Moreover, we argue that *boundary objects* mediate the creation of *language communities* (Kamlah and Lorenzen 1984, p. 57) that afterwards enable the transfer of knowledge across boundaries between communities of practice. We argue that the creation of a language community between DWH professionals and both BEDFs and OSPs in early stages of DWH development plays an important role for the success of the final product. We suggest that early creation of language communities lowers DWH development costs by helping DWH professionals to construct *extraction*, *transform* and *load* (ETL) processes faster and more correctly, and by synchronizing decision-makers' requests with sources of data. Consequently, we propose that the development of IT artifacts should not start sooner than a language community is created. The fundamental question that arises from this argument is how we are able to determine whether the creation of a language community was successful or not.

The structure of the remainder of the paper is as follows. In the next section, we discuss the motivation for our research. Afterwards, we present our research objectives. Following this, we review related work and possible theoretical foundations. We present an overview on our research-in-progress project and summarize the findings and limitations so far, giving an outlook on further research.

2 MOTIVATION FOR RESEARCH

Because DWH projects often fail or significantly exceed budgets, existing research has concentrated on quantitative or qualitative analyses of success factors as well as contemporary best practices for building DWH (e. g., Herrmann and Melchert 2004; Hwang, Ku, Yen and Cheng 2004; Hwang and Xu 2007; Watson, Fuller and Ariyachandra 2004; Weir, Peng and Kerridge 2003). March's and Hevner's (2007) thorough literature research warns how links between data warehousing, strategic decision-making and evaluation are under-researched. They present four overarching objectives for DWH support of management decision-making processes and influences of those objectives on the successful use of decision support in business organizations: integration, implementation, intelligence and innovation.

Integration, the first objective, is concerned with the consolidation of data from disparate sources into one consistent body of data. Integration lies at the heart of decision-making tools, with content management as one of the biggest challenges of DWH designers (March and Hevner 2007, p. 1036). March and Hevner (2007) warn that effective integration decisions can only be reached by experts having intimate acquaintance with knowledge domains pertaining to business internally and to the context in which the business that the MIS was built for is immersed (March and Hevner 2007, p. 1041). Therefore a pre-sequence that prefigures an integration process should be DWH professionals' affiliation with the community of individuals (BEDFs) that are familiar with the business logic and the business environment (internal and external business ontologies) and the community of individuals (OSPs) familiar with operational source data (internal technical ontologies).

The next objective, *implementation*, addresses DWH development alignment with existing business processes in the organization, overcoming the current role of DWH as a repository of historical data which addresses passed organizational transactions (March and Hevner 2007, p. 1038). This is only possible when DWH professionals *understand* the business logic and can introduce learned business logic into the DWH.

The third objective, *intelligence*, refers to a right fit between DWH users and different types of tools (March and Hevner 2007, p. 1041). Once the fit is found users receive appropriate training and support from DWH professionals. Analytical and data mining tools provide interfaces between decision-makers and data in the DWH. The users as decision-makers use the data to generate meaningful information on which they act. The last objective, *innovation*, deals with change management, specifically how changes in DWHs propagate to MIS. The DWH professionals' job is to design the DWH to be ready for change so that every change is transparent to decision-makers (March and Hevner 2007, p. 1041).

We argue that only when the first two objectives (integration and implementation) have been successfully realized, decision-making can use the DWH to engage into the objectives of intelligence and innovation. Therefore we suggest that research should focus on concepts and theories that help DWH professionals to successfully accomplish both objectives of integration and implementation. In this context, the concepts of convergence and divergences between communities of practice and information artifacts offer a useful starting point for further research.

Star et al. (2003) introduced the concept of *convergence* to describe processes of mutual constitution between communities of practice and information artifacts they use: "information artifacts undergird communities of practice, and communities of practice generate and depend on the same information resources" (p. 244). Basically, DWHs are shared information artifacts between OSPs and BEDFs. Given the term convergence, the alignment of practice with information artifact increases when use and practice fit design and access (Star et al. 2003, p. 224). Therefore, DWH professionals' main concern should be to build a DWH that will satisfy both the BEDFs' needs for information and OSPs' needs for easy integration. The complex processes at the boundaries between the two communities of practice include the discussion of differences between community insiders and outsiders. Members of

one community are called insiders of that community, whereas all others are outsiders. The thin line between insiders and outsiders is not easy to draw (Star et al. 2003, p. 262).

What follows from this discussion is that shared IS such as DWHs are a kind of boundary object, and DWH professionals are brokers between multiple communities of practice (Pawlowski, Robey and Raven 2000, p. 332). Apart from IS as such, entities pertaining to IS (e.g., system documentation, user training materials, standards, policies) are also considered boundary objects that are shared by the set of communities (Pawlowski et al. 2000, p. 334). Pawlowski et al. (2000) pointed out a major problem IT professionals (such as DWH professionals) face while supporting IS shared by several communities of practice: they have to learn the practice of each community and have to become insiders of both communities (not only learning about these practices, but also entrée to practice-enough legality) (Pawlowski et al. 2000, p. 335). In this context, the process of brokering means to get members of the one community (insiders) to understand and accept changes in their work necessitated by changes in the shared system that are needed by the other community (outsiders).

Based on these suggestions, we propose a solution for lowering the development costs of DWH projects and for creating business value. Creating mutual understanding between DWH professionals and communities of practice involved in data warehousing (i. e., OSPs and BEDFs) is a precondition for building successful and cost-efficient DWH-based MIS that add business value. We describe "evolution of a shared IS" (the DWH-based MIS) as developing a boundary object between OSPs and BEDFs based on various artifacts. Moreover, these artifacts also exist as boundary objects between DWH professionals and OSPs, and between DWH professionals and BEDFs. We propose that investigating how these artifacts influence the creation of language communities between the involved communities of practice should yield interesting and useful new insights for research. We are especially interested in exploring which phenomena contribute to the coherence of this language community, and how a language community, once created, enables DWH professionals to overcome the previously mentioned problems during the development of decision-making systems.

3 RESEARCH OBJECTIVES AND QUESTIONS

To summarize, the importance of communication in DWH projects has been widely recognized and studied (e. g., Wixom and Watson 2001). Research on impact of communication on DWH project success is limited, but is growing (e. g., Behrmann and Räkers 2008; Gallivan and Keil 2003; Joshi, Sarker and Sarker 2007; Ko, Kirsch and King 2005). As yet, little is known about how communication in DWH projects is influenced by boundary objects. While previous studies on boundary objects have, for instance, dealt with their influence in traditional ISD projects (e. g., Sapsed and Salter 2004), there is a lack of valid, reliable measures for assessing the boundary objects used in communication in DWH projects. This research-in-progress paper focuses on the role of boundary objects for communication in DWH projects with the aim of understanding how boundary objects influence the success of such projects. There are four objectives to this research:

- Which boundary objects are used in DWH projects to connect different communities of practice?
- How do the boundary objects (both formal and informal) evolve during a DWH project?
- How does selection or availability of adequate boundary objects or/and brokers in early phase of requirements analysis affect DWH project success, and how do these boundary objects affect DWH project success from the perspective of the different communities of practice involved?
- Can the development of boundary objects and the process of brokering be regulated or influenced in order to achieve better project results?

This research hopes to contribute to previous work on boundary objects in IS development projects by investigating the evolution and use of boundary objects in DWH projects and by developing and validating artifacts for leveraging such boundary objects. We also hope to provide a practical contribution by developing a framework that project managers and project teams can use to measure and assess the effectiveness of specific boundary objects at various stages throughout a DWH project.

4 THEORETICAL FOUNDATIONS

Communities of practice are characterized as shared histories of learning (Wenger 1998, p. 86; Wenger, McDermott and Snyder 2002). Such histories are known to create discontinuities between the ones who participate in the community work and the ones who do not (Wenger 1998, p. 103). These discontinuities are also revealed in development of DWHs. We distinguish two major communities of practice which confront each other in DWH projects: (1) OSPs with knowledge of the legacy and source systems, and (2) BEDFs. OSPs are in charge of maintenance and further development of operational systems; whereas BEDF influence the course of actions the company needs to take in order to stay competitive in the environment. Connection between these two practices is made by introducing a third practice, DWH professionals who are responsible for the development of the DWH.

Wenger (1998) uses the term *negotiation of meaning* as "the process by which we experience the world and our engagement in it as meaningful" (p. 53). Thus, our personal meaning of the world around us is located in the process of "negotiation of meaning" which involves an interaction of two constituent processes, namely *reification* and *participation* (Wenger 1998, p. 52). Participation involves all kinds of relations. In social communities participation shapes our experience, and also shapes those communities. Trough the process of reification, aspects of human experience and practice are congealed into fixed forms and given the status of objects. Participation and reification form a duality that is inherent to human perception of meaning and hence reflected to the nature of human practice (Wenger 1998, p. 52).

The two constituent processes of participation and reification have to be in balance (Wenger 1998, p. 56). When one of the processes predominates, negotiation of meaning is negatively affected or disturbed. If the process of participation prevails, negotiation of meaning lacks real, physical arguments that could help participants coordinate their argumentation lines and solve the differences. If on the other hand, the process of reification predominates, very little interaction and experience exchange remains. In these conditions, reconstruction of meaning buried in the products of reification (reified objects), could be very difficult (Wenger 1998, p. 56). Participation and reification can both contribute to the discontinuity of boundaries (e. g., a specific jargon is understood only by participants of a community where it is used), but can also create continuities across boundaries. Thus, the process of reification produces objects that can move across boundaries (Wenger 1998, p. 105). Likewise, members of one community of practice can participate in multiple communities of practice at once and help to introduce those reified objects from one community of practice to the others, when such translation is needed. Therefore two forms of boundary connections exist, as introduced before: *boundary objects* and *brokering* (Brown and Duguid 2001, p. 209; Wenger 1998, p. 105).

Star and Griesemer (1989) define boundary objects as "both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (p. 393). Boundary objects may be abstract or concrete, are weakly structured in common use, and become strongly structured in individual-site use. In different social contexts (i. e., communities of practice), they can have different meanings; however, their structure is common enough across contexts to make them recognizable by means of translation. Consequently, the creation and management of boundary objects is especially important in developing and maintaining coherence across intersecting social contexts (Star and Griesemer 1989, p. 393). In the context of DWH projects, the artifacts (e. g., shared documents, tools, business processes, objectives, schedules) exchanged between communities of practice (Brown and Duguid 2001, p. 209) can *potentially* become boundary objects if they should belong to (at least) two different practices. These artifacts then form a *nexus of different perspectives* (Figure 1), which then needs to be coordinated (Wenger 1998, pp. 107-108).

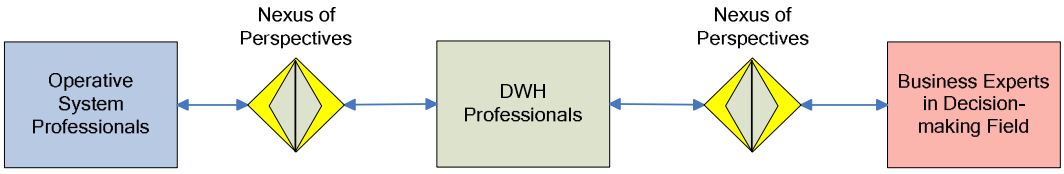

Figure 1. Shared Information Artifacts as a Nexus of Perspectives

Pawlowski et al. (2000, p. 331) emphasize the role of legitimacy in the jobs of IT professionals such as DWH professionals that helps them to influence the development of practice, to mobilize attention and to address conflicting interests. DWH professionals have a coordinative role as brokers in DWH projects. They create participative connections between the two practices of OSPs and BEDFs:

- On the one hand, gathering requirements in DWH projects means not only gathering reports and documents created, for example, by the BEDF community (boundary objects), but also meeting with community's representatives. Reports do represent and are related to some of the more tactical decision-making requirements (Kimball and Ross 1996, p. 15), but they are purely reifications of them. Only trough interaction with members of the BEDF community, where those objects were reified, can a full understanding of the requirements be reached. These objects then form the nexus where different perspectives of BEDFs and DWH professionals through processes of participation align and hence form DWH professionals' understanding of the objects. This suggests that communication between both practices is of paramount importance for successful DWH projects.
- On the other hand, in interaction with members of the OSP community, DWH professionals concentrate on the main process of DWH development: implementation of extraction, transformation and loading (ETL) of operational data with the goal of creating more appropriate data-sets matching the BEDFs' requirements. Compared to the overall costs of DWH projects, the costs resulting from the ETL process have a major share (Kimball and Caserta 2004). Extraction of operational data implies knowledge of what operational data exactly needs to be extracted to meet the requirements and business demands, and from which operative system this data needs to be extracted. In this context, we suggest that communication between OSPs and DWH professionals is a profound prerequisite for aligning different perspectives of exchanged boundary objects (e. g., database schema, database tables, excel tables, text files etc.) between those two communities. Only in close cooperation with OSPs, DWH professionals can extract and interpret operational data so that it matches the requirements of the BEDFs.

We propose that DWH professionals generate a mutual understanding of artifacts on the nexus of perspectives (i. e., boundary objects) trough communication with members of both OSPs' and BEDFs' communities. In accordance with Ågerfalk and Eriksson (2004), we argue that traditional research on requirements analysis has focused too much on the syntactic and semantic aspects of conceptual modeling languages, and too little on the pragmatics of the requirements process. But where Ågerfalk and Eriksson (2004) use speech act theory as a theoretical foundation, we suggest to employ a different theoretical foundation from philosophy of language. *Language critique* (Kamlah and Lorenzen 1967; Kamlah and Lorenzen 1984), a branch of constructivist philosophy known as the "Erlangen School", provides useful insights and backup for our understanding of DWH projects, and has been successfully applied to IS research before (e. g., Becker, Niehaves and Pfeiffer 2008; Holten 2007; Holten, Dreiling and Becker 2005; Holten and Rosenkranz 2008; Rosenkranz and Holten 2007; Rosenkranz, Laumann and Holten 2009).

Kamlah and Lorenzen (1984, p. 47) argue that language as a system of signs promotes mutual understanding as a "know-how" held in common, the possession of a "language community". A new term is introduced by explicit agreement between language users with respect to its usage (first agreement) and meaning (second agreement) (Kamlah and Lorenzen 1984, p. 57). This agreement leads to a relation of concept and term, and is shared by a language community as the knowledge of using this term. Accordingly, if members of a group of people communicate, and each has an aligned semantic and pragmatic dimension of a symbol (or term) in mind, then this group of people forms a

language community. All members have the same concept in mind if they are confronted with a symbol of the language and vice versa.

According to our understanding, boundary objects play a significant role in making language communities explicit: if members of communities of practice have a same concept in mind when confronted with a same artifact (boundary object), they belong to the same language community (Figure 2). It is difficult for non-members of a language community to understand the local artifacts in a proper way. An individual has to revise his or her understanding of the given language signs with respect to the ones of the language community in order to become its member, and thus gain the possibility of using the same terminology in discourse with the other community members (Holten 2007, p. 3). One can readily say that an alignment of a community's terminology is essential for its viability.

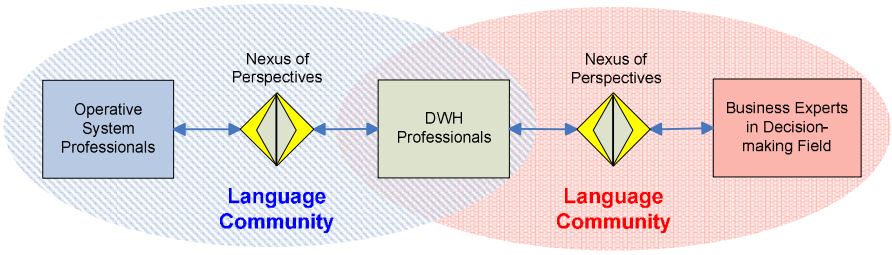

Figure 2. Creation of Language Communities between (OSP & DWH Professionals) and (BEDF & DWH Professionals)

We argue that DWH professionals have a unique and moderating role: since they simultaneously belong to both communities of practice, and hence to both language communities, they are aware of the different perspectives that OSPs and BEDFs have. Their job is to moderate and manage the mediating process of translation, coordination and alignment between the two perspectives. Therefore it is essential that DWH professionals have a free hand to influence the development of practice and to mobilize their attention to address conflicting interests (Pawlowski et al. 2000, p. 331). In order to achieve a successful implementation of the developed DWH, both involved communities of practice need to fully participate in the development process. Therefore, we suggest that the job of DWH professionals is to make the developed DWH to be accepted and actively used in both practices (brokering). This implies that OSPs know why they prepare source data for the DWH, and BEDFs to comprehend the benefit of the reports generated by the DWH solution. As a result of DWH projects, a DWH is constructed, which represents a new boundary object between OSPs and BEDFs as a new nexus where community's perspectives meet and align trough the process of negotiation of meaning (Figure 3).

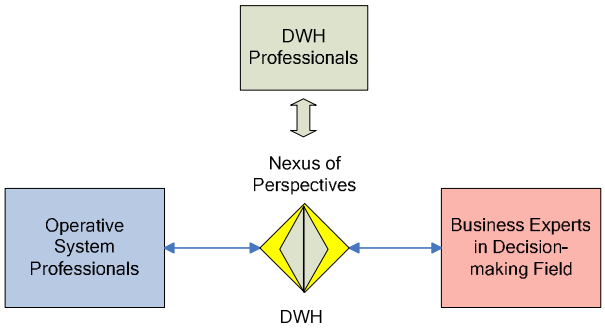

Figure 3. DWH as Boundary Object - New Nexus of Perspectives

We argue that the brokering role of DWH professionals remains a significant success factor even when a DWH is finally implemented. Up until now, maintenance of DWHs often relies entirely on the

knowledge base these high-skilled professionals prepare in form of exhaustive documentation or as consultancy service they offer (Räkers and Rosenkranz 2008, p. 10).

5 RESEARCH METHODOLOGY

5.1 Design Science Research

We propose to adopt design science as a research framework, which is recommended for scientific studying in the field of IS when artificial, human-made phenomena, such as DWHs, are examined (March and Smith 1995, p. 253). Developed and evaluated IT artifacts that are useful and capable of solving research problems in the IS realm constitute the cornerstone of this approach (Gregor 2006, p. 62; Hevner, March, Park and Ram 2004, p. 78). That is, rather than producing general theoretical knowledge, we aim to create efficient IT artifacts by design science research. In contrast to behavioral science, design science research aims to provide four general outputs: (1) constructs, (2) models, (3) methods, and (4) instantiations (March and Smith 1995). Therefore we aim to develop and provide useful methods and instantiations of IT artifacts that DWH professionals can utilize for their role as boundary spanners and brokers. We argue that research has to support this role explicitly in order to support the integration objective. We plan to follow the design science research methodology as suggested by Vaishnavi and Kuechler (2008, pp. 19-22). In order for DWH professionals to acquire the necessary understanding of the involved communities of practice (OPS and BEDF), and thereby to develop cost-efficient DWHs which add business value, we propose the following DWH development scheme for DWH project improvement as a first step in our design science project (Figure 4).

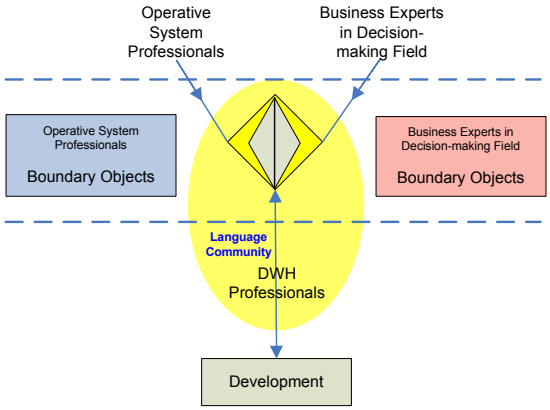

Figure 4. DWH Project Improvement Scheme

Furthermore, the improvement scheme acts as a framework for our research. We envisage that project managers and project teams can use a more elaborate version of the scheme for identifying potential problem areas and for planning and coordinating their requirement analysis processes (see Figure 5 for a first tentative proposal). Initially, it is necessary to discover community's representatives (BEDFs and OSPs). During the process called negotiation of meaning, BEDFs and OSPs together with DWH professionals discuss the meaning of BEDFs' set of business requirements and OSPs' operational data sources. We suggest that this process should be supported by a kind of *Analysis Panel*. Artifacts such as business documents, source system documentation, source system data or interview notes will be gathered and stored in an *Input Data Storage*. The Analysis Panel is by no means an ETL tool. Whereas ETL tools try to map source systems and DWHs unequivocally, we consider ambiguities in both requirements and sources as opportunities for negotiation and creation of new understanding. The Analysis Panel then serves as a foundation for engaging into negotiation of meanings between DWH professionals and the other stakeholders. As a result of this process, DWH professionals produce, vary and store a set of terms in the so-called *Term Storage*. Terms in the *Term Storage* represent the

explicit definition and meaning of the domain language that DWH professionals have developed while negotiating the meaning of the information artifacts with the help of the Analysis Panel (and stored in the Input Data Storage). The sketched feedback loops suggest how the process of negotiation affects all participants and changes their preliminary understanding of the discussed artifacts. Each time participants meet, the process of negotiation influences the DWH professionals' set of terms. Consequently, the Term Storage should support versioning of each single term. When no novel versions are produced, the meaning of a term is stable and ready for usage (i. e., a language community is created when all necessary terms are stable). In later phases of a DWH project, these terms should enforce further business requirements and operational data source collection as well as the development of the final DWH.

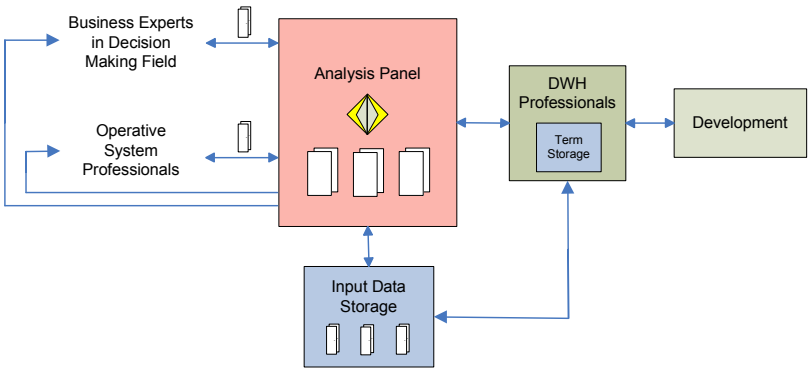

Figure 5. DWH Project Improvement Scheme – Detailed Version

For example, consider the following scenario: company X is in charge of DWH development for an insurance company, in our case called company A. During the first phase of requirements gathering, companies' representatives, DWH professionals from company X, BEDFs and OSPs from company A, meet on regular basis. Most of the meeting sessions include discussions over company A's legacy systems specifications as well as company X's DWH solution proposition. Those documents represent the foundation for negotiations of the meaning for concepts and terms involved (e. g., differences in the meaning of the terms "hospital" and "clinic", that DWH professionals are unaware of, is clarified and both terms are afterwards stored in the Term Storage). Our proposed DWH improvement scheme could act as a framework that facilitates systematic investigation of hidden, weak and unexpected relationships between language terms from the perspective of visual exploration and analysis of discussed documents.

5.2 Proposed Data Collection & Further Course of Project

The goal of design science is utility. For evaluating a proposed artifact, its utility for solving specific problems must be assessed. In presenting the development of methods and instantiations used to support the presented improvement scheme, we will firstly explore and introduce theoretical constructs and express the relationships among constructs to propose "how things are" in DWH projects. By building a logical chain of arguments for our reasoning, we will discuss why artifacts that we propose and build during our project will provide a suitable basis for addressing those problems.

First, in extending our already thorough literature review, we will conduct a second review in the hope of finding existing and related approaches in other areas in order to detail and refine our improvement scheme. Second, we plan to conduct expert interviews with DWH professionals in DWH departments of software development companies. The interviews should revile a set of communication problems and their probable causes in DWH projects. We will then match the results (in form of cause-problem pairs) with our scheme for DWH project improvement and the suggestion that the early creation of language communities between involved communities of practice, using boundary objects as nexus of different perspectives, will lead to alignment between participants. Furthermore we will conduct an

additional round of interviews with a second group of experts in other software development companies to test if they experience the same set of problems as the first group. This should show if the perceived practical problems can be linked to the theoretical foundation and the suggested improvement scheme. Then we plan to generalize our project improvement scheme and test it against other shared IT projects in the companies, conducting surveys. Third, we plan to explore how specific IT artifacts (i. e., both methods and instantiations) can be used (1) to support the creation of boundary objects and the process of brokering in general, and (2) implement the proposed improvement scheme. This will include several proposals for IT artifacts, which will be based on a more detailed improvement scheme and aim to solve issues arising from this scheme.

By conducting field studies to evaluate the usefulness of our improvement scheme and the to-be developed IT artifacts, we hopefully will show significant improvements in language community creation, reduction of DWH development costs, and added business value. Since design science is characterized by an iterative search process, during these "micro evaluations", minor redesigns will probably occur on several occasions, which is a common occurrence in design science research (Vaishnavi and Kuechler 2008, p. 25). Despite the problems inherent in the subjectivity of these approaches, we strongly believe that there is a need for field studies to examine the usability and actual usage of proposed IT artifacts.

5.3 Current Status of the Project

The project to date has reviewed the literature on boundary objects in many different domains. Literature relating to DWH projects has also been reviewed. At this point the motivation for the research is clear, the overall research objective has been identified and the research questions are defined. Currently, various possible artifacts that relate to the improvement scheme are being identified and critiqued for their suitability and applicability to this study. It is hoped that at least some of the constructs already detailed in the literature can be adopted, but the expectation is that some new constructs will need to be developed that relate specifically to boundary objects in DWH projects. Once the improvement scheme is defined and pilot tested, IT artifact construction will proceed.

6 CONCLUSION

In this paper we argue that the creation of a language community between DWH professionals and both BEDFs and OSPs in early stages of DWH development lowers DWH development costs by helping DWH professionals to construct ETL processes faster and more correctly, and by synchronizing decision-makers' requests with sources of data, thus allowing for effective and efficient integration. By using boundary objects as means to create mutual understanding between participating communities, we proposed an initial scheme for DWH project improvement as a first step in our design science project. According to Kimball and Ross (1996), the combination of understanding the business requirements and the available data is necessary as a first step toward the design of a DWH (Kimball and Ross 1996, p. 33). From our perspective, only DWH professionals belonging to both BEDFs' and OPSs' language communities can live up to these design expectations.

7 ACKNOWLEDGMENTS

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