



Europäisches
Patentamt
European
Patent Office
Office européen
des brevets

Patents and Industry 4.0

EPO practice for CII - Computer Implemented Inventions



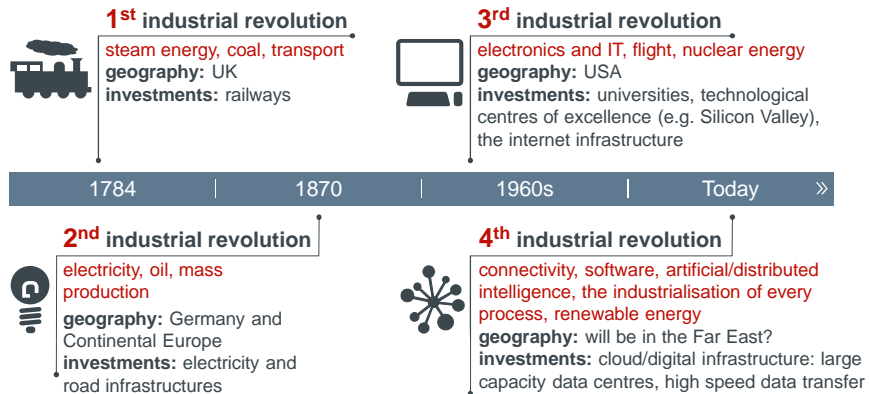
Koen Lievens – CII GL Workgroup Sector ICT April 2018

Patents and Industry 4.0 Computer Implemented Inventions (CII)

Agenda

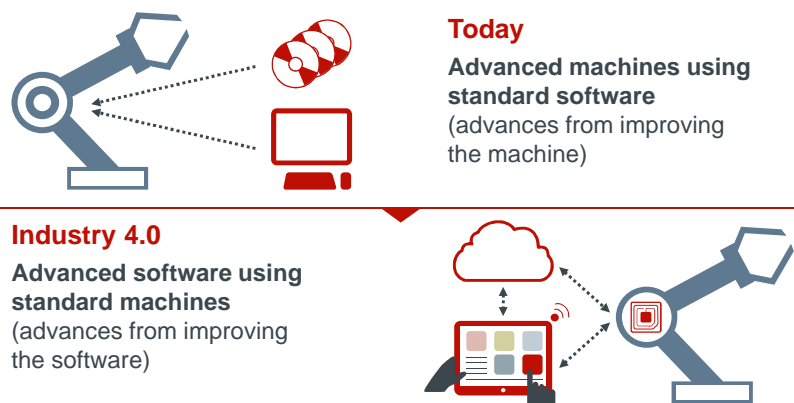
1. Industry 4.0 – IoT – IoE
implications for society and IPRs
2. CII - introduction - definition - examples
EPO as Benchmark: well-established and stable practice
3. Two-Hurdle Approach - schematic overview and legal basis
examples
4. CII Guidelines and CII Index
guidance for technicality and allowable claim forms
5. Points of attention when drafting patent applications for CII

Industry 4.0 in the industrial landscape



European Patent Office

Industry 4.0: it's all about software



European Patent Office



European Patent Office



EUROPEAN INVENTOR AWARD 2016
NON-EUROPEAN COUNTRIES

Hugh Herr
Biomechatronic leg joints

European Patent Office



European Patent Office

From Industry 3.0 to Industry 4.0

Industry 3.0

A computer in every home.



Industry 4.0

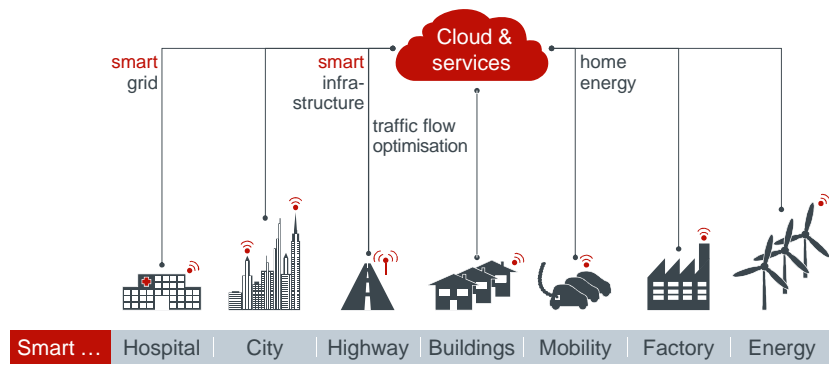
A computer in every object.
And connected.



One person, 100s of CPUs
(on wearables, medicine dispensers,
watch, sports equipment etc.).

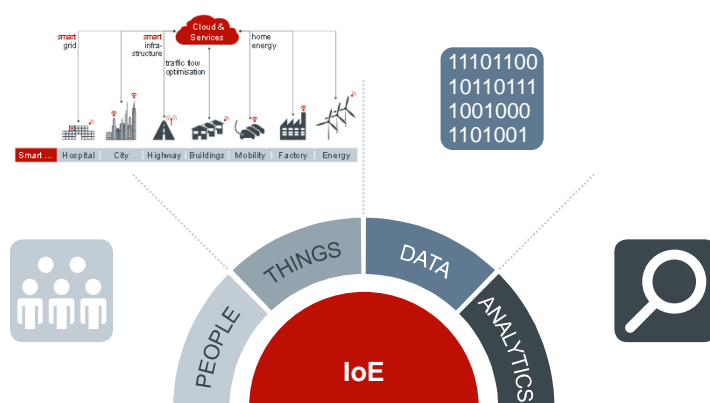
European Patent Office

The Internet of Things (IoT)



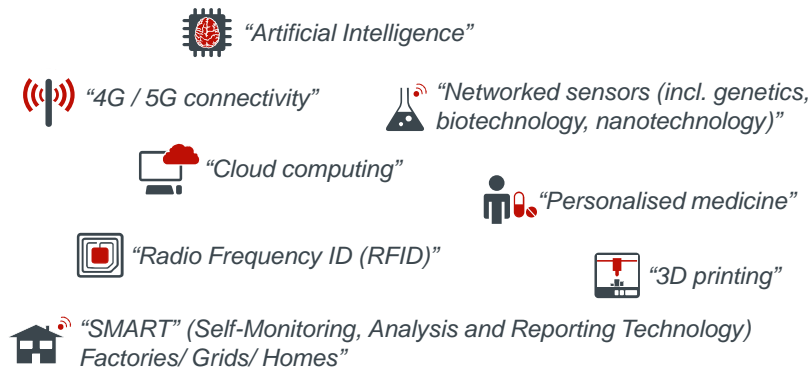
European Patent Office

Internet of Everything (IoE)



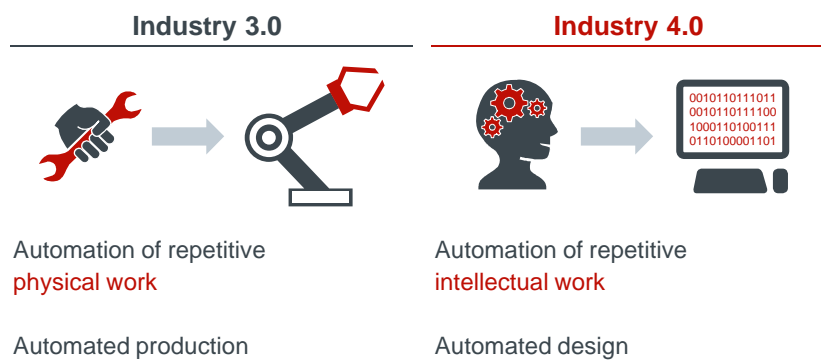
European Patent Office

Examples of Enabling Technologies/ Areas for Industry 4.0 (all software-driven)



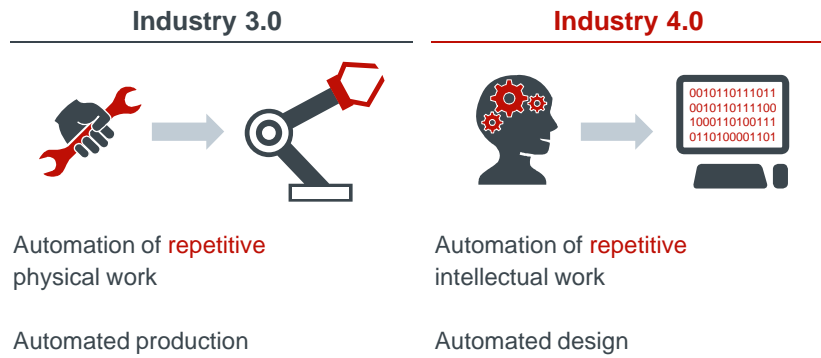
European Patent Office

From Industry 3.0 to Industry 4.0



European Patent Office

From Industry 3.0 to Industry 4.0



European Patent Office

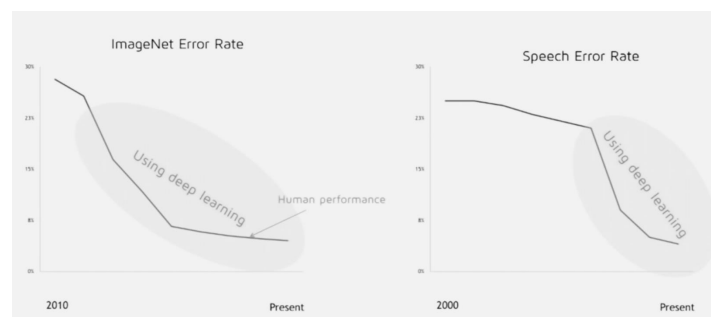
AI – Artificial Intelligence - The rise of Deep learning

§ **1959**: Checkers– Arthur Lee Samuel

§ **1997**: Chess – Deep Blue vs Kasparov

§ **2011**: NLP – Watson vs Jeopardy

§ **2016**: Go – AlphaGo



European Patent Office

Page 14

Implications for society

Threats:

- § Entire business sectors disappear or change dramatically (sales departments, analysts, news, taxi drivers, insurance brokers, accountants, bank services, entertainment ...)
- § Labour market disruption – growing income gap – need only top level (leaders) and bottom level (cleaning, catering, security, etc.)
- § No office job is safe: if it is routine it will be automated
- § Inadequate education systems (education cycle > technology cycle)
- § Western world may lose centrality
- § Privacy, security and jurisdiction issues (e.g. taxation)



European Patent Office

Implications for society

As well as opportunities:

- § New business models – e.g. “Uberisation”
- § Creative destruction will bring about significant efficiency improvements
- § Huge, global market potential
- § Talent, education, knowledge more important for success rather than capital and labour
- § Past industrial revolutions have created more jobs than they destroyed – rather than destroying jobs, automation redefines them
- § Transparency – democratisation of information distribution



European Patent Office

Implications for IP (1)

Industrial revolution → IP revolution

The IP / licensing system today is still adapting to Industry 3.0



- § Patents and standards, open Source, software, copyright ...
- § Fast development cycles (weeks to months) vs longer granting cycles (months to years). No need for 20 years protection?

The meaning of fundamental concepts will be challenged:

- § Concepts such as “industrial”, “technical”, “aesthetic”, “abstract”, “mental act” will become even more crucial to understand within the patenting process.
- § Who/what is an “inventor” (99% machine invention)?

European Patent Office

Implications for IP (2)

Further steps to adapt to Industry 4.0 – major IP issues:



- § Networked / territorial aspects. Where is the innovation produced or put into practice? Need for more regional, global protection.
- § Increasing inventions in virtualised level – disconnected from the physical object
- § Clarity on patenting of software (Computer Implemented Inventions - CII)
- § Multitude of data stakeholders (mining, hosting, reporting, analysing ...)

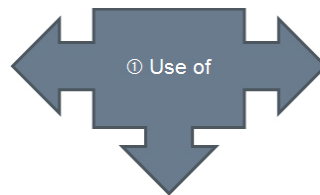
European Patent Office

The EPO is Well Prepared for Industry 4.0



- § Strong recruitment of a highly skilled workforce with high retention
- § Rigorous quality control (entire patent grant system ISO9001 certified)
- § Searches delivered within 6 months
- § Examination to be completed within 12 months and opposition within 15 months
- § Interdisciplinary technical divisions of 3 examiners for each application
- § Annual improvements to the CII content of the Guidelines for Examination
- § Re-organisation of ICT sector under one management team
- § Creation of specialised Industry 4.0 directorates and teams
- § Focus on CII training throughout the entire EPO operational area.

Computer Implemented Inventions – a definition



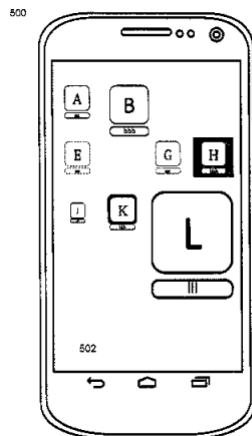
, The features of the inventions are realised wholly or partly by means of a computer program.

Examples

A program-controlled ...

- fault tolerance scheme
- washing machine cycle
- car braking system

Computer Implemented Inventions – a typical example



“A method of displaying applications on a mobile device, comprising....”

§ mainstream CII:

“computer-implemented method”

§ functional features implemented in s/w

§ technicality – presentation of information

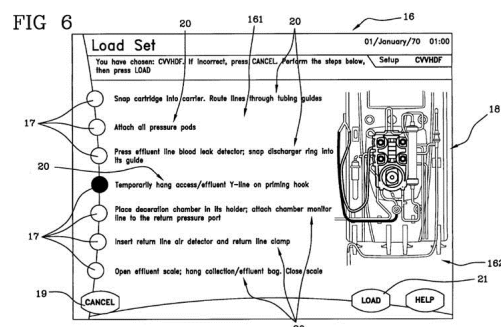
Computer Implemented Inventions - MCT example

“A user interface for an extracorporeal blood treatment machine, comprising ...”

§ involving special purpose h/w

§ technicality

§ presentation of information



CII is a KEY area of innovation

The economic impacts of
computer-implemented inventions
at the European Patent Office



Fraunhofer
ISI

Rainer Frietsch, Peter Neuhäusler,
Klaus-J. Melullis, Oliver Rothengatter,
Sonia Conchi



June 2015

ISBN: 978-3-945185-02-5

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

§ “In total, almost 1,4 million jobs were directly or indirectly dependent on CII in 2010 in Germany. These are 3,9 % of total employment.”

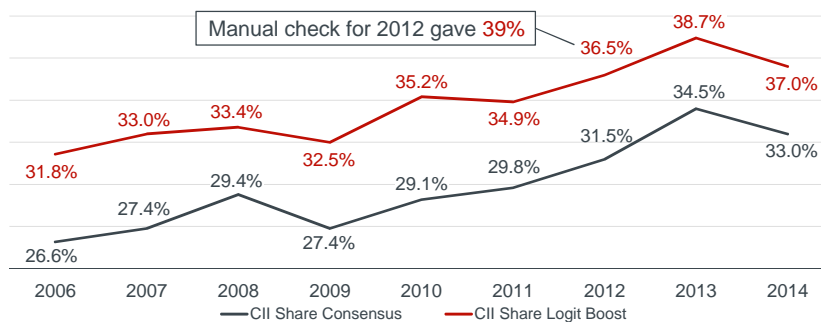
§ “In the manufacturing sector 14,2 % (abs. 963,000) of the jobs are dependent on CII”

European Patent Office

Page 23

CII share in medical technologies

Percentage of European patent applications in the field of medical technology
claiming a computer-implemented invention – earliest priority year (2006-2014)



European Patent Office

EPO practice - Worldwide Benchmark for patentability

1. CII is KEY area

- innovation
- growing number of applications
- many fields impacted

*all technical fields
prepared to handle CII*

2. EPO is worldwide benchmark in CII

- we take the lead
- key aspect of our quality
- harmonised approach for legal certainty and predictability

*EPO follows the trends
in technology*

*like subject matter
treated in the same way*

3. Full management support and Quality Cycle

- “do what we say”; ISO9001

*predictability is key to
our quality*

4. CII Guidelines Workgroup

- reinforce standing practice in the Guidelines; clarify where appropriate
- cross fields harmonisation for legal certainty
- clarification, training, managerial commitment

European Patent Office

Page 25

EPO practice – Worldwide Benchmark for Patentability



Search

Website

Patents

Home

Searching for patents

Applying for a patent

Law & practice

News & issues

Lea

Home > Law & practice > Legal texts > Guidelines for Examination > Index for computer-implemented inventions

European Patent
Convention

Official Journal

Guidelines for
Examination

Index for computer-
implemented inventions

Archive

Examination at the EPO
as PCT Authority

Extension/validation
system

Guidelines for Examination in the European Patent Office

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's.

European Patent Office

Page 26

EPO practice is Worldwide Benchmark “EPO used as “Gold Standard” for patentability”

LEXOLOGY publication by [Barker Brettell LLP](#) - [David Combes](#) (21/3/2017)

*“Expert systems that are applied in a technical field are likely to be patentable, provided that the features that make them work are novel and inventive. **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. Having said that, some offices have a lower bar for computer implemented inventions than the EPO.*

Applications that describe computer implemented inventions should:

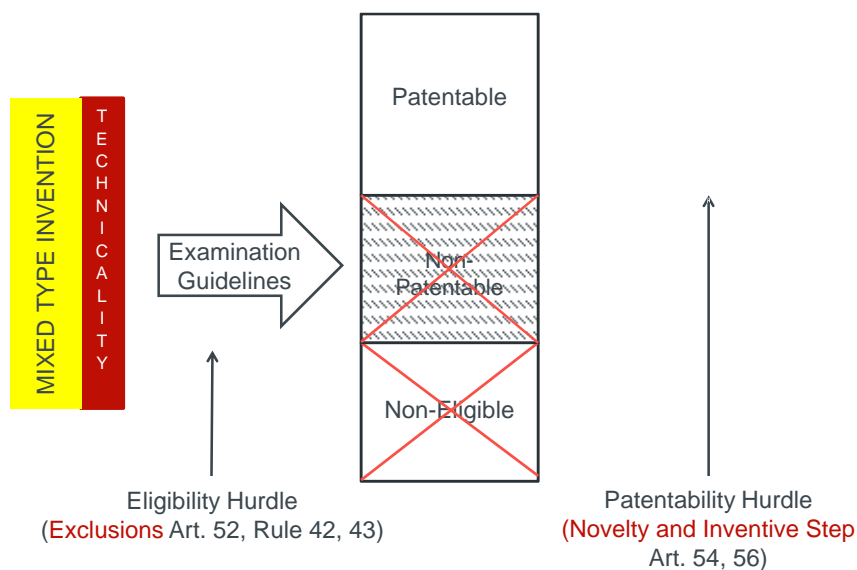
- ★ *always emphasise the technical nature of the invention,*
- ★ *and make clear what technical problem is solved by the invention.*
- ★ *Discussions of different application areas, and effects that go beyond the normal functioning of a computer should be explicitly mentioned.”*

<http://www.lexology.com/library/detail.aspx?g=b150f084-2a4c-4959-8505-8fd7ddcb8e9d>

European Patent Office

Page 27

CII “Mixed Type” Inventions – Two Hurdle Approach



European Patent Office

Page 28

CII “Mixed Type” Inventions – Two Hurdle Approach

§ 1st hurdle: Exclusions (Art. 52, Rule 42, 43 EPC)

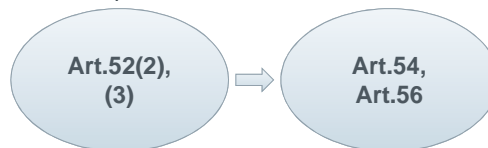
Low Threshold

The claimed subject-matter must have a **technical character**. But claims may contain a mix of technical and non-technical features, in which case:

High Threshold

§ 2nd hurdle: Novelty and Inventive Step (Art. 54, 56 EPC)

The presence of an inventive step may only be supported by those features of the claimed invention which contribute to its **technical character**, i.e. those feature which contribute to the solution of a **technical problem** by providing a **technical effect**. There must be a non-obvious **technical contribution** over the prior art.



European Patent Office

Page 29

CII “Mixed Type” Inventions

FIRST HURDLE PASSED?

- § *'A method of encouraging customers to be loyal buyers by giving a discount on future purchases'*
- § *'A computer with a database of customers who have previously purchased And applying a discount to any subsequent purchase'*
- § *'A computer-implemented method of encouraging customers to be loyal buyers by giving a discount on future purchases '*
- § *'A program to do the method of encouraging customers to be loyal buyers by giving a discount on future purchases '*

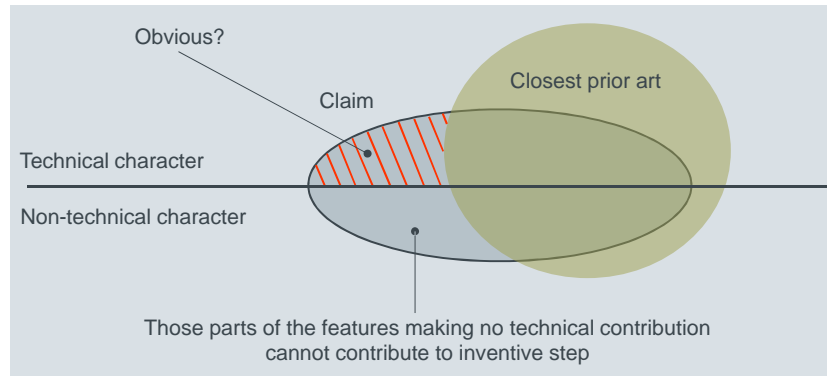
???

European Patent Office

30

CII Claims: 2nd Hurdle

2nd HURDLE = HIGH THRESHOLD



European Patent Office

Page 31

CII “Mixed Type” Inventions

FIRST and SECOND HURDLE PASSED?

- a. a system for a vehicle, coupling the fuel indicator and the GPS navigation device of the vehicle, and indicating to the driver the closest fuel stations when the fuel level falls below a predetermined threshold.
- b. a smartphone comprising a social networking application, the application indicating to the smartphone owner the persons in his immediate vicinity speaking a language that the smartphone owner speaks.
- c. a method of allocating seats to passengers in an aircraft, wherein passengers with similar interests are allocated adjacent seats.

European Patent Office

Page 32

CII Claims: G-VII, 5.4.2

Examples illustrating PSA for mixed-type inventions

Four specific examples adapted from case law:

1. Method of facilitating shopping on a mobile device (T 1670/07 and T 279/05)
2. A computer-implemented method for brokering offers and demands in the field of transporting freight (T 696/06)
3. A system for the transmission of a broadcast media channel to a remote client over a data connection (T 102/08)
4. A computer-implemented method for the numerical simulation of the performance of an electronic circuit subject to 1/f-noise (T 1227/05)

CII Patents = Strong Patents EPO is Benchmark

§ “Technicality” analysis: crucial step in Patentability Assessment:
determining the features which contribute to the **technical character** of the invention on the basis of the technical effects achieved in the context of the invention.

§ Detailed Guidance on **“Technicality”** in Sections G-II, 3,* of the Guidelines:

- 3.5.1: mental acts (11/2018)
- 3.5.2: business methods (11/2018)
- 3.5.3: games (11/2018)
- 3.6: programs for computers (11/2018)
- 3.7 and 3.7.1: presentations of information (POI) and GUIs (11/2017)
- 3.3: mathematical methods (11/2018)

§ Current Practice Clarified and Reinforced - **no change of Practice**

Allowable claim formulations for CII

Guidance on allowable claim formulations for CII
in [F-IV, 3.9](#):

- Comprehensive and clear overview of allowable claim forms for CII
- Two situations: all computer implemented method steps
 \emptyset can be fully implemented by generic data processing means
 vs.
 \emptyset are implemented by a combination of generic data processing means and special purpose hardware

Points of attention when drafting patent applications for CII

- § the invention must tackle a **technical problem** and the **solution** must use **technical** means
- § the problem and the solution must be clearly described in the description and the claims must contain all technical features by which the technical problem is solved
- § **you cannot rely on non-technical features to support inventive step**
- § no technical problem can be asserted in the course of examination, if this technical problem is not mentioned in the description as filed, or can not be directly derived from the description as filed
- § **the description must contain adequate fall back positions** (i.e. enough technical details) in case the claims need to be amended by adding more technical features

who would come up with the idea to solve this problem in the first place?
 -a financial expert, a salesperson, a business analyst
 -a software or systems engineer

CONCLUSION**EPO practice
Benchmark for patentability****1. CII is KEY area**

- innovation
- growing number of applications
- many fields impacted

All technical fields
prepared to handle CII

2. EPO is worldwide benchmark in CII

- we take the lead
- key aspect of our quality
- harmonised approach for legal certainty and predictability

EPO follows the trends
in technology

Like subject matter
treated in the same way

3. Full management support

- “do what we say”; ISO9001

Predictability is key to
our quality

4. CII Guidelines Workgroup

- reinforce standing practice in the Guidelines; clarify where appropriate
- cross fields harmonisation for legal certainty
- clarification, training, managerial commitment

European Patent Office

Page 37



Europäisches
Patentamt
European
Patent Office
Office européen
des brevets

Thank you!

Need more information?

§ **Visit** www.epo.org

§ **Follow us on**

www.facebook.com/europeanpatentoffice

twitter.com/EPOorg

www.youtube.com/EPOfilms

www.linkedin.com/company/european-patent-office

§ **Contact us via** www.epo.org/contact

