
Standard creation and adoption for SME networks

The experience of the European Textile-Clothing and Footwear Industry

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ABSTRACT: This paper presents the experience that is running in the Textile, Clothing and Footwear industry under the framework of the European project eBIZ-TCF as a case of standardisation in industrial sectors that are characterised by the large presence of SMEs. The activities are presented in connection with previous initiatives that constitute the industrial and technological background of such initiative. In fact it is a long way that led the actors of the project to identify the requirements and remove the bottlenecks that hamper eBusiness adoption in a crucial part of the European manufacturing industry.

KEY WORDS: eBusiness, standards, networked business, Textile Clothing Industry, ebXML, UBL, SME

1. Introduction

In January 2009 an independent group, the Expert Panel for the Review of the European Standardisation System (EXPRESS) was established by the European Commission. Its aim was to review the entire European Standardisation System (ESS) in the European 2020 perspective.

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As a first statement the report, released on February 2010 (Express, 10), declares “The ESS has been a central element in the delivery of the single European market, in particular, through the use of Directives in key areas under the ‘New Approach’ policy, integrated into the New Legislative Framework.”

Then, as one of the final recommendations, the expert groups points out the need “to promote a coherent work programme where there is ease of access for all interested stakeholders, such as SMEs, to standardization work and standards information.”

These statements are the most recent ones in a sequence of reports, positions papers, political statements regarding the role of standardisation, the importance of the involvement of industry (especially SMEs) at general and sectorial level and the need for the European economy to exploit the opportunities offered by the technology (and the new ways to do business they can enable).

An important statement about the relevance of sector specific actions addressing SMEs is also witnessed by content of the “CEN/ISSS ROADMAP addressing key eBusiness standards issues 2003-2005” (Kuster *et al.*, 2003).

Despite this importance and its necessity still eBusiness is far from a wide diffusion in the networks of European industry, especially in sectors dominated by a large presence of SMEs. For example Textile, Clothing and Footwear (TCF) sectors show an average level of adoption of eBusiness and interoperability standards that appears to be quite lower comparing to other similar manufacturing sectors (ebWatch, 04, ebWatch 05). Other sectors characterised by the large presence of SMEs and the absence of few preeminent leaders, like furniture, are not so far from this picture.

It is not in our focus in this paper to discuss the reasons why a wide eBusiness adoption should be desirable and how it would benefit our industry. But to understand how and why the problem of interoperability has hampered standard adoption and how the standardisation processes have been tackled in order to overcome the low level of adaption in respect of other sectors.

2. Factors hampering eBusiness diffusion in TCF

An analysis report recently published by the eBIZ-TCF project (eBIZ, 08) has shown evidence of some aspects of the problem that can be resumed in

- Sectorial specific requirements: intercompany relationships based on multiple connections in a *m to n* schema instead of a *1 to n* schema, production processes largely sector specific and demanding for sector specific solutions, inconstant relationships on a seasonal base;
- Technological offer for eBusiness implementation: existence of a number of solutions and initiatives (implementing different paradigms:

P2P as well as Web Application based and Integration Services) but with a very low level of adoption and no capacity to interoperate each other (they are islands of interoperability, not interconnected)

- eBusiness adoption is hampered by:
 - a) insufficient perceived benefits
 - b) lacking interoperability between different solutions conflicts with the high dynamicity of the *m to n* relationships
 - c) differences at the business level, including not only the content of data messages but also the organisation of business processes

On the contrary, this is the evaluation from the report, the existence of numerous solutions and (some) standards does not present the biggest single obstacle to eBusiness adoption because at the technical level, different standards do not necessarily prevent interoperation between different systems

A reluctance was observed of many firms and technology providers to implement common specifications, fearing a risk of an excessive 'normalisation' of the applications that leads to lose their assets towards the customers or their suppliers; they rather wait and see which will be the successful initiative when the risk on investing will be lowered to zero.

On the other hand, from concrete practices, it was also observed that even the pressure from large industry to activate electronic data flows might be unsuccessful because suppliers are not convinced to invest in a single customer solution; this puts in evidence a request for common languages and standards to preserve IT and organisational investments (DeSabbata. *et al.*,2008).

The need for standardised solutions is strengthened by the high volatility of the commercial relationships in the sector: the fashion waves and the market evolution leads to change yearly a relevant part of the partners.

In short the perceived negative key factors for the SMEs networks in the textile clothing and footwear sector could be resumed in:

- high threshold to begin the eBusiness 'game'
- difficulty in setting up/understanding collaboration processes
- long time of network setting up and testing
- costly scaling.

These statements depict a situation where interoperability appears as a key issue for eBusiness adoption and the adoption of standards plays a relevant role in four key aspects: a) lowering the investment for each firm to participate the 'game' b) achieving a longer life time of the adopted IT solutions , c) offering a reference state of art as benchmark for collaborative processes to be implemented, d) increasing

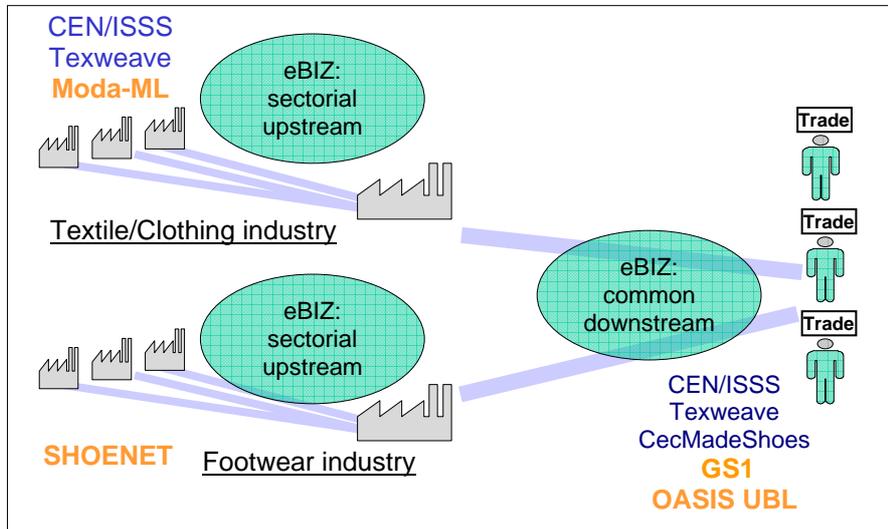


Figure 1. The eBIZ-TCF architecture in short.

perceived benefits thanks to a larger number of adopters (that are partners technically ready to collaborate).

3. Criticalities in achieving interoperability and standard contribution

In order to establish interoperability between different systems there are at least three aspects of interoperability that must be tackled:

- business processes
- data models (semantic, syntax, including product classification and identification)
- communication protocols.

The analysis in the TCF sectors demonstrated that the communication protocols are not affected by sector specific issues and are not so much critical, because the outcomes of IT research and developments from other applicative domains can be directly applied, with no adaptation (but with a clear understanding of costs and functionalities that are fitting the technological level of each organisation).

On the contrary, business processes and data models are very sector specific and attempts to directly transfer tools and solutions from other sectors resulted unsuccessful. This is the reason why in the TCF sector there has been a constant attention to these two aspects of interoperability.

More in detail, since the beginning the work of analysis (Texspin 04, DeSabbata *et al.* 2008) led to identify two different challenges related to the requisites of the different rings of the supply chains of the TCF industry (figure 1):

- highly specialised networks of manufacturing enterprises (upstream area) where very sector specific (vertical) languages (and data models) have to be provided (DeSabbata *et al.*, 2005a, 2005b)

- retail channels for the final goods (downstream area) where normalisation and common and efficient connection are required by the retailers to the producers of different sectors (thus non-sector specific, horizontal languages).

On the other hand difficulties in participating in standardisation processes were immediately clear for a sector dominated by SMEs (DeSabbata *et al.*, 2005a, Jakobs 04):

- Time: the life-cycles in the standardization processes are too long
- Resources: the extent of human and economical resources prevent SMEs participation
- Usability: the specifications have poor usability (address few expert readers)
- Adoption: the integration in legacy systems/ERPs requires specific technological skills
- Implementation complexity: the complexity of the software to implement the full specifications is costly and often not incremental.

In order to tackle these issues both Textile-Clothing and Footwear sectors, in parallel, de facto adopted a ‘light’ approach to the creation of a standardised interoperability framework (DeSabbata *et al.* 2008, Gessa *et al.*, 2005) with the following requirements:

- user driven: a bottom-up approach involving relevant actors since the beginning, on local small tasks at a time
- sectorial: focused on a narrow domain but aware of horizontal frameworks (like ebXML or UBL)
- dictionary centric rather than document centric: in order to reuse terms in many document templates with reduced time to deliver usable results
- supported by public specifications and on-line free resources
- iterative: the starting point is a core of inter-company processes; they are analysed and implemented with the support of a group of pilot industries and then proposed in a standardisation framework; then further iteration consolidates and extends the existing dictionaries and specifications; the CEN/ISSS CWA approach has been an enabling factor for the success of this strategy.

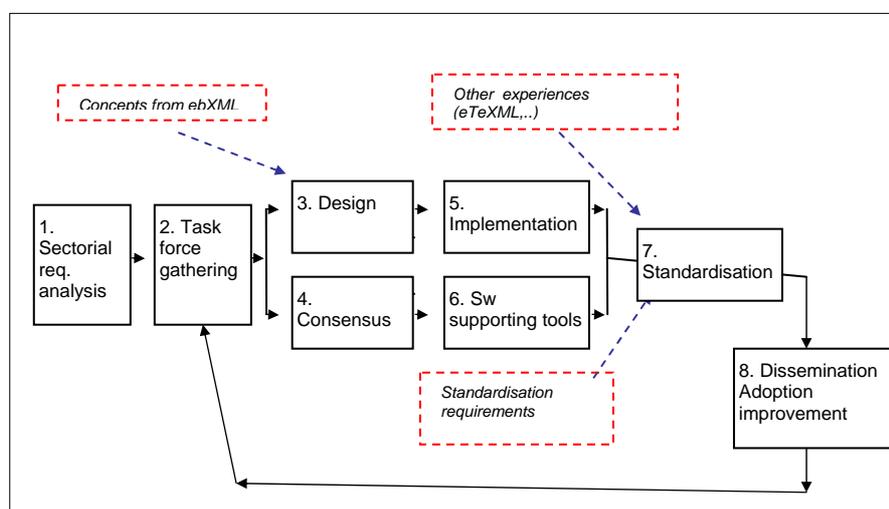


Figure 2. The textile-clothing standardisation life cycle (Gessa *et al.*, 2005)

The result of such approach has been a sequence of independently promoted initiatives that, *de facto*, implemented an iterative standardisation life cycle (see figure 2, Gessa *et al.*, 2005): after the first initiatives in 90s' (EDITEX, result of TEDIS project, TEDIS 92), the two industry associations, Euratex and CEC, jointly with EU Commission, CEN/ISSS and others actors like GS1 and ENEA promoted TexWeave for Textile/Clothing (TexWeave 05), CEN/ISSS FINEC for Footwear (EFNET 03, EFNET 05). In the meantime a number of 'user centric' demonstration initiatives and projects (like eTeXML, Visit, Moda-ML, EFNET2/3, CecMadeShoe, ShoeNet, TQR, IPSA,...) with a wide involvement of industry associations, prepared a background of analysis and specifications that was (almost) ready to be implemented by the industry.

4. The role of research for standards, the role of standards for research

It is worth to mention that, in parallel, the NMP Leapfrog Integrated Project (www.leapfrog-eu.org) had activities to provide new tools and methodologies to implement the concept of the Extended Smart Garment Organization (xSGO) model in the Textile/Clothing sector (Artschwager *et al.*, 2009) with the following objectives:

- reduction of misalignment between different organisations by managing models of the collaboration processes and agreements

- fast setup of collaborative procedures and customised data models.

For inter-organisational data flows, a shared semantics was derived from standard specifications (Moda-ML/TexWeave, ebXML) and a methodology and tools were developed to facilitate their adoption.

The outcome of this work was Knowledge Exchange Infrastructure (KEI), a conceptual framework supported by artefacts, software tools and a sectorial ontology (OntoModa) that, subsequently, has been published (www.moda-ml.org/moda-ml/Ontologies/Moda-ML/ModaMLOntology.owl) to support both semantic reconciliation applications as well as document (re-) engineering (DeSabbata *et al.*, 2009).

The integration of technological and organizational aspects while building enterprise networks and the creation of open communities that exploit standardization outcomes is an achievement of LeapFrog IP. Thus the contribution from Leapfrog to the subsequent standardisation initiatives (like eBIZ-TCF) can be resumed in:

- collaboration architecture as an open, non monolithic, composition of different contributions (methods, resources, solutions) at different levels, partially public and partially intrinsically proprietary
- networks of firms as systems of stakeholders with different roles and drivers
- KEI tools to simplify the definition of e-Business collaborations and to release artifacts and resources.

Similar initiatives, more focused on business processes and communication architecture were managed in parallel in the Footwear sector, CecMadeShoes project (www.cec-made-shoe.com), for example (Chituc 08a, Chituc 08b).

5. The role of eBIZ-TCF, an eBusiness harmonisation initiative

At the end of this path, in 2008, a new large scale initiative was launched to foster the adoption of eBusiness jointly (for the first time) in Textile-Clothing (TC) and Footwear (FW) through the call for tender “Harmonising eBusiness processes and data exchanges for SMEs in the Textile/Clothing and Footwear sectors in the Single Market” issued by DG Enterprise & Industry.

A consortium promoted by Euratex (coordinator, Textile/Clothing industry European association), CEC (Footwear industry European association) and ENEA in collaboration with GS1 and Hermes Lab answered with the eBIZ-TCF project (eBusiness for Textile/Clothing and Footwear, www.ebiz-tcf.eu).

First objective of the project was to systematize existing standards and experiences through the definition of a Reference Architecture for eBusiness in Textile/Clothing and Footwear sectors; it tackles distinctly downstream and upstream requirements for the supply chain with appropriate technological and



Figure 3. Map of eBIZ-TCF pilots across Europe (list on the web site).

methodological specifications related to data models, communication protocols and product classification:

- upstream, distinct sectorial business models and languages (Moda-ML, Shoenet)
- downstream, common use profiles for a generic eBusiness language (UBL) and adoption of product and party identification standards (GS1 GTIN and GLN).

Second objective has been to demonstrate the suitability of the Architecture for the sectors and obtain consensus from the stakeholders. During the project a public call received applications for pilots and, at the end, 17 were accepted with more than 150 organisations across 20 European countries (DeSabbata *et al.*, 2008, see figure 3).

In order to meet the requirements for interoperability in SMEs networks the project focused on three aspects:

- clear, free, easy to use documentation of the specifications (targeting different potential types of users) and availability of a set of related public resources (XML Schema, XSL, samples, technical user guides, use profiles, tools, economical benefit studies) and related tool for automatic documentation creation/maintenance/change management (eBIZ 09)

- adoption of use profiles and strict typing to reduce Redundancy and Uncertainty in the specifications in order to reduce the efforts a) to map internal processes and data models towards the specifications, b) to reconcile different implementations of the same specifications. A first method to measure these parameters was proposed (Brutti *et al.*, 2010)

- clear identification of the different layers of decisions (figure 4) that are necessary to reduce Redundancy and Uncertainty in the implementation: from the general standard model (UBL) to the sectorial use profile (eBIZ-TCF) to the inter-company agreement (firms through ebXML) (Brutti *et al.*, 2010).

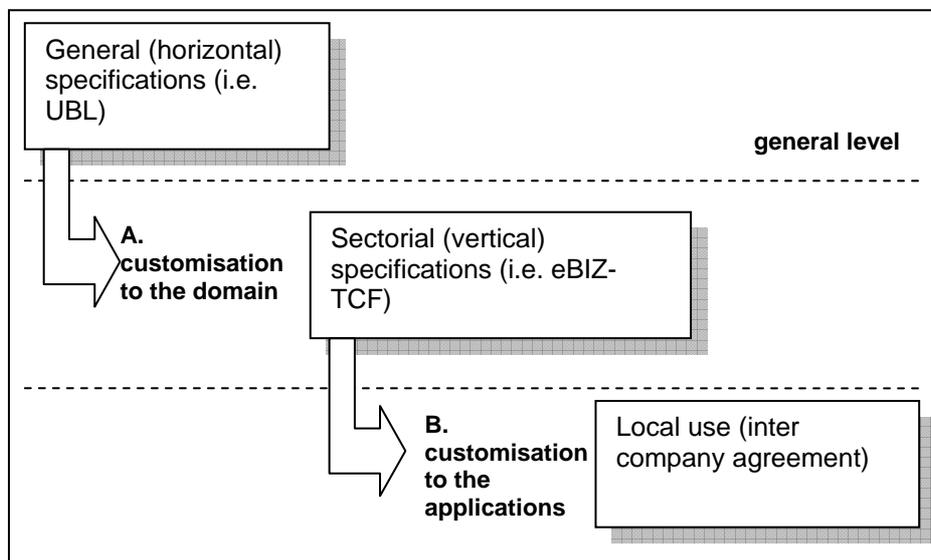


Figure 4. *Different layers of decision and specialisation/customisation (from Brutti et al., 2010).*

6. Conclusions: Learnt Lessons and the perspective

The methodologies for checking and self-evaluation during both the Use Profiles creation/maintenance process as well as during their implementation by the developers emerged as a relevant open issue, that eBIZ-TCF has only begun to tackle (Brutti10).

On the other side, for the first time, thanks to the common efforts of many actors (associations, European Commission, technology suppliers and research organisations) there is an architecture in place that is open and ‘standard-aware’ and

with a large number of adopters all around Europe; finally some lessons have been learnt:

- large scale adoptions of standards requires the contribution of a plurality of actors (industry associations, researchers, service or technology suppliers) when the presence of SMEs is predominant; unilateral actions cannot build a sectorial reference architecture (or application)

- specific sectorial requirements and skills availability are relevant in the implementation of standards and of interoperability technologies; that requires a relationships between technologies and industrial policies fostering their adoption

- a virtuous cyclic interaction between standardisation, research and technology uptake activities can benefit the capacity of industry to achieve their goals in the game of standardisation

- the issues of customisation and validation with 'light' tools and procedures are still open.

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