Business Transaction Standards for Electronic Commerce

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1. STAGE OF THE RESEARCH

The research project "Business Transaction Standards for EC" started in June 2001. Currently we are at the meta model construction phase. We have first results of elements of business transactions based on theory, standards and practice and we are in a process of constructing the first version of the meta model based on these findings. As the meta model construction is an iterative process, in the following year we will add new elements and improve the meta model.

2. MOTIVATION AND OBJECTIVES

Our motivation is on one hand to facilitate practitioners when choosing standards to support the electronic execution of parts of their business transaction, and on the other hand to contribute to the scientific efforts in that direction. The goal of this research is to try to elicit problems that might occur due to mismatch between the distributed business transaction standards (DBTS) used for a particular business transaction and the requirements of that specific business transaction (BT).

To identify mismatch between the standard and the requirements of the situation means that we need to be able to compare the two. As we consider direct comparison to be very difficult, we propose to use a meta model for this purpose. Our objective is to *construct a meta model* to be used to1) elicit requirements of a distributed business transaction (DBT) situation and 2) to elicit characteristics of a DBTS and by doing so, identify mismatches and elicit potential problems.

To do so, we need to answer the following questions:
o   How to construct a Meta model that can be used to (1) elicit requirements of a DBT and (2) elicit characteristics of a DBTS?
o   Can we identify mismatch and elicit some potential problems using the Meta Model?

The rest of the proposal is structured as follows. In part 3 we make a review of relevant literature, in Part 4 we outline the research approach, and further steps in the research are briefly described in part 5.

3. LITERATURE REVIEW

The idea to automate parts of a business transaction is not new. EDI standards promised significant advantages in facilitating the exchange between business partners, reducing errors, increasing speed, cutting cost, and building in competitive advantage (Kerke & Mukhopadyay, 1992; Mackay, 1993; Wrigly et al., 1994; Jelassi & Figon, 1994, Sokol, 1995; Damsgaardn, 2000). However, the EDI standards failed to capture the communication context, in order to support the complex business communication. They were more like languages for depositing character strings into a particular place of a remote computer, than languages for exchange of knowledge. EDI standards were lacking clear and complete lexicon; did not have fully specified grammar, and had nearly no semantics. Furthermore, the focus of many IS professionals on EDI was how to provide technical tools, rather than to support the way people do business (Huang, 1998; Covington, 1997; Kimbrough, 1999).

A lot of initiatives are going on now, trying to solve some of the problems that the EDI standards could not. A lot of efforts are devoted towards the development of new standards (ebXML, RosettaNet, BizTalk, HL7), new languages (FLBC (Moore 1997), BCL (McCarthy 1993)), classification of standards (Guarino 2000).

However, in order to have value for a particular business process, a standard needs to be linked to a particular situation, which might be different from what the standard developers had in mind. Thus, the standard needs to be evaluated (for a specific business process) whether it can cover the communication context (of the particular business transaction). The question is how to make sure that the chosen standards can cover the communication context of the specific business transaction?

4. RESEARCH APPROACH

To make sure that the chosen standards can cover the communication context of the specific business transaction, we will try to compare the characteristics of the standard chosen with the requirements of the business transaction.

How can we make such comparison? On one hand we have the requirements of the business transaction (or the context of communication), which could be described in documents, models or could as well be implicit. On the other hand we have the standard, which could be expressed in the form of a standard specification, and which might be developed according to a certain methodology. Direct comparison will be difficult to make. It might be possible, however to go a level higher and make a comparison at a meta level. Thus our main concern is:

Could a meta model help us to compare the characteristics of a standard with the requirements of the context, and to elicit some potential problems at operational level?

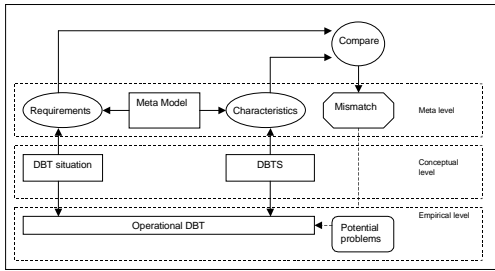To solve this problem we need to answer the following questions:
o   How to construct a Meta model that can be used to (1) elicit requirements of a DBT and (2) elicit characteristics of a DBTS?
o   Can we identify mismatch and elicit some potential problems using the Meta Model?

The first research question refers to the meta model construction, while the second one refers to the meta model testing.

Figure 1 below illustrates the proposed approach. Our aim is to elicit problems with the use of standards at an operational level. The operational DBT is a combination between the DBT situation (communication context) and the DBT standard (DBTS). As we said above it is difficult to compare the context and the standard directly. We propose to go a level higher and to make the comparison at a meta level. Our objective is to create a meta model to be used to on one hand express the requirements of the DBT situation and on the other hand the characteristics of the DBTS. Once both are expressed in terms of the meta model we will be able to compare them. The expectation is that a possible mismatch on a meta level would signal some potential problems on an operational level.

Below we go further in detail in illustrating the meta model construction and the meta model testing.

Figure 1: Illustration of the research approach

4.1. Meta Model Construction

The first research question, "How to construct a Meta model that can be used to (1) elicit requirements of a DBT and (2) elicit characteristics of a DBTS?", refers to the meta model construction.

As the meta model needs to be able check whether a set of standards could capture the communication context, the meta model needs to describe the elements of the context. We consider, that by describing the elements of a business transaction we can try to capture the context of communication. The meta model that we will construct will try to capture the context of communication by describing the elements of a BT.

In order to define the elements of BT and their relationships we will look at theory, practice and standards. Thus, to answer the first research question we need to find an answer to three other questions.

1. What relevant elements of DBT and their relationships (on a Meta level) are described in theory?
2. What relevant elements of DBT and their relationships (on a Meta level) are covered by the existing DBTS?
3. What additional relevant elements of DBT and relationships (on a Meta level) are encountered in practice?

By relevant we mean elements that describe the shared meaning and intentions within a business transaction.

4.2. Meta Model Testing

The second research question was: "Can we identify mismatch and elicit some potential problems using the Meta Model?" refers to the meta model testing.

We would like to do case studies to perform this evaluation. By conducting case studies we will get an in-depth insights about the usability of the meta model. The strategy that we'll follow to test the meta model is presented in Figure 2. For each case we will look at one transaction. We will analyze a practical situation, where standards have been used to automate parts of that business transaction. We will use different techniques to identify problems that occur while implementing and using standards. In that way we will arrive to a description of actual problems that occur in practice (See the lower part of figure 2).

Figure 2: Meta Model Testing
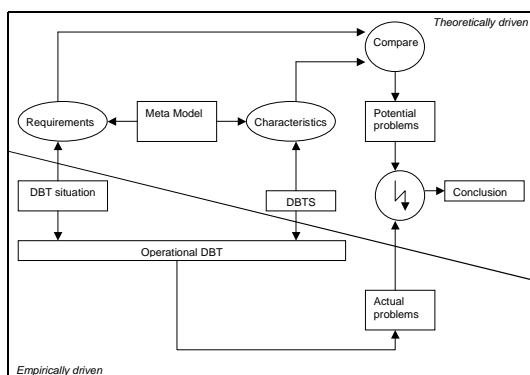
On the other hand, for the same case, looking at the same situation, we will try to theoretically identify potential problems, using the meta model. By walking the meta model and reasoning about the specific situation we can define which elements of the meta model are relevant for the specific situation. In that way, looking at the DBT situation and using the meta model we will be able to define the requirements of the situation in terms of the meta model. We can follow the same logic for the DBTS. Looking at the DBTS that were used and using the meta model we can identify the characteristics of the standards, again in terms of the meta model.

Once we have done that we can compare the requirements of the situation and the characteristics of the standards and identify mismatch between the two. A mismatch would signal that there are requirements of the DBT which are not met by characteristics of the DBTS. This means that theoretically there might be potential problems.

The next step is to confront the problems that actually occurred in practice to those that we identified using the meta model. A mismatch might signal potential problems. We are aware of the fact that by doing case studies we are not able to generalize our findings. However, by testing the meta model in two different industries we can get more and deeper insights about the findings and outline directions for further research.

5. FURTHER RESEARCH

The remaining time of the research project will be devoted to completing the construction and the testing of the meta model and writing the PhD thesis.

REFERENCES

Damsgaard J., Truex, D. (2000), Binary Trading Relationships and the Limits of EDI Standards: The Procrustean Bed of Standards. *European Journal of Information Systems*, 9(3) pp. 173-188

Guarino, N., Welty, C., Partridge, C. (2000), Web Content Standards, In Liddle, S.W., Mayr, H.C., and Thalheim, B. (Eds.): *ER 2000 Workshop*, LNCS 1921, pp. 1-6, Springer- Verlag Berlin Heidelberg 2000

Huang K. (1998), *Organizational Aspects of EDI: a Norm-oriented Approach*, PhD thesis, ISBN 90-3651095-3

Jelassi, T. and Figon, O. (1994), Competing through EDIat Brun Passot: Achievements in France and Ambitions for the Single European Market, *MIS Quarterly*, 18(4), pp. 337-352.

McCarthy, J. (1982), Common Business Communication Language. In Albert Endres and Jürgen Reetz, editors, *Textverarbeitung und Bürosysteme*. R. Oldenbourg Verlag, Munich and Vienna.

Moore, S.A. (1997), On Automated Message Processing in Electronic Commerce and Work Support Systems: Speech Act Theory and Expressive Felicity, *ACM Transactions on Information Systems*, Vol. 15, No 4, October 1997.

Kekre, S. and Mukhopadyay, T. (1992), Impact of Electronic Data Interchange Technology on Quality Improvement and Inventory Reduction Programs: A Field Study, *International Journal of Production Economics,* 28(3), pp. 265-282.

Kimbrough S., EDI, XML, and the Transperancy Problem in Electronic Commerce

Mackay, D.R. (1993), The Impact of EDI on the Components Sector of the Australian Automotive Industry, *Journal of Strategic Information Systems*, 2(3), pp. 243-263.

Sokol, P. K. (1995), *From EDI to Electronic Comemrce- a Business Initiative,* McGraw-Hill, Inc., New York, ISBN 0-07-059512-7.

Stegwee R.A., Lagendijk P.J.B. (2001), Healthcare Information and Communication Standards Framework, in: R.A. Stegwee & T.A.M. Spil, *Strategies for Healthcare Information Systems*, Idea Group PublishingVermeer, B., How Important is Data Quality for Evaluating the Impact of EDI on Global Supply Chain? *Proceedings of the 33 Hawaii International Conference on System Science.*

Williams H., Li F., Whalley J. (2000), Interoperability and Electronic Commerce: A New Policy Framework for Evaluating Strategic Options*, JCMC 5 (3)*

Wrighly, C.D., Wagenaar, R.W., and Clarke, R. (1994), Electronic Data Interchange in National Trade: Frameworks for the Strategic Analysis of Ocean Port Communities, *Journal of Strategic Information Systems*, 3(3), pp. 211-234.

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