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A Semiotic Perspective

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ABSTRACT

This paper reports on an ongoing study of an initiative to build e-Customs capabilities in eastern Africa. The EU's customs capability building unit is trying to "export" e-Customs solutions to developing countries in order to strengthen the competiveness of companies based in these countries. Following the international development, e-Customs (with the improved control and traceability possibilities from producer to end consumer) will soon be a prerequisite for participation in international trade. The study is based on a semiotic framework for e-Customs implementations. Previous research has shown how interdependencies between the syntactic, semantic, and pragmatic levels cause problems already within the EU. This research we are now expanding to the introduction of so called Authorized Economic Operators (AEOs) in the East African Community. Since this project has just recently started we have only limited empirical material to load our framework, but initial data shows that the African initiative is trying to implement only parts of the e-Customs solutions that are developed to fit into a different semiotic structure. We can conclude that significant challenges lay ahead in adjusting also the rest of the structure if the initiative is to be successful.

INTRODUCTION

Since the 1980's pioneering countries have tried to transform their paper-based customs processes to processes based on electronic interchange of export and import data, so called e-Customs. The initiative has been motivated by expected control and security improvements in combination with lowered administrative burden on exporting companies (Rukanova et al.,

2010). For developing countries adoption of e-Customs is an urgent issue by two main reasons. First, in the swells after terrorist attacks and pandemic diseases such as the bird and swine-flues, the many countries are demanding more and more control and traceability to accept import of goods (Baida et al., 2007). This control and traceability is not possible without e-Customs and is already leading to companies from countries without e-Customs being excluded from many markets. Second, as companies in countries with e-Customs are benefiting from decreased administrative burden, companies in countries without e-Customs are competitive disadvantaged on the still open markets. Adoption of e-Government is considered to be one of the main drivers for strengthening national competiveness (OECD, 2005). It is difficult to calculate exactly how painful the administrative burden of paper based customs processes is. Dutch Customs estimate that the customs related overhead corresponds to about 2% of the total turnover for exporting companies (Razmerita & Bjørn-Andersen, 2007). A transition electronic data exchange is estimated to lower that sum by 70% (SITPRO, 2008).

With help from the World Customs Organization and the Swedish International Development and Cooperation Agency, one of the European e-Customs initiative's key concepts, the "Authorized Economic Operator" (AEO), is now being implemented by the five East African Community (EAC) countries (Burundi, Kenya, Rwanda, Tanzania and Uganda). Companies that are granted the AEO-certification are considered to be trustworthy traders and are granted substantial trade facilitations. A prerequisite for being granted the AEO status is that the company is able to deliver accurate and timely export declarations via e-Customs.

Our general purpose with this paper is to increase the understanding of how to develop e-Government in developing countries based on existing e-Government implementations. This paper approaches the EAC implementation of AEO as an attempt to "export" a European e-Customs solution. We suggest that one perspective, among many others, from which this export can be studied to increase the understanding of how to build e-Government solutions in developing countries, is the semiotic perspective. The purpose of the implemented e-Customs solution is to communicate export-related information, thus the suitability of theories of communication to approach the problem. We have already fruitfully applied the three semiotic levels of syntactic, semantics, and pragmatics to explain problems with the European attempts to develop similar e-Customs solutions in the 27 EU member states (Henningsson & Bjørn-Andersen, 2010). We use the experiences from that study to develop a semiotic framework for e-

Customs implementations. The framework is used as foundation to fulfill the specific outset in this paper: to describe problems with the EAC implementation of AEO and explain the consequences of encountered problems. This new insight will be useful in future e-Customs and other e-Government implementations in developing countries.

A SEMIOTIC FRAMEWORK FOR E-CUSTOMS IMPLEMENTATIONS

In the IS literature, semiotics (or semiotic science, or semiology) is frequently treated as a single theory (c.f. Beynon-Davies, 2002; Krogstie et al., 2006; Barron et al., 1999), but is rather a collection of theories that have in common that the that they are concerned with signs and/or signification (the process of creating meaning). Some of the theories within semiotics are compatible and can be used jointly to increase the explanatory potential of a theoretical baseline, while other theories are mutually excluding. This section will outline which semiotic theories are applied in this paper and the consequences of their use.

The semiotic theories we apply are fundamentally structural to their nature. Structuralists postulate that every system has a structure. Structuralists focus structural relations that deal with coexistence rather than changes. A structural view of e-Customs is thus on the elements that constitute the system and how the elements are interrelated. Structuralism can be criticized for omitting the dynamic processes of change in systems and for that the studied structures are themselves socially and culturally conditioned (Hitt et al., 1993). We argue that the focus on constituting elements and their relations makes structural theories suitable for analysing elements of e-Customs solutions.

Semiotic levels

The Vienna Circle (proposed in the International Encyclopedia of Unified Science; Morris, 1938) has defined semiotics as grouping the triad "syntax", "semantics", and "pragmatics". The syntax (also "syntactics") refers to relations between signs, semantics to relations between symbols and real world objects, and pragmatics to relations between signs and the situation which they are used. The semiotic levels has previously been used in IS for purposes such as differentiating between different IS (Barron et al., 1999), determining quality issues of process models (Krogstie et al., 2006), and examining the concept of information (Beynon-Davies, 2002).

In addition to the syntax, semantics, and pragmatics of symbols the levels of empirics and physics have also been argued of interest to the IS field (Stamper, 1973; 2001). Physics and Empirics refer to hardware and to attributes of signals used to carry or code the signs of a message; the physical characteristics of the medium of communication, e.g., sound, light, electronic transmission, etc. (Stamper, 1973, (Beynon-Davies, 2002). Both levels are thus important prerequisites for exchange of signs in computerized IS, but in this paper treated exactly just as that – (given) prerequisites of importance, but outside the scope of this paper.

Syntax refers to relations between individual signs (Morris, 1938). These relationships are without regard to the actual content of signs or sign-systems. Syntax of symbols can be seen as rules of how symbols should be combined with other symbols. For example, the symbols for a steering wheel and engine relate to the symbol of car as "being parts of." In IS, the individual fields of a data base are signs, and the relations between the fields are the syntactics. Relational data base models, UML diagrams, and other modeling techniques that are frequently used in IS development are approaches used, in a graspable manner, in order to represent how the IS function (or should function after development) by explaining how symbols are processed in the IS (Krogstie et al., 2006). These techniques normally include ways of representing basic relationships such as "is part of," "is not part of," and "triggers."

Semantics is the level that addresses the relationship between a sign and a real world object (Morris, 1938). The link to a real world object is what gives the sign a certain meaning. For example, a semantic problem is making the link between sign and object stable and reliable enough to enable communication using the sign. An example is when two persons in face-to-face communication refer to an object that is familiar to both of them. The face-to-face situation also gives instant possibilities to confirm understanding or redefine unclear signs. Semantics may be more problematic in computer based IS. Not all symbols are without semantic ambiguity even in face-to-face communication. What is the meaning of a symbol such as "quality"? The loss is in "communication richness" (Daft & Lengel, 1986), and sometimes asynchronous communication puts pressure on the semantic definitions of signs in computer based IS.

Pragmatics refers to the link between the sign and its user. Indirectly, it depends on the use situation, the intentions with the use, and the social context in which it is used. The social context

influences not only the pragmatics of a sign but also the development of syntactics and semantics.

In the IS literature pragmatics refers to how the IS are used, and for which purpose (Barron et al., 1999). The same sign from an information system could be used for very different purposes. Barron et al. (1999) give the example of how an information system for managing a stock exchange can present figures for stock selection that are then used differently, thus leading to different investments. In the same manner, insurance companies may have access to the same data about a potential customer but can reach very different conclusions regarding the person's risk attributes.

Semiotic levels of e-Customs implementations

In an previous study (Henningsson & Bjørn-Andersen, 2010) we have shown how interdependencies between the syntactic, semantic, and pragmatic levels cause problems already within the EU. To work properly, the three levels have to be aligned. An e-Customs solution can differ from another e-Customs solution in any of the three levels.

Table 1 summarizes the three levels of e-Customs implementations. On a syntactic level differences can be found in data models, describing which data should be transferred through the system to eliminate such differences (Egyedi & Dahanayake, 2003; Henningsson & Bjørn-Andersen, 2010).

Table 1. Semiotic levels of e-Customs implementations

Level	Description	Purpose
Syntactic	Which symbols	Accurate transmission
Semantic	Symbol meaning	Understandable message, what content
Pragmatic	Business logic	How the message is used

The semantic level of IS exists in a language context (Iivari, 2003). This means that the objective of an information system is to supply its user with information to support its activities. The

interpretation and meaning of transferred data is another potential source of IS deviation (Gustafsson et al., 1982). In the case of e-Customs, deviations can occur because data fields such as "means of transport", "description of goods", and "exporter" are interpreted differently in each e-Customs implementation. An exporter might be the company that produce the goods and who is now sending it to the customer, but it might also be the logistics service provider that actually transports the goods across the border. In some cases it is even the receiving part who actually acts as exporter. The same problems exist for almost all data that is shipped: shall weight of goods be specified with or without wrapping? How does one write an appropriate description? Is the receiving part represented by its name or organizational number, and if so the organizational number in which country? Data transferred in the IS should have the same meanings to all users. Data meaning is another potential source of e-Customs deviation. (Henningsson & Bjørn-Andersen, 2010)

The pragmatic level of IS refers to a process view of how data is transformed through the systems to its users. IS can be seen as work systems that as one constituent part contains a work process (Alter, 2003). To complete transfer the user has to manipulate the system by a logic that is partly built into the system and partly defined by the implementation context. The process view addresses when to send which data and to whom. It is possible that national customs offices wants some part of the data model to be submitted to VAT-controlling authorities, some data to health authorities, and some data to the authority responsible for controls of dangerous goods. When and where data is transmitted is defined by the IS' work process, which is a third source of standards implementation deviation. (Henningsson & Bjørn-Andersen, 2010)

A semiotic framework for e-Customs

The communication in the export process is depicted in Figure 1. Five major actors are involved: shipper, trader, receiver and the governmental agencies in both the exporting and importing countries. It is the communication between these actors as outlined in the figure we intend to capture with the semiotic framework.
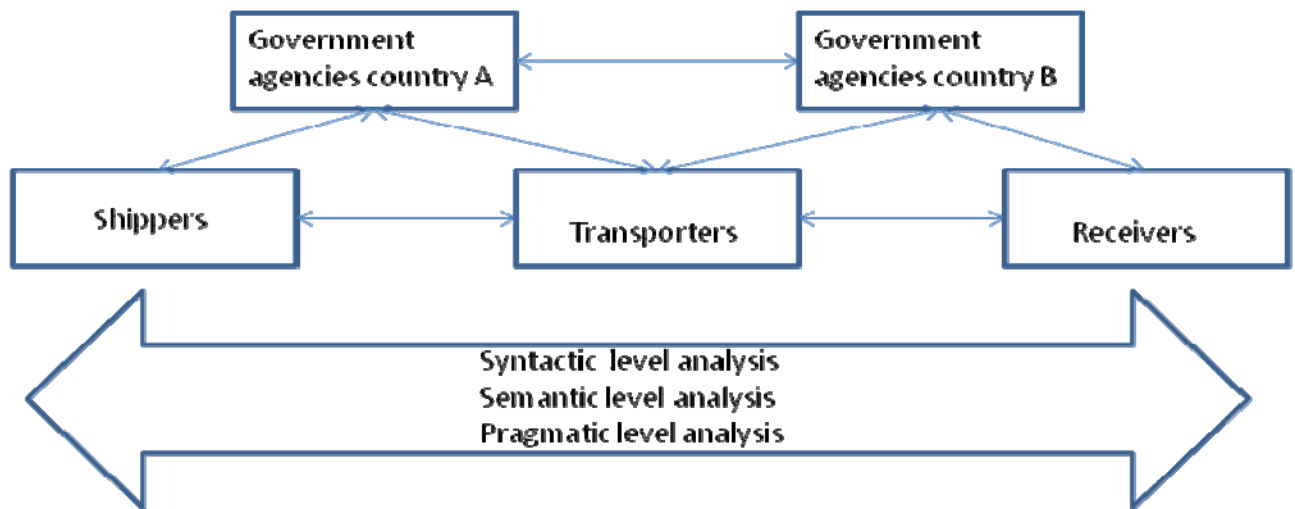
Figure 1. Overview of the actors, exchanges of information and the three levels of analysis applied

Henningsson and Bjorn-Andersen (2010) showed that three semiotic levels of e-Customs solutions have to be aligned in order for the system to work properly. With an empirical investigation of e-Customs in Europe they found that interdependencies between the syntactic, semantic, and pragmatic levels cause problems already within the EU. If one syntactic component of the e-Customs solution, for example the data model, was "exported" to another EU country it did not automatically fit into the semantic and pragmatic context. In concrete terms, the data element in the data model (e.g. exporter) meant something different in the new country (exporting company instead of individual employee filling out the export forms) and sometimes was not compatible with the pragmatic level (some export data should be sent to different authorities in different countries).

Altogether Henningsson and Bjorn-Andersen (2010) found six ways in which e-Customs implementations could deviate from each other (Table 2). Besides deviation in the data model what also was highlighted on the syntactic level was the need to specify in which format the data were submitted. Here the issue of encryption was in the case of e-Customs unsolved. On the semantic level it was previously recognized that the interpretation of data could differ in implemented IS. In addition, recognizing the importance of the interpreter gives automatically also importance to authentication as deviation source on the semantic level. Different approaches exist for establishing identity and identity is expressed in different ways. In the e-Customs case

identity could be both an organizational belonging and an individual. On the pragmatic level how the export process is shaped clearly affected the e-Customs implementation. How risk assessment was made, when controls were carried out, and timeframes for submitting export data were among the parameters that could render different standards implementations. What also became visible in the e-Customs case was that the timing of changes to the e-Customs process was an issue that affected the exporters.

Table 2. A taxonomy of deviation sources in e-Customs implementations

Semiotic level	Deviation source	Description
Syntactic	Data model	Data processed by the IS
	Data format	Encryption of messages
Semantic	Data meaning	The meaning of processed data for IS' users
	Authentication	Digital signature
Pragmatic	Process model	How Differences in workflow procedures
	Time of implementation	When the IS and changes to the IS are implemented

In the next we will explain how we intend to use this taxonomy of deviation sources as theoretical framework for study of e-Customs export to the EAC.

RESEARCH APPROACH

The research presented in this paper is a case study, following the structured case study approach (Carroll & Swatman, 2000), of e-Customs implementation in the EAC.

Our outset with the research in this paper is to describe and explain problems with transferring e-Government solutions from one national context to another. With this outset we developed a framework based on the three semiotic levels of syntactics, semantics, and pragmatics. The framework has a specific use in this paper to investigate e-Customs implementations, but also a more general application as framework for describing e-Government solutions within the domain of IS.

The case in the study is the "export" of European e-Customs solutions to the EAC. The European Customs Capability Building unit is trying to transfer the solution to developing countries in order to strengthen the competiveness of companies based in these countries. Following the international development, e-Customs (with the improved control and traceability possibilities from producer to end consumer) will soon be a prerequisite for participation in international trade.

The essence of the structured case study approach is that it forms an iterative research cycle using a formal theoretical framework. The framework creates a structure that permits collection of relevant field data and, in later stages, enables traceability of conclusions and theoretical generalizations (c.f. Yin, 1994). The framework in this study was based on the three levels of semiotics and the taxonomy of e-Customs implementation deviation. Empirical data was, and will be, collected on the three levels in both standards specification and implemented IS.

Empirical data gathering had two legs: the first to grasp the European e-customs solution that was intent for export and a second to grasp the EAC implementation. Existing documentation about the European e-Customs initiative and the implemented systems are extensive and was an important source of empirical data. The standards specification Regulation (EC) No 648/2005 was a natural starting point. Other important documents produced by the EC include Regulations, Decisions, and Communications regarding customs code, as well as e-Customs and the Multi Annual Strategic Plan that sets the strategy for developing European customs. To grasp the implemented systems, user manuals, system documentation, specification of applied data model, and specifications of UN/EDIFACT and XML-schemas for data transfer were investigated. In addition, specifications of technical standards by ISO, DG/TAXAUD, and UN/CEFACT were investigated. Participations in meetings, workshops, and interviews of IT personnel at Danish and Swedish Customs complemented the first empirical leg. Questions were asked with starting point in the semiotic levels. Informants were selected based on their ability to provide an account for how the implementation of the e-Customs standards affected the three semiotic levels. Data collection was carried out in parallel to ongoing analysis of the situation in Denmark and Sweden, striving for a saturated understanding of the implementations. In total 12 meetings and workshops were held on e-Customs with representatives from the two customs organizations, the EC and exporters. These were complemented by 10 semi-structured interviews to understand the specific details of the customs processes.

The second empirical leg is still under formation. A set of first, informal, interviews has been made to understand the outset and anticipated problems. Interviews have been made on central level. The ambition is to further load the framework with face-to-face interviews and project documentation.

TENTATIVE FINDINGS

The European e-Customs solution

Key concepts of the European e-Customs solution

In 2006, the European Commission established the ambitious and legally binding goal of reducing the cost of regulations for European companies by 25% in 2012. It has been estimated that administrative costs could amount to about 3.5% of GDP in the EU (EC, 2006a). Reducing the administrative burden by 25% would eventually lead to an increase in EU GDP of 1.6% (EC, 2006). A 25% cost reduction would require substantial efficiency improvements in the current administrative processes, including customs processes. The complexity of the current export processes is manifested by the sometimes more than 20km long line of freight trucks waiting at the Finnish-Russian border, or by the more than 40 paper documents, each in four copies, that have to accompany a container shipped by vessel (Tan et al., 2006). A recent report from SITPRO, a British interest organization working for trade facilitations, on the cost of paper documents in the supply chain of perishable foods of the UK, revealed that the supply chain produces approximately 1 billion papers annually, of which 90% are destroyed (SITPRO, 2008). The consequences of UK's paper based supply chain are that duplicated data are keyed in at least 189 million times every year, and that 13 million man hours are spent on keying in data. All in all, the cost of paper in UK's supply chain - just in the perishable food industry alone - is estimated to be £1 billion annually. It should be noted that this sum is only for perishable food and only for the UK. The sum for all supply chains in the EU is ungraspable. In the SITPRO report, however, a complete move to electronic information exchange is expected to reduce this cost by 70%. Thus far, only 4% of all trade documents exist exclusively in electronic form (Tan et al., 2006). This is an enormous waste of paper (causing CO^2 emissions), and is a huge administrative burden. Additionally, in a number of countries, the passing of paper documents from one person to another is a potential for bribes/kick-backs.

The EC's e-Customs plans are outlined in the Multi-Annual Strategic Plan (MASP) (TAXUD, 2008). In the near future the EC wants to allow goods to be declared in the country where the economic operator is established, regardless of where goods are physically located or from which EU country it is clearing customs – so called centralized clearance. The centralized clearance will be a benefit offered to traders that through certification has been considered trustworthy. These traders will receive the status of Authorized Economic Operator (AEO). Another important step in the MASP is the establishment of a Single Electronic Access Point (SEAP) to allow a trader to lodge all his declarations to customs electronically via one single interface of his choice which connects his system with all EU's member states' customs systems. One step further than the SEAP (which only focuses on data explicitly for customs organizations) is the single window approach that allows traders to lodge all information required under both customs and non-customs legislation for cross border trade of goods in one place and at one time only. The information will then be shared among all the authorities and agencies that are involved in the movement of goods. The functional specifications of SEAP and Single Window should be finalized by 15 February 2011. Full scale implementation "is anticipated to be established by the Member States and the Community after 2012" (TAXUD, 2008, p. 17).

Pragmatic level

Figure 2 outlines the main steps associated with export declaration and control when exporting from Denmark to outside the EU. Before the goods are transported across the border, the exporter has to notify Danish Customs with what is called a pre-advice message (step 1 in Figure 2). When this message has to be sent is dependent on the status of the exporter. If the exporter is certified by the customs as an approved exporter, and if the shipper uses electronic transfer of
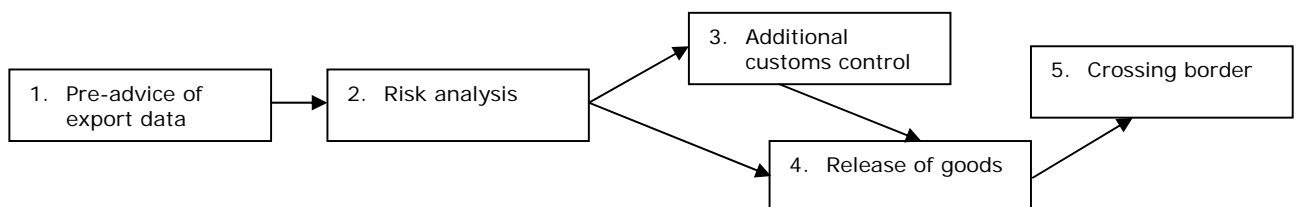

Figure 2. Generic export process in Europe

declaration data, the data can be submitted as late as one hour in advance.

Based on the pre-advice, Danish Customs runs a risk analysis (step 2) and then either a) decides that additional control is required (step 3), possibly with a physical inspection at the loading place, or b) initiates a final release process of the goods for export (step 4). Assuming that nothing is discovered in the additional customs control in step 3, the goods from step 3 are finally released for export (step 4) and shipped across the border (step 5).

Semantic level

Regarding data meaning, the Danish e-Export system benefits from being a direct derivation from SAD, since the need for specifying data meaning was already highlighted when SAD was introduced. A substantial amount of work had already been done by UN/CEFACT, ISO, and the EC/TAXAUD in order to specify the meaning of data. Even for such fairly generally described fields such as "product description" there are appropriate guidelines on how to provide and interpret data.

The meaning of data is dependent on the senders and receivers in the communication. In Denmark the sender of export data is the juridical body that exports goods. In other words, the trading company, for example Arla, is the communicating partner responsible for the accuracy of reported data. In Sweden, the individual employee submitting an export declaration is the one responsible for submitted data being correct. This means that in Denmark the data submitter is identified by the EDI link used for data submission. The channel used identifies the company. In Sweden, the individuals who submit data are identified with digital signatures. As will be elaborated later, this source of deviation may be very difficult to deal with, which is due to the roots in national legislation.

Syntactic level

The European e-Customs solutions are generally direct computerization of a previous manual and paper-based system. Messages sent have their paper equivalent which might still be used by companies who for some reason do not want to submit export data electronically. The paper-equivalent is the Single Administrative Document (SAD). The SAD, specified by the EC in Regulation No 1875/2006 and No 648/2005, is a standardized form for customs data that is accepted in the EU, EFTA-countries and many other countries, including for example Russia.

The electronic data model is a field by field translation of the SAD-fields that Danish Customs was using prior to the computerization. The Danish e-Export system can be reached using standards like UN/EDIFACT messages or XML messages. However, it should be noted that using XML does not mean that the contents is standardized. There are no international XML standards for electronic customs declaration messages. Regarding UN/EDIFACT directory D96.B is used.

Export of e-Customs solution to Eastern Africa

Objectives

The countries of the EAC has recognized that trade is one of the key components of national and social developments. Together they have formed the EAC Customs union with a not so distant objective of transforming into a common market after the European example. The Customs modernization project collects a number of regional and national initiatives aimed at facilitating and promoting trade, investment and production in the EAC.

As part of the EAC customs modernization project, the World Customs Organization (WCO) and the EAC are working jointly on the implementation of the AEO model according to the European role model. This is a development project sponsored by the Swedish International Development and Cooperation Agency (SIDA). It is designed to implement modern customs procedures for the five EAC countries, based on WCO international conventions and standards. The AEO model is to be implemented as a top priority by the five EAC countries (Burundi, Kenya, Rwanda, Tanzania and Uganda), with mutual recognition between the five EAC countries. When implemented the AEO model will be the first operational model in Africa and one of the first models of this kind in the world, and is expected to give the business community considerable benefits in the future.

Semantic levels of the EAC e-Customs implementation

The AEO is an intended shift on a pragmatic level. The EAC countries wants to radically redesign the way its current export processes are carried out. To describe the current processes in one common process model would be impossible. The processes differ not only from country to country but also from individual customs offices in the five EAC countries. However, a few things can be said about the processes in general. They are all transaction based. This means that

every shipment is controlled at the border and reported individually. The main idea behind the AEO status is that export shall be reported in summary declarations for those companies that are granted AEO status. This means that a company reports every, or every third, month what it has been exporting - similar to how VAT reporting is carried out in most countries.

An AEO implementation builds on that companies can, at any given time, prove that they have their business process under control. This is the basic idea behind the certification. According to the European model this means that customs shall be able to trace any export product through the business systems of the exporting company. In the guidelines for AEO status application there is a fairly lengthy description of the functions that a business system should be able to perform. It should be recognized that the status of corporate business systems are not the same for European and EAC countries and that the AEO concept builds on business systems of European standard.

On the semantic level the European countries has gone through extensive work with the SAD to determine the meaning of each data field. Still exporting companies' report that the interpretations differ from country to country. The EAC has limited history of formal trade following formalized customs processes. Yet unconfirmed, it can be expected that the semantic interpretation of data fields will differ more in the countries that not have a long tradition of extensive trade with each other. In Europe countries with much mutual trade seem to have aligned their interpretations over time.

In Europe the syntactic level of export communication was determined largely by the SAD document. In the EAC the AEO solution is built upon a diverging set of data required for export. While some data is required in one country, this data may not be needed in another country. The common data model is essential for the AEO implementation in that the receiving countries' customs shall be able to ask the exporting countries' customs for the export data when necessary. If that data is not available according to the European model the AEO status shall not be accepted, hence the problem.

Future challenges

What is happening in the EAC implementation of the AEO is that the some part of the European e-Customs solutions is taken out of its context and introduced into another setting. In this case it

is a concept that exists primarily on a pragmatic level but clearly builds on both the semantic and syntactic levels of the European e-Customs solution.

The introduction of AEO will disturb the existing paper-based processes in the EAC countries. To apply for AEO status companies need to adopt state of art business systems with full transparency of their supply chains. The national customs organizations will need to develop e-Customs solutions that permits interchange of customs data and that allows customs officers to electronically access the business systems of companies to obtain data on shipments upon request. The countries of the EAC need to agree upon a definition of the AEO that include which data should be required for export and also work out how the definitions of this data should be shared among all people working with customs in the five countries.

DISCUSSION AND CONCLUSIONS

This paper has described a study in progress of the attempts to transfer parts of the European e-Customs solution to the EAC. We believe that the initiative of introducing European e-Customs solutions in eastern Africa is an import subject of study in its self. It would come as no surprise if IT artifacts, Information Systems, and related processes developed for the European community not are easily transferred to the African context. The research is also interesting from the point of view of it represents a general idea of exporting e-Government solutions to other national and cultural contexts.

The study takes its starting point in an investigation of the European e-Customs initiative. As theoretical foundation for the paper a semiotic framework for e-Customs implementations is developed. The framework is then applied to the EAC implementation of the European e-Customs concept AEO. Although the EAC implementation is still only embarking it is possible to use the intended objective to outline challenges that lay ahead of the initiative. Previous research by Henningsson and Bjørn-Andersen (2010) has shown that the different semiotic levels of e-Customs implementations are tightly interdependent and that changes on one level leads to necessary changes on the other levels in order to keep the levels aligned. What is done in the EAC initiative is that a concept on primarily a pragmatic level is introduced, without the necessary foundation on syntactic and semantic levels in place. The challenges that lay ahead of the EAC initiative, if the AEO concept should be kept similar to the European concept, are to adapt the syntactic and semantic levels to make possible the change on the pragmatic level.

Keeping the AEO concept similar is on the other hand one of the key factors for making the initiative to have impact on business life since it would enable smoother export to the European countries. Without the implemented AEO concept, and a full transition to e-Customs it is likely that companies in the EAC countries will by time be excluded from the European market.

REFERENCES

1. Alter, S. (2003) Sorting out issues about the core, scope, and identity of the IS field. *Communications of the AIS* 12 (41),

2. Baida, Z., Rukanova, B., Liu, J. and Tan, Y.-H. (2007) Rethinking eu trade procedures - the beer living lab. In *Bled eCommerce Conference*, Slovenia.

3. Barron, T. M., Chiang, R. H. L. and Storey, V. C. (1999) A semiotics framework for information systems classification and development. *Decision Support Systems* 25 (1), 1-17.

4. Beynon-Davies, P. (2002) *Information systems: An introduction to informatics in organizations.* Palgrave, New York.

5. Carroll, J. M. and Swatman, P. A. (2000) Structured-case: A methodological framework for building theory in information systems research. *European Journal of Information Systems* 9 (4), 235-242.

6. Daft, R. L. and Lengel, R. H. (1986) Organizational information requirements, media richness and structural design. *Manage. Sci.* 32 (5), 554-571.

7. Ec (2006) Measuring administrative costs and reducing administrative burdens in the european union - com(2006) 691. COMMISSION OF THE EUROPEAN COMMUNITIES, Brussels.

8. Egyedi, T. M. and Dahanayake, A. (2003) Difficulties implementing standards. *Standardization and Innovation in Information Technology, 2003. The 3rd Conference on*, 75-84.

9. Goldkuhl, G. and Ågerfalk, P. J. (2002) Actability: A way to understand information system pragmatics. In *Coordination and communication using signs* (Al., L. K. E., Ed), pp 85–114, Kluwer Academic Publishers, Dordrecht.

10. Gustafsson, M. R., Karlsson, T. and Bubenko, J. J. (1982) A declarative approach to conceptual information modelling. In *Information*

11. *systems design methodologies: A comparative review* (Olle, T. W. and Sol, H. G. and Verrijn-Stuart, A. A., Eds), pp 93-142, North-Holland, Amsterdam.

12. Henningsson, S. and Bjørn-Andersen, N. (2010) The missing links between adoption of standards and full interoperability in international trade *Under review*,

13. Hitt, M. A., Harrison, J. S., Ireland, R. D. and Best, A. (1993) Lifting the veil of success in mergers and acquisitions. In *Annual Meeting of the Strategic Management Society*, Cambridge University Press, Chicago.

14. Iivari, J. (2003) Towards information systems as a science of meta-artifacts. *Communication of the AIS* 12, 568-581.

15. Krogstie, J., Sindre, G. and Jörgensen, H. (2006) Process models representing knowledge for action: A revised quality framework. *European Journal of Information Systems* 15 (1), 91-91.

16. Morris, C. W. (1938) *Foundations of the theory of signs.* The University of Chicago Press, Chicago, Il.

17. Oecd (2005) E-government for better government. *OECD E-Government Studies* OECD, Paris.

18. Razmerita, L. and Bjørn-Andersen, N. (2007) Towards ubiquitous e-custom services. In *Web Intelligence Conference*, pp 833-837, IEEE Computer Society, Sillicon Valley.

19. Rukanova, B., Van Stijn, E., Zinner-Henriksen, H., Baida, Z. and Tan, Y. H. (2010) Understanding the influence of multiple levels of governments on the development of inter-organizational systems. *European Journal of Information Systems* (Forthcomming),

20. Sitpro (2008) The cost of paper in the supply chain: "project hermes" perishable foods sector research report. SITPRO, London.

21. Tan, Y.-H., Klein, S., Rukanova, B., Higgins, A. and Baida, Z. (2006) E-customs innovation and transformation: A research approach. In *Bled eCommerce Conference*, Slovenia.

22. Taxud (2008) Electronic customs multi-annual strategic plan - 2008 yearly revision. European Comission, Brussel.

23. Yin, R. K. (1994) *Case study research.* Sage Publications, Thousand Oaks.