

# Product Classification and Description in Public e-Procurement: Are There Lessons to be Learned From Private e-Procurement?

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**Abstract:** Looking at recent developments in private e-procurement, automating processes is increasingly based on standard product classification schemes such as eCl@ss and UNSPSC. However, this trend is yet not reflected in public e-procurement to the same degree. This paper provides arguments for the existing gap concerning product classification and semantic interoperability. It compares the contributions of product classification and description to private and public e-procurement, and evaluates selected standards.

**Keywords:** Public e-Procurement, Interoperability, Standards

## 1. Introduction

In the EU, public sector procurement has undergone a paradigm shift in the last few years with government-based initiatives that fundamentally affect the way that government bodies perform their procurement activities. As a result of this movement, public e-procurement has drawn a lot of attention due to expectations towards reducing process costs, streamlining processes, shortening lead times, improving procurement services, and realizing reductions in procurement spending. Looking at recent developments in private procurement, we see considerable efforts to automating processes based on aligned, thus standardized descriptions of products and services being the object of all procurement activities.

A key instrument for achieving a common understanding of a product domain is classification by standard product classification schemes (standard PCSs). However, this current trend is yet not fully reflected in public e-procurement and its respective standard, the Common Procurement Vocabulary (CPV). This paper aims at providing arguments for the existing gap concerning product classification and semantic interoperability. We provide criteria for comparing the contributions of standards PCSs to private and public e-procurement. In addition, we evaluate two representative schemes, eCl@ss and CPV. By this comparison, we answer the question if there are lessons to be learned from private e-procurement. Our findings may help standards makers in developing “extended” schemes for public e-procurement.

The remainder of our paper is structured as follows. Section 2 describes the current state of public e-procurement in the EU. Section 3 introduces product classification and description, and relates it to the expected benefits of e-procurement by identifying more specific contributions. Based on this, the components of PCSs can be reconstructed. In Section 4 we emphasize the importance of standards for product classification, both in private and public e-procurement. Section 5 incorporates the previously discussed aspects by applying criteria for evaluating the status quo of existing standard PCSs. Eventually, we discuss in Section 6 related work. Finally, we draw conclusions from our findings.

## 2. Goals and Benefits of e-Procurement

### 2.1 e-Procurement in the European Union

e-Procurement across the EU is very much at an evolutionary stage. However, despite the variations in the adoption of e-procurement across member states, the trend towards its acceptance is strong, with the majority of national governments developing strategies to expedite the implementation of e-procurement projects. This diversity of government implementations

reflects the variety of commercially available *technologies, business models, and product coding (classification) schemes* (NECCC 2001).

For the purposes of this paper, we distinguish the e-procurement process between e-sourcing and e-ordering. Sourcing is the process by which an organization identifies, selects, and manages its suppliers for the pre-contract phases of the purchasing process (e.g., tenders, reverse auctions, stock markets). Ordering is the transactional process of creating and approving purchasing requisitions, placing purchase orders as well as receiving goods and services via e-catalogs.

## **2.2 Drivers and benefits of public e-Procurement adoption**

It has been suggested that the public sector is likely to benefit from the use of e-procurement solutions (Neef 2001). Those benefits are both tangible and measurable with direct or indirect effect on cash flow such as price savings, and intangible such as cultural change and enabling e-business into public sector. (Heywood et al. 2001) proposes that there are three potentially levels of benefit achievable from e-procurement: *Transactions*, focusing on e-enabling the purchasing process, *strategic sourcing*, using the newly aggregated control information to enable better and cheaper sources of supply, and *market transparency*, facilitating innovation and collaboration across the supply chain.

At this point it is important to note, however, that government agendas are typically more extensive and complex than those of private organizations where efficiency, cost reduction and time saving are sufficient justifications for e-procurement adoption. Within this context apart from increased efficiency in government operations, the adoption of e-procurement greatly assists in the reengineering of government business processes and can be viewed as a way that government can lead by example (Coulthard, Castleman 2001).

## **2.3 Differences between private and public e-Procurement**

Unlike procurement in the private sector, public sector procurement requires a bureaucratic procedure to be followed due to the nature of the institutions (Henriksen et al. 2004). A major characteristic of the public sector is the regulation of the procurement process by local, regional, national and international authorities. Regulation embraces “audit, accountability and compliance with national and international rules ensuring competition for supply and transparency in the award of contracts” (NAO 1999). For example, public procurement in the UK must be consistent with EU procurement directives, which provide a framework of rules for the procurement activities. These rules prevent EU member states from distorting competition in public procurement and discriminating on a geographic or nationality basis. Moreover, they help promoting the single European market.

The second priority of the public e-procurement adoption refers to that of the social responsibility of government through *sustainable* procurement. Sustainable procurement relates all “policy-through-procurement” issues – where public procurement is seen as a lever to achieve wider policy objectives. These include environmental or “green” issues; the creation of job places and wealth in regeneration areas; opportunities for Small and Medium Enterprises (SMEs) and Ethnic Minority Businesses (EMBs); fair trade and the inclusion of developing countries; adult basic skills; disability, race and gender equality; innovation; and the promotion of ongoing and contestable supplier markets. Policies aimed at meeting social objectives should be legal, transparent and effective within government (NAO 1999).

Undoubtedly public sector institutions have different objectives towards e-procurement and those cannot be seen simply as extensions of commercial e-procurement applications. The significance of this reality means that one of the first challenges for an e-procurement policy and standards framework is to recognize that within a public sector context e-procurement is more complicated than in the private sector. Public e-procurement represents an on-line environment involving the complex interactivity of public-private, private-private and public-public sectors rather than just a simple interface between government buyers and private sellers. Within this context a main objective of government policy in relation to its interactions with the business sectors should be to seek to promote and enhance efficient and affordable connectivity and interoperability.

### 3. Product classification and description

#### 3.1 Product-related information

Information on the products (and services) to be procured is essential both in e-sourcing and e-ordering. This information is critical to making the right procurement decision that incorporates selecting the right supplier and product as well as determining the conditions for the intended contract and order respectively. The term product classification and description (PCD) refers to two basic concepts of product-related information (CEN 2004): First, classification is an instrument to subdivide markets, industry segments, and its belonging products in classes of products. All products belonging to the same class fulfill similar functions and/or share a set of same attributes, thus they are similar or equivalent to each other. Second, product description underlines the importance of more detailed information that represents specific characteristics or functions of the respective product. Moreover, these two concepts supplement each other, since the product class determines many parts of the product description. The latter is implemented by defining class-specific *property lists*. Such a property list contains all properties that should be used to describe products belonging to the respective class.

Taking in mind that product-related information has to be delivered by suppliers, PCD must not be seen from the buyer's perspective only. Often suppliers need to meet buy-side requirements concerning product classification and description. However, e-procurement has to consider limitations of suppliers' capabilities in fulfilling these requirements as well as supplier-specific interests in classifying and describing products. Based on the consideration that both buyers and suppliers are stakeholders in the same problem, we extend the focus to e-sales processes being the supplier's view on e-procurement processes.

The key responsibility for product-related information belongs to suppliers by nature. This information is created, stored, and maintained in ERP and product data management systems. In addition, the product assortment, its structure and the way of describing products depend heavily on strategic goals, competitive advantages, and addressed markets. In the context of e-procurement, however, the need for *standardization* becomes evident. Only if suppliers and buyers commit to the same way of classifying and describing products, heterogeneities can be aligned and semantic interoperability achieved (Fensel et al. 2001). Standard PCSs aims at fulfilling this role.

#### 3.2 Contributions to e-Procurement and e-Sales

Standardized product classification supports multiple functions that benefit e-procurement and e-sales processes. These functions can be derived from (1) benefits of e-procurement, mainly related to buyers, (2) publications by vendors of standard product classification schemes, and (3) existing literature. Next, we compile the results of a review of these sources (CEN 2004; eCI@ss 2004; Fairchild, de Vuyst 2002) by identifying nine contributions:

Hierarchical search: Searching for products often follows a top-down approach by browsing through a hierarchy leading to the most specific level that finally leads to instances, thus actual products. Hierarchical search can be implemented due to the definition of product classes forming a class hierarchy.

Direct search: This search strategy works directly on class names. Since the scope of a product class can often hardly expressed by a single class name, additional keywords aim at improving the name-based search (i.e. synonyms, industry-specific terms, colloquial language).

Property-based search: If similar products are associated to the same class and this class comes with a property list, the search for relevant products can be detailed by specifying requirements on the property values. This search strategy is also called parametric search (e.g., find all screwdrivers with handle insulation corresponding to IEC 900 and length between 180 and 200 mm).

Product specification: Property lists are templates for the description of products. Therefore, it is predefined how to describe a product. Buyers can rely on this, if suppliers stick to the templates.

Product comparison: Based on the preceding contribution, standardized specifications open the ability to compare offerings by multiple supplier (multi-supplier catalogs).

Spend analysis: Due to the subdivision of markets and its products, all procurement activities are also segmented into these classes. Analysis of procurement spending can be based on the given class hierarchy, if it reflects markets appropriately. Performing spend analysis is often regarded as the most important benefit of a standard PCS, since it is a critical instrument of strategic procurement and already part of reporting functions in ERP systems. Benchmarking different procurement organizations is enabled as well.

Process management: Since procurement (and sales) processes often depend on the product being subject of this process, product classes can be used to map products to specific ways of executing the respective process. For instance, the responsibility of each purchaser in an organization can be expressed by referring to the class hierarchy. Another example is adding special process steps required when purchasing hazardous materials. The contributions to process management are of high importance for achieving the benefits of desktop (direct) purchasing systems which are part of e-ordering.

Description of contracts: Instead of referring to actual products the scope of procurement contracts can be described by naming respective product classes. Skeleton agreements can make use of this simplified procedure.

Description of assortments: Analogous to describing contracts, suppliers can provide information on their assortment by referring to standardized classes, especially those on higher levels of the class hierarchy. This information can be forwarded to marketplaces that implement PCS-based tools for searching for suppliers.

These contributions address various needs of e-sourcing and e-ordering. For instance, property-based search is only relevant to e-ordering systems, because the strategic perspective of e-sourcing does not include decisions of selecting single products. Table 1 determines the relevance of each contribution to e-sourcing and e-ordering.

**Table 1:** Contributions to e-sourcing and e-ordering

<b>Contribution</b>	<b>E-Sourcing</b>	<b>E-Ordering</b>
Hierarchical search	No	Yes, implemented in e-catalogs.
Direct search	No	Yes, implemented in e-catalogs.
Property-based search	No	Yes, implemented in e-catalogs.
Product specification	Yes, properties can be used for describing requirements on items of tenders, and for supplier bids.	Yes, implemented in e-catalogs.
Product comparison	Yes, properties can be used for comparing supplier bids.	Yes, implemented in multi-supplier e-catalogs.
Spend analysis	No	Yes, analysis of all orders.
Process management	No	Yes, management of all catalog-based procurement process.
Description of contracts	Yes, supports searching for tenders.	No
Description of assortments	Yes, supports searching for suppliers.	No

### **3.3 Basic components**

The previous discussion revealed significant differences between the contributions of standard PCS to e-sourcing and e-ordering. This does not imply that two specific PCSs should be used. Contrary, most standard schemes aim at supporting both types of procurement processes. However, an important question is what are the requirements on schemes that are truly suitable for these applications? From a practical point of view, this question can only be answered by evaluating the content quality, thus the suitability of classes and properties for the respective

purpose. Here we abstract from these domain-specific criteria by limiting our view to the structure, not the content.

We derive the basic components of standard PCSs from the previously determined contributions (table 2). For instance, hierarchical search requires the existence of a class hierarchy, while property-based search calls for property lists. This procedure can be seen as a reconstruction of the structure of PCSs, and results in four components: class hierarchy, keywords to class names, property lists, and uniqueness (real classification). The latter is also a requirement on the classification process; each product has to be assigned to one product class only.

**Table 2:** Relations between basic components and contributions

Contribution	Class Hierarchy	Keywords	Property Lists	Uniqueness
Hierarchical search	X			
Direct search		X		
Property-based search			X	
Product specification			X	
Product comparison			X	
Spend analysis				X
Process management				X
Description of contracts				X
Description of assortments				X

#### 4. Standards for product classification and description

As stated before, the benefits of product classification and description can only be achieved when suppliers and buyers commit to a standard PCS. Here the attribute “standard” does not only cover “real” standards created and maintained by standards development organizations (SDOs, e.g., ISO, IEC, ANSI, and DIN). Contrary, countless industry-driven, less formal initiatives and consortia have proposed standard schemes for their respective purposes.

In private e-procurement, the number of standard PCSs is still increasing, and the multiplicity of schemes has led to confusions among suppliers and buyers, since the competition between similar standards prevents the diffusion of a single standard, and limits expected network externalities (Dhai, Kauffman 2001). This is especially true for horizontal, international standards on which we focus here. In addition, the organizations behind these standards have seen significant changes in their strategic settings, business models, and services for supporting adopters.

The two most relevant standards as identified in (CEN 2005) are as follows:

- eCl@ss is being developed by a consortium of mainly German companies since the late 1990s (eCl@ss e.V. 2004). It has gained a significant relevance for e-procurement in Germany and many European countries. A key characteristic are its property library of about 5,000 properties and class-specific property lists for 10,930 product classes.
- UNPSPC, the United Nations Standard for Product and Service Classification, is the most known standard PCS due to its early start under the UN Development Program (UNDP 2005). Its coverage is very broad with 21% of its classes concerning services. Over the past four years, there were multiple changes in the organization that manages the standard. Due to this uncertainty, and partly because of the missing property lists, UNPSPC has lost some of its market share, especially in Europe.

Looking at recent developments in activities by standards makers, the importance of harmonizing existing schemes, committing to basic components and reference data models – especially the ISO 13584 standard (ISO 2001) – as well as integrating horizontal with vertical schemes has been emphasized. Another pathway is marked by adding property lists for product description in order to tap the full potential of standard PCSs. This requires even more resources for creating commonly accepted solutions, and maintaining these extended schemes. On the other hand, decision makers face changes in standardization processes, organizations, data models, exchange formats, and content; all these changes may cause uncertainty about the future directions in global standard PCSs.

In public e-procurement, the number of standard PCSs is much lower; actually there is often one standard for each region only. The reason is that the standard is set by the legislative institution in charge of the respective region. The limitation to a single standard can be attributed to the primary purpose of product classification in public procurement: The subdivision of procurement activities for statistical purposes, especially economic statistics. In the EU, the Common Procurement Vocabulary (CPV) has become mandatory for public e-procurement by Regulation No 2151/2003. CPV is being managed by Internal Market DG of the European Commission.

Another standard is the NATO Codification System (NCS). It is one of the oldest and largest standard PCSs in the world, being used in all NATO organizations, and many other countries. In addition, the NCS forms the basis for a database of more than 31 million parts supplied by 1 million suppliers. NCS is interested in offering its standard for purposes outside the military environment, though it remains to be seen if this can be achieved. Due to its restricted adoption for a specific type of organizations, NCS may be seen as a vertical standard, though its coverage is very broad.

The brief comparison revealed some significant differences in the standard setting process for private and public sector standards. In the private sector, it can be described by competition, since those standards will prevail that gain the highest acceptance. Contrary to that, public sector standards are the result of regulation that necessarily excludes competition.

## **5. Evaluation of selected standards**

### **5.1 Criteria**

Next, we select two standard PCSs for a detailed evaluation. However, all our criteria will address organizational, structural and technical issues only, since we are not able to evaluate the content quality and suitability of these standards. Due to their representative status for private and public e-procurement in Europe, we select eCI@ss and CPV.

The criteria of our evaluation can be subdivided into the following groups:

- Basic components (analogous to Section 3.3)
- Contributions to e-procurement and e-sales (analogous to Section 3.2)
- Supported languages
- Statistical metrics describing the class hierarchy: We perform some statistical analysis as introduced in (Hepp et al. 2005) concerning the number of top-level classes, total number of classes, and type of the hierarchy.
- Data model and exchange format: We check the data models and exchange formats for type and quality of documentation based on criteria described in (Leukel 2004).
- Standardization Process: We check the transparency of the standardization process.

### **5.2 Findings**

The main difference between the two schemes is the absence of property lists in CPV (see table 3). The reason lies in the main purpose of CPV, which is to describe the subject of procurement contracts; hence it is not intended to be used for e-catalogs (in which products are described on a detailed level). Contrary, the degree of abstraction is much greater (contracts vs. single products). CPV supports buyers and suppliers in the tendering process only, and buyers in performing spend analysis. From a European point of view, the CPV classification code enables participants to bypass existing language barriers. While CPV is available in all 20 official languages of the EU, eCI@ss is restricted to five languages.

**Table 3: Evaluation of eCI@ss and CPV – Part 1**

<b>Criteria</b>		<b>eCI@ss 5.1</b>	<b>CPV 2003</b>
Basic components	Class hierarchy	Yes	Yes
	Keywords	Yes	No
	Property lists	Yes	No
	Uniqueness	Yes	Yes

Criteria		eCl@ss 5.1	CPV 2003
Contributions to e-procurement and e-sales	Hierarchical search	Yes	Not intended for e-catalogs
	Direct search	Yes	Not intended for e-catalogs
	Property-based search	Yes	No
	Product specification	Yes	No
	Product comparison	Yes	No
	Spend analysis	Yes	Yes
	Process management	Yes	No
	Description of contracts	Yes	Yes
Supported languages	Description of assortments	Yes	Yes
	Number	5	20
	Languages	DE, EN, IT, FR, ESP	official languages of the EU

Table 4 presents the results of selected metrics. Both class hierarchies follow two different principles. eCl@ss defines a hierarchy of 4 levels, with 25 top-level classes (segments). The tree is balanced, since all segments and their sub-trees lead down to the lowest, fourth level; there are no leaves on higher levels allowed. If a segment requires a higher degree of specialization, thus a fifth level, then the segment has to be divided into two or more segments (the respective sub-tree on the second or third level has to be promoted to a new segment).

CPV builds a non-balanced hierarchy of 2 to 7 levels. For instance, there are four top-level classes with only 1 sub level (e.g., recovered secondary raw materials); hence the degree of specialization in these segments is very low compared to the other 24 segments with 6 sub levels (e.g., construction work with 796 classes). In addition, the class hierarchy is broader (61 vs. 25 segments) covering more markets and industries. This has to be attributed to the high amount of services classes (30% of all classes) whereas eCl@ss is mainly focused on physical goods.

**Table 4:** Evaluation of eCl@ss and CPV – Part 2

Criteria		eCl@ss 5.1	CPV 2003
Class hierarchy and evolution	Number of levels	4	2 to 7
	Number of classes	25,658	8,323
	Balanced tree	Yes	No
	Number of top-level classes	25	61
	Top-level classes with 1 sub level	-	4
	Top-level classes with 2 sub levels	-	4
	Top-level classes with 3 sub levels	ALL	7
	Top-level classes with 4 sub levels	-	11
	Top-level classes with 5 sub levels	-	10
	Top-level classes with 6 sub levels	-	24
	% of services classes	4%	30%
	% of classes in the 3 biggest segments	39%	27%
	Class growth	93% in 2 years 503 % in 5 years	1% in 6 years

Comparing the sheer number of classes does not necessarily contribute to assessing the coverage of relevant domains. For instance, representing markets based on classes depends on the degree of abstraction, the principles of the class hierarchy, and the use of properties (i.e. specific classes can be replaced by a generic class that describes characteristics by properties). Here we apply two metrics: First, the percentage of classes in the three biggest segments indicates whether the standard is a true horizontal one or horizontal just with regard to the existence of top-level classes, but focused quite vertically at the more detailed level. Surprisingly, both schemes are quite vertically focused (eCl@ss: 39%, CPV 27% of all entries). Looking at these figures, we have to state that eCl@ss is rather focused on the chemical industry; its biggest segments cover organic, inorganic chemical products, laboratory materials and laboratory technology.

Second, we determine the amount of new classes in the current version compared to previous versions. For a good coverage, any standard requires timely feedback about missing classes from the user community, and a standardization process that makes new elements available in a timely manner. The major difference here is that CPV seems to be very static (just 1% growth in 6 years). However, this could be caused by many factors. For instance: very good coverage already in CPV 1998, missing resources for maintenance, and lack of comments from standards adopters.

However, the most important factor is the standards setting process which requires a legislative initiative up to the Commission. Contrary, eCI@ss shows a tremendous growth in number of classes. However, a steady growth and significant modifications of the class hierarchy may also harm standards adopters, because re-classification of products becomes necessary.

Both standards do not provide an explicit conceptual data model, and both underlying data models are not compliant with the ISO 13584 standard for product classification schemes (see table 5). The data definitions are supplied in proprietary exchange formats which are easily processable due to their syntax (comma separated values, Excel spreadsheets). eCI@ss provides a syntax description for its 7 files (needed for property definitions and properties lists). Update information describing modification in the recent version is available only for CPV, while eCI@ss has delegated this service to a third-party.

User participation in the standardization process is quite different (see table 5). Companies may join the eCI@ss organization formally, a number of industry associations are involved in the definition of consensual classes and properties, and any individual or company is asked to submit change requests. On the other hand, CPV's transparency regarding the standardization process is very low.

**Table 5:** Evaluation of eCI@ss and CPV – Part 3

Criteria		eCI@ss 5.1	CPV 2003
Data model	Explicit model	(No)	No
	ISO 13584 compliance	No	No
Exchange format	Syntax description	Yes	No
	Format	CSV	XLS
	Number of files	7	1
	Update information	No	Yes
Standardization process	Transparency: Organization	Yes	No
	User participation	Membership, Industry Associations	No
	Change requests	Yes	No

## 6. Related work

Related work to product classification and description can be found in several fields such as e-procurement, product data management, and ontology engineering. Next we provide an overview of closely related work and outline their relevance to the matter of industry vs. public e-procurement:

- Early work on basic concepts of product classification evaluates standard PCSs from a business perspective. For instance, (Fairchild, de Vuyst 2002) examined the role of UNSPSC towards benefits of spend analysis.
- Recently, the importance of properties as a cornerstone of product classification has been underlined. For instance, (Ondracek, Sander 2003) proposed a “property based product classification” from that several, still different classification hierarchies for specific purposes can be built, though they are based on common, thus standardized properties. (Kim et al. 2004) developed a “semantic classification model” based on properties in order to enable an in-depth understanding of product classification. All this work is in support of semantically rich PCSs that incorporate well-defined properties. However, it is several steps ahead of the current state of PCSs for public e-procurement.
- Assessing the content quality of standard PCSs is another important subject. (Hepp et al. 2005) proposed a comprehensive set of content metrics that reveal characteristics and shortcomings in existing schemes. Their coverage of relevant standard PCSs is limited to those for private e-procurement (eCI@ss, eOTD, RNTD, and UNSPSC). However, the metrics itself are domain-independent, and we used them for our evaluation in Section 5.2.
- Schulten et al. introduced product classification as a reference domain for ontology engineering and the Semantic Web, and called for concentrated efforts to “design a generic model” for automated mapping between two different PCSs (Schulten et al. 2001). Concerning public e-procurement, this call and its extensive response in the research community (e.g., Beneventano

et al. 2004), is also relevant to CPV, because it may help integrating existing industry schemes into CPV, or provide mappings to it.

While a lot of existing approaches, concepts and models are technically oriented, and therefore to some degree independent from domains, we have to state that the field of PCD in public e-procurement is widely neglected in IS literature.

## 7. Conclusion

This paper provided arguments for the gap between private and public e-procurement concerning product classification. We first determined criteria for comparing the contributions of product classification and description to these two fields. The main contribution was the evaluation of two representative classification schemes, eCl@ss and CPV. This comparison tried to answer the question whether there are lessons to be learned from private e-procurement. Our findings may help standards makers in developing “extended” schemes for public e-procurement. The gap can partly be attributed to different objectives. CPV is still an instrument for spend analysis and tendering processes whereas classification in private e-procurement is directed at e-ordering based on e-catalogs. The comparison revealed some shortcomings as well as fundamental differences of CPV. From theory, CPV does not tap the full potential of product classification.

Concerning the structural components, eCl@ss must be regarded as a forerunner. However, the current adoption of the eCl@ss property lists in e-catalogs is quite low. Recently, eCl@ss has received a funding by the Federal Ministry of Economy and Labor of Germany. The Government has acknowledged the importance of eCl@ss, because it is critical to the success of German companies in conducting e-business on an international level. In addition, eCl@ss has announced to strengthen its efforts in becoming one of the visible, and eventually leading international standards.

Standards for private e-procurement are moving ahead and investing significant resources for creating and maintaining the schemes. Product innovation appears in almost all segments, thus continuous monitoring of markets and adjusting current standards is necessary. Due to these challenges, the need for harmonizing existing standards has become evident, and resulted in a promising CEN/ISSS project (CEN 2005).

Suppliers acting in both markets face another important problem: They need to know public e-procurement practice and rules for classification in addition to those in private environments. This causes additional efforts in classifying products. The vision to arrive at a universal PCS, as it is still assumed by CPV, does no more exist in private e-procurement. Therefore, public authorities could learn lessons from recent developments, and aim at cooperating closer with standards makers in private e-procurement. So, why should each standard maker reinvent the wheel when there are fond solutions available, or will be hopefully in the near future? This could help standards adopters as well and result in reduced efforts for product classification and description.

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