

Assessing Patent & Technological Trends using IPC and CPC Classification Systems

Luca FALCIOLA (Scibilis SRL, Belgium), Massimo BARBIERI (Politecnico di Milano, Italy)

Abstract

Patent classification systems are foundational tools for empirical research in intellectual property law, innovation economics, and technology policy. While the International Patent Classification (IPC) has long served as the standard reference framework for patent-based studies, the Cooperative Patent Classification (CPC) — jointly developed by the European Patent Office (EPO) and the United States Patent and Trademark Office (USPTO) — has evolved into a substantially richer taxonomy. Indeed, CPC classification, while used by many patent information professionals in daily activities, remains largely underutilized, if not simply disregarded, in academic and policy-oriented research.

Indeed, when parallelly reviewing the latest CPC-to-IPC concordance files(a) and the IPC-based categorization of patent documents in 35 technological areas (as defined in a report prepared by U. Schmoch for WIPO in 2008(b) that is still used by this and other institutions), we observe that:

- In addition to CPC-specific Section Y, CPC contains further 2 additional classes (D10 for textiles; F05 for engines or pumps) and a total of 15 subclasses and more than 1,700 additional groups that are absent from both IPC and the IPC-based categorization of patent documents in technological areas (ranging from food technologies to cross-cutting vehicle systems);
- IPC itself contains 8 subclasses that have been added and used only after since 2017;
- CPC currently contains over 253,000 subgroups compared to fewer than 79,000 in IPC, with only approximately 31% of CPC subgroups being identical to IPC ones;
- The additional subgroups are associated to the new CPC-specific (sub)classes (more than 24,000), to new CPC-specific groups within existing subclasses (more than 48,000), to further CPC-specific subgroups that improve precision of existing IPC groups (more than 102,000).

This study presents factual evidence about how the exclusion of CPC analysis from trend analyses in the empirical literature may have significant implications not only for patent searching (using either classical or AI-assisted approaches) but also for economic and innovation studies. For instance, a quick analysis of IPC and CPC sections that are used to classify in PCT applications filed between 2015 and 2024 that are both IPC and CPC categorized shows:

- Variable level of overlapping categorization of such documents even at this highest categorization level, - A percentage of patent documents under the same Section being higher in CPC than IPC.

(see fig.1A and 1B below, without or with concurrent presence of Section Y categorization)

This evidence appears significant, even without considering the CPC-specific subclasses or (sub)groups that add data granularity and the empirical observations that more CPC than IPC codes are generally associated to a single patent documents. Thus, the IPC-only analysis of patent production by technological areas may lead to conclusions that are different when the same classification subclasses or (sub)groups are used to search within parallel CPC classification that are present in the same patent dataset.

The study further pursues the analysis in PCT applications that have been filed between 2015 and 2024 by showing the most highly represented CPC subclasses within the classical IPC-based technological categorization. Crucially, EPO data extracted from the EP Full-text database reveal a steady increase in granted European patents associated with CPC-specific subclasses — rising from 12,093 in 2022 to 16,197 in 2025 — now approaching the volume of EP patent applications associated with such CPC-specific subclasses that are published in the same year (18,557 in 2025). This trend appears further amplified by the expanding

role of the Chinese National Intellectual Property Administration (CNIPA), now the leading authority in CPC assignments globally.

Thus, we consider important to critically assess the limitations of most widely used IPC-based categorisation frameworks —still grounded in a sectoral taxonomy established in 2008 — and elaborate new models and analytical pathways to integrate CPC-specific data into patent trend methodologies. Such improved, technically updated approaches may support more robust methods for innovation monitoring and technology forecasting, as well the development of next-generation AI-based patent retrieval systems.