



PRESENT STATE OF IOT
AND 3D PRINTING IN
EUROPE AND STATUS OF
PATENT APPLICATIONS IN
THE FIELD



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CONTENTS

- Internet of things
 - Brief general review / introduction
 - IoT at the EPO
 - IoT: ICT related issues

- 3D printing
 - Brief general review / introduction
 - 3D printing and patents
 - 3D printing at the EPO



“INTERNET OF THINGS” (IoT)

- Network of physical devices embedded with electronics, software, sensors, actuators and **connectivity** which enables these objects to connect and exchange **data**
- IoT will consist of about **6 billion objects by 2020 in EU28 (30 billion worldwide) > Internet of Everything**
- EU28 market value of IoT will reach **€1.2 trillion by 2020 (7 trillion worldwide)**
- Inherently linked to information and communication technology (“ICT”)
- Also referred to as or being part of the “fourth industrial revolution” (4IR)



“SMART CITY OF SANTANDER”

- Project financed by European commission
- 20,000 sensors in city (175,000 citizens)
- Car parking system covering all parking places and directing drivers to a free place
- Weather sensors for calculating water need of plants in public parks
- Garbage bins calling garbage collection if full
- Street lights only switching on if someone passes
- Shops informing nearby people about special offers
- Apps connecting citizens with government, e.g. reporting damaged streets...



IoT - MAIN TECHNOLOGY SECTORS

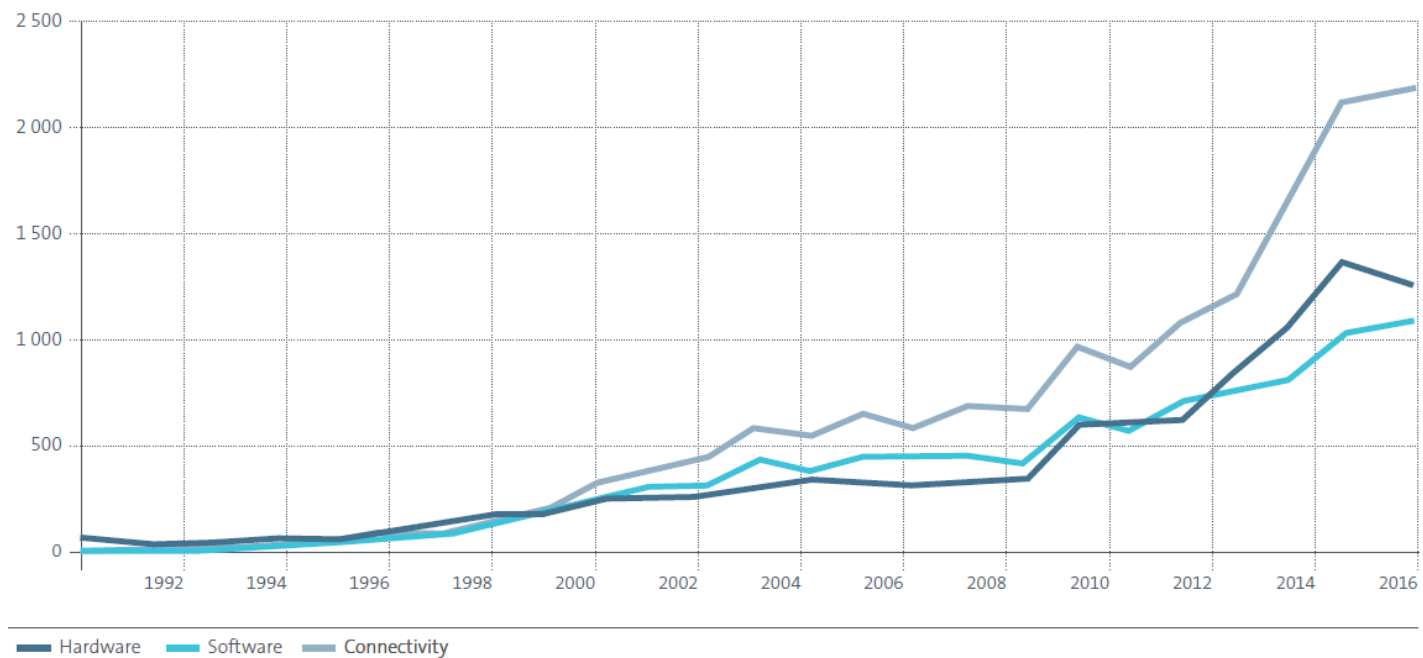
- “Core technologies”
 - include standard ICT (software, hardware, connectivity)
- “Enabling technologies”
 - include e.g. analytics, user interfaces, AI, security...
- “Application domains”
 - include e.g. personal, home, vehicles, manufacture
- Overlaps possible and increasing



“CORE TECHNOLOGY” AT THE EPO

- Between 1978 – 2016:
 - 15775 application in connectivity
 - 10390 application in hardware
 - 9910 application in software

Patent applications in core technologies 1990-2016

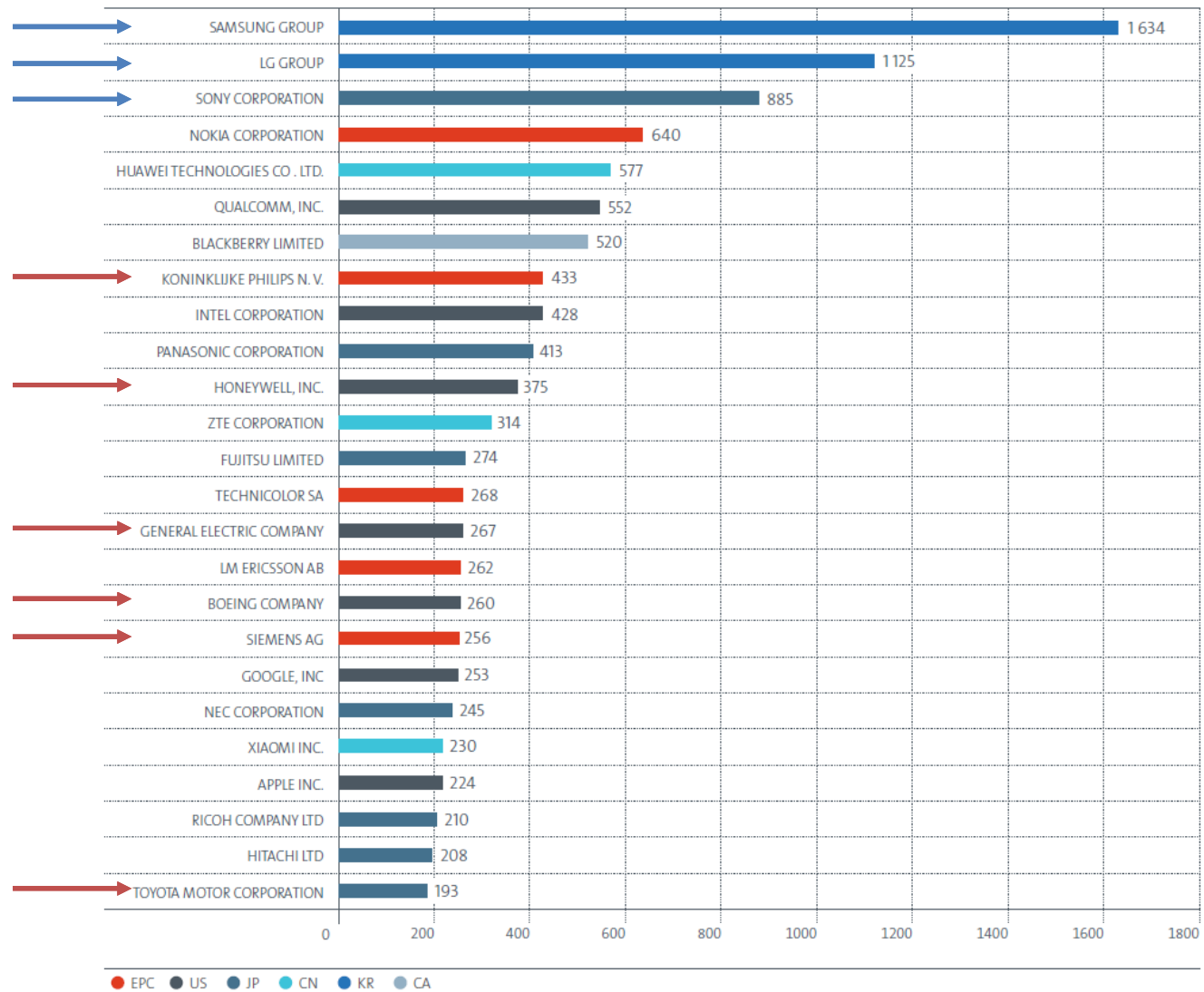


Source: European Patent Office



IoT - MAIN APPLICANTS

Top 25 4IR applicants at the EPO 2011-2016





INTERNET OF THINGS AT THE EPO

“Over the last few decades we’ve developed very well-established Computer-implemented invention (CII) patenting procedures and an associated policy capable of dealing with the increasing number of applications for 4IR technologies (by definition all 4IR inventions are computer-implemented inventions).”

[\(https://blog.epo.org/patents/role-epo-4ir/\)](https://blog.epo.org/patents/role-epo-4ir/)

Since about 2002, more than 35 % of total filings at the EPO are CII patents.



Business as usual...



COMPUTER IMPLEMENTED INVENTIONS (CII)

“The EPO can be used as a ‘gold standard’ for patentability: if the invention clears the EPO’s requirements, it is likely to be allowable in Japan, China and the US.”

LEXOLOGY publication by Barker Brettell LLP - David Combes
(26/3/2017)



Rather strict requirements at EPO



“Two Hurdle Approach”



COMPUTER IMPLEMENTED INVENTIONS (CII)

EPO Guidelines: Index for CII

<http://www.epo.org/law-practice/legal-texts/html/guidelines/e/j.htm>

Europäisches Patentamt
European Patent Office
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Home Searching for patents Applying for a patent Law & practice News & issues Learn

Home > Law & practice > Legal texts > Guidelines for Examination

General Part

Part A – Guidelines for Formalities Examination

Part B – Guidelines for Search

Part C – Guidelines for Procedural Aspects of Substantive Examination

Part D – Guidelines for Opposition and Limitation/Revocation Procedures

Part E – Guidelines on General Procedural Matters

Part F – The European Patent Application

Part G – Patentability

Part H – Amendments and Corrections

Index for Computer-Implemented Inventions

Guidelines for Examination

Table of Contents - Guidelines for Examination

Index for Computer-Implemented Inventions < >

Index for Computer-Implemented Inventions

A computer-implemented invention (CII) is one which involves the use of a computer, computer network or other programmable apparatus, where one or more features are realised wholly or partly by means of a computer program.

The following collection of hyperlinks is provided in order to facilitate access to the sections of the Guidelines for Examination in the EPO which give instructions particularly useful for the search and examination of CII.

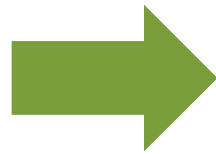
It is noted that this collection is not a separate publication about CII. Instead, following a hyperlink will lead to the section of the most recent and applicable version of the Guidelines which has the stated number and title.

The collection of sections essentially comprises the teaching about assessing patentability requirements, in particular in case of claims comprising a mix of technical and non-technical features, which are common in CII. Sections providing teaching about how to evaluate features related to the list of **Article 52(2)** are included as well as sections describing the search practice and requirements of **Articles 83**



IOT, ICT, SEP, FRAND, PLP, PPLP, NPE

One main aspect of IoT is ICT



Specific issues known from ICT will swap over to all IoT areas

- Standard essential patents (SEP)
- FRAND (“fair, reasonable and not discriminatory”)
- Patent pooling
- Patent licencing packages (PLP)
- Packages of PLPs => PPLP
- Aggressive litigation strategies (“smartphone wars”)
- Non-practising entities (NPE)



IMPORTANCE OF IOT IN EUROPE

- European commission is well aware of importance of IoT (“Digital single market”)
- Many studies have been carried out, including studies in the IP field
https://ec.europa.eu/growth/industry/intellectual-property/patents/standards_en
- SEP and FRAND issues are acknowledged
- Several decisions of European Court of Justice
Huawei / ZTE, <http://curia.europa.eu/juris/liste.jsf?num=C-170/13>
- “Communication from the Commission to the Institutions on Setting out the EU approach to Standard Essential Patents”
<https://ec.europa.eu/docsroom/documents/26583>



3D-PRINTING

Additive manufacturing, also referred to as 3D printing, is a manufacturing method in which material is added layer-by-layer to create products.

Material is only used where it is needed to define the product, in other words, a near-net shape is obtained. This is in contrast to traditional subtractive manufacturing, by which the product is obtained by taking away material locally from a larger block.



MATERIALS USED IN ADDITIVE MANUFACTURING

Metals	Polymers
Stainless steel Titanium Aluminium Nickel Co-Cr Cooper Noble metals	Polyethylene (PE) Polypropylene (PP) Polyetheretherkethone (PEEK) Polyetherkethonekethone (PEKK) Rubber Polyvinyl chloride (PVC) Polyamides (e.g. nylon12)
Ceramics	Biomaterials
Alumina Silica Stabilised Zirconia Silicon nitride Graphite Fullerenes	Cell material Hydroxyapatite Peptides Proteines Polysaccharides poly lactic-co-glycolic acid (PLGA) Biofilms



3D-PRINTING PATENT DEVELOPMENT

First patents on 3D-printing from Charles W. Hull (now 3D Systems Inc.)

US 638,905 08.08.1984



EP0171069 06.08.1985

EP0681906 30.10.1990

EP0852536 27.09.1996



US 638,905 FAMILY INFORMATION



Source: www.lense.org



Approximately 8,000 utility and design patents have been issued that relate in some way to additive manufacturing or rapid prototyping.

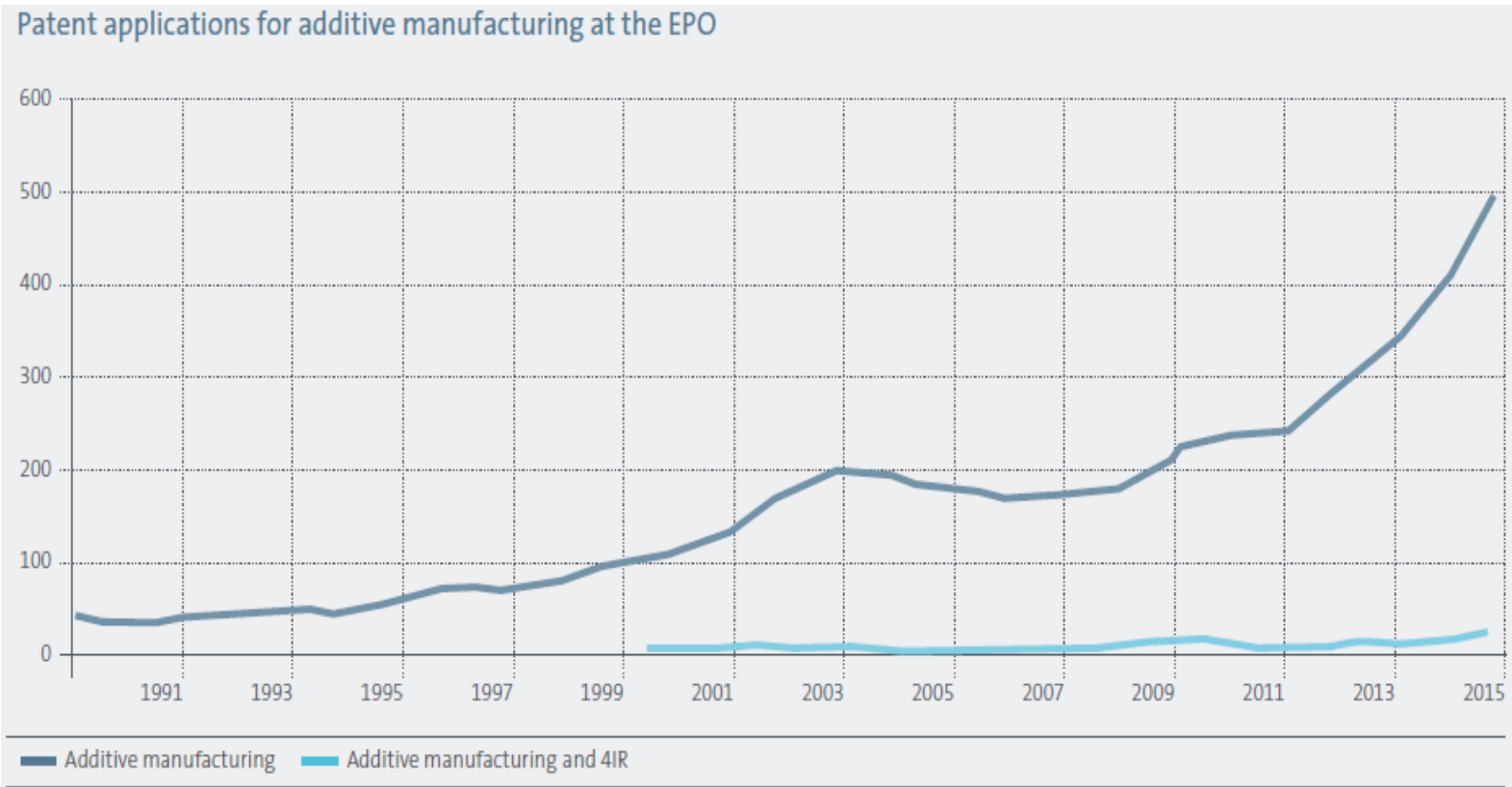
Since 2000, approximately 4,000 applications have published that relate in some way to 3D printing. New applications are being filed all the time.



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- From 2002 to 2014, about 225 early 3D printing patents expired.
 - About 16 key patents relating to 3D printing processes called Material Extrusion, Powder Bed Fusion, and Vat Photopolymerization expired in 2013-14.
 - An expired 3D printing patent gives only the right to use that specific 20-year-old technology.



DEVELOPMENT OF 3D-PRINTING PATENT APPLICATIONS AT THE EPO



source: European Patent Office



DEVELOPMENT OF 3D-PRINTING PATENT APPLICATIONS AT THE EPO

- Inventors from European countries (50.5% of patents filed at the EPO in 2011- 2015) and the US (32.2%)
- Up to 2009, only 2% of inventions in 3D-printing incorporated digitisation and networking (4th Industrial Revolution)
- Between 2010 and 2015, this proportion rose to 3.5%, indicating that they are likely to become more important in the future.

Source: European Patent Office



**THANKS TO THE
AUDIENCE!**

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