

# Software Parts Classification for Agile and Efficient Product Life Cycle Management

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## Introduction

- ❖ PLM applications can define software and firmware as parts and link them with their executables, but manufacturers require a more structured approach for classification.
- ❖ This paper aims to propose a structured approach for software part classification to help manufacturers manage software components effectively and efficiently.
- ❖ The proposed approach can aid sustainability and growth in the face of drivers such as globalization, pricing pressure, product complexity, and competition.

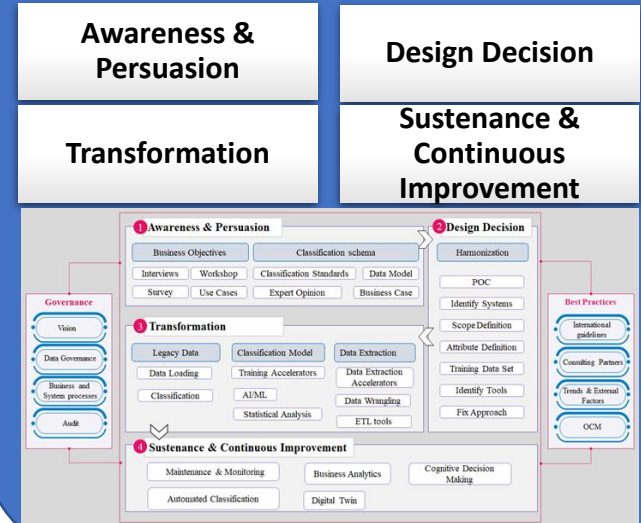
## Classification System

- ❖ Classification is crucial for companies to remain competitive in the digital age by improving supplier sourcing strategies, optimizing production, targeting buyers, and reducing transaction times.
- ❖ There are more than 20 international standards for the classification of products and services, all of which vary in objectives, data models, granularity, breadth of categories, and adoption depending on the region.
- ❖ All classification standards provide coded names and textual descriptions in noun-modifier combinations with different schemas, and various types of parts, such as hardware, electrical, mechanical, and software, are classified at different levels.

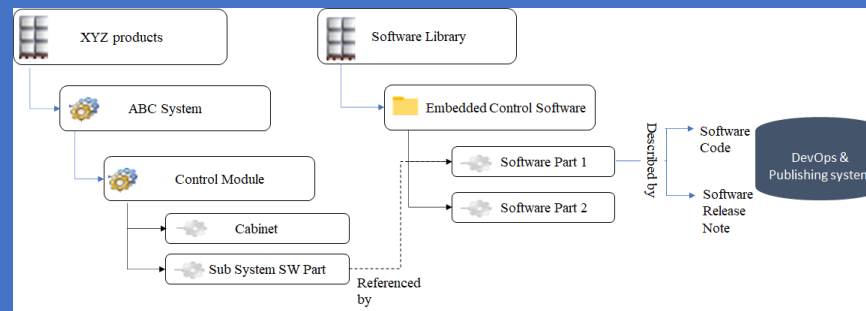
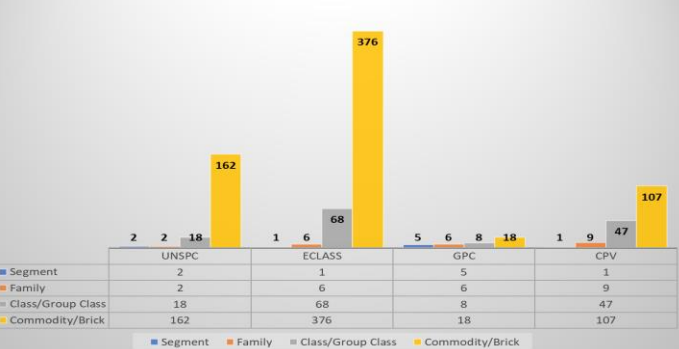
## Analysis Report

Criteria	ECLASS	UNSPC	GPC	CPV	ETIM
Standard Objective	Empower procurement, sales, engineering	Procurement	Buyers & manufacturers in cataloguing	Public procurement	Taxonomic classification of technical products
Classification or Product data dictionary	Product data dictionary	Classification	Product data dictionary	Classification	Product data dictionary
Schema (Classification level)	Four	Four	Four	Five	Two
Applicable Industry	Multi sector e.g., Automotive, construction, Electrical, Textile etc.	Multi sector e.g., electronic, Oil, Software, Energy, Healthcare etc.	Specific sectors such as apparel, consumer goods, etc.	Specific sectors e.g., Raw material, tourism, toys, Biotechnology, etc.	Specific sectors such as Electrotechnical, plumbing, shipbuilding etc.
Semantic definition and Attributes or feature availability	Partially available but rich in attributes	Not available	Available but number of attributes less compared to ECLASS	Not available	Partially available but rich in attributes
Language support	16	15	25	24	17
Geographic dominance	Germany & other European countries	US, Asia, Australia	Global	European countries	European countries
Adoption by companies	4000 +	2100 +	20L+	2.5L +	300+
Industry 4.0 (Digital Twin)	Provide library for machine readable characteristics	No references found	No references found	No references found	No references found
R&D specific features	ECLASS ADVANCED is mainly used in engineering and CAx areas.	No references found	No references found	No references found	Characteristics for 3D product data & Building information management

## Framework for software part classification



Software Classification



## Summary

- ❖ Standardized product data is crucial in the industry 4.0 era for leveraging digital twins and extracting business value across the vertically integrated value chain.
- ❖ Harmonized product characteristics and classification simplify R&D processes and streamline procurement, sales & marketing, material management, and manufacturing processes.
- ❖ Common engineering language or semantic system facilitates automation of CAE systems and robotic manufacturing processes, creating circuit diagrams, part lists, wiring lists, and assembly diagrams.
- ❖ As the number and variety of embedded software and firmware increases, organizations should explore new use cases for software part classification to support its adoption, and the proposed framework can be adapted and contextualized as per company needs for classification of other part types as well.