The role of science and IP data in informing and driving national innovation policy

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Clarivate Analytics

Kazakhstan, 30th June 2017

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Agenda

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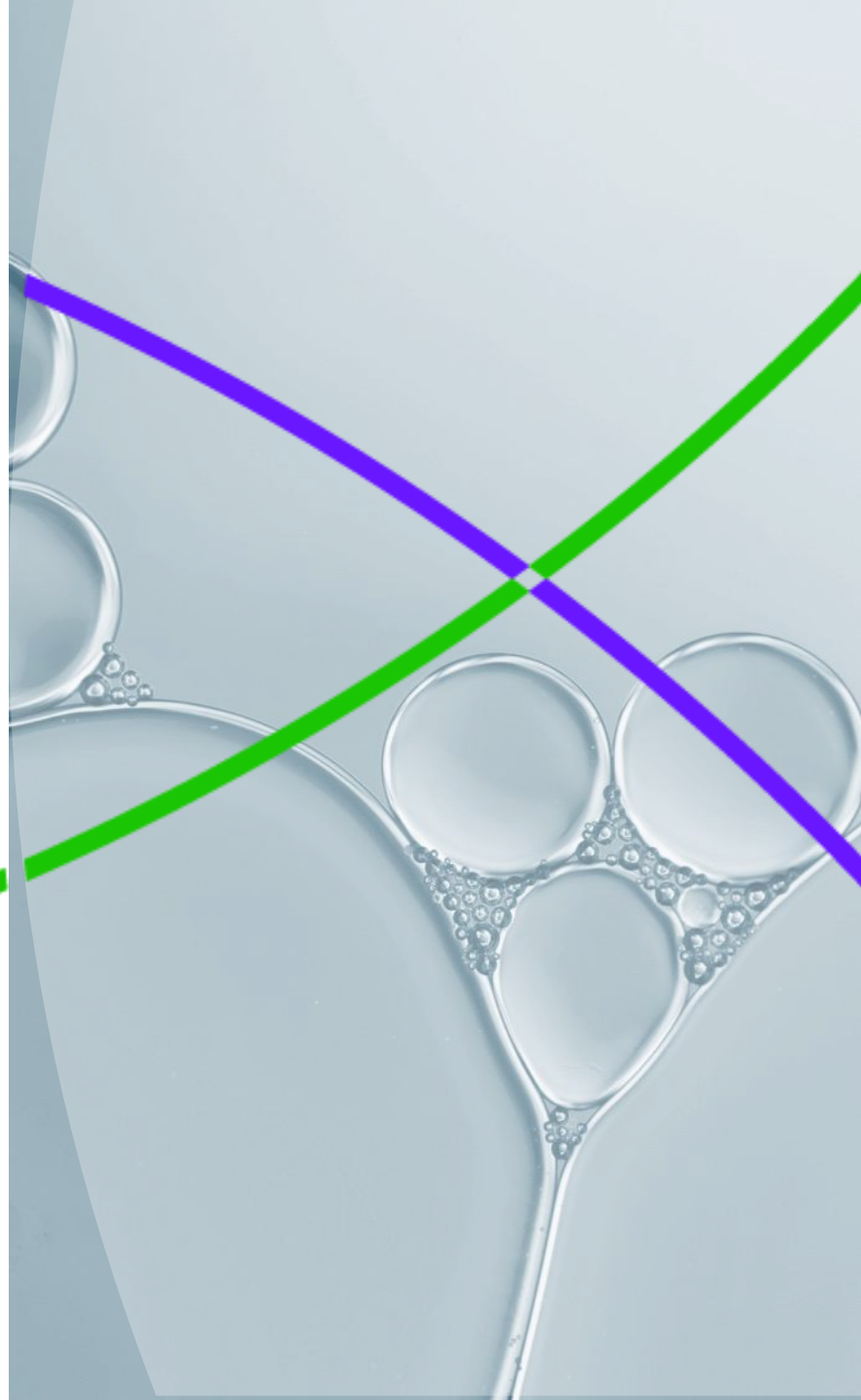

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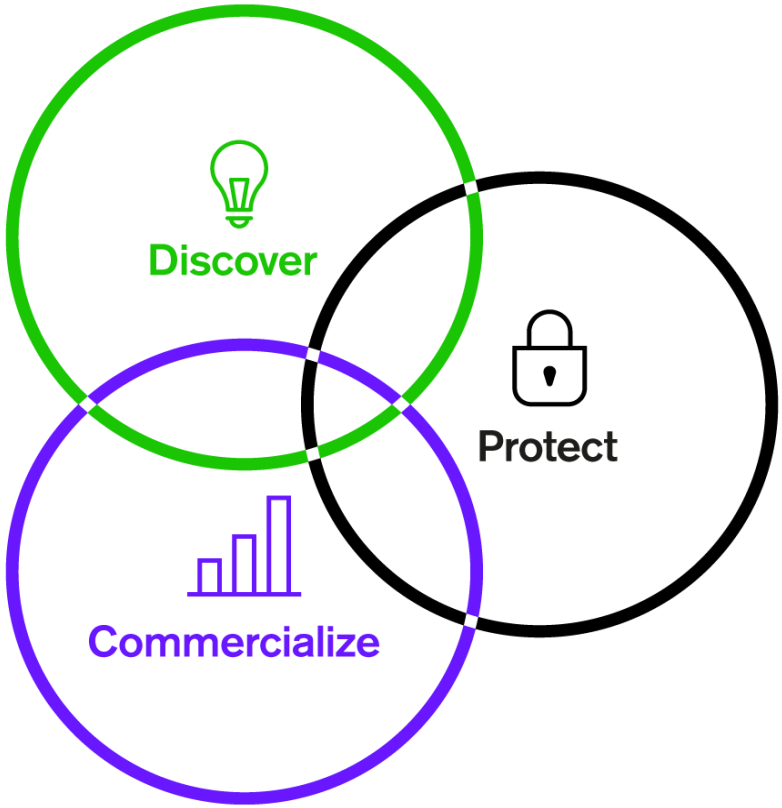
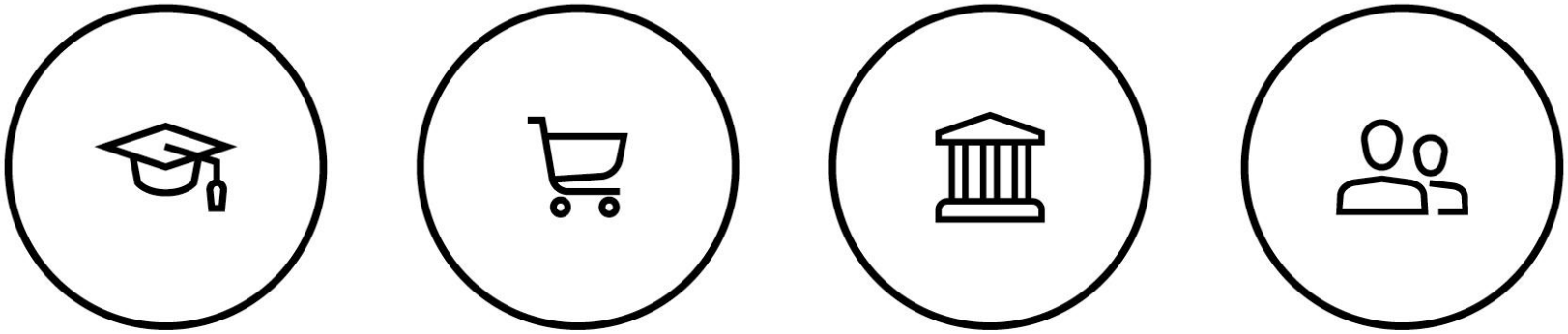


Clarivate Analytics **accelerates the pace of innovation** by providing trusted insights and analytics to customers around the world, enabling them to **discover**, **protect** and **commercialize** new ideas, faster.

Our customers include those working within the lifecycle of innovation **who strive to make a difference**: the world's top universities, corporations and brands, and many individual innovators



Academic institutions

Commercial enterprises

Governments

Individuals

We provide world-class solutions and services

Web of Science

Derwent World Patents Index

Derwent Innovation

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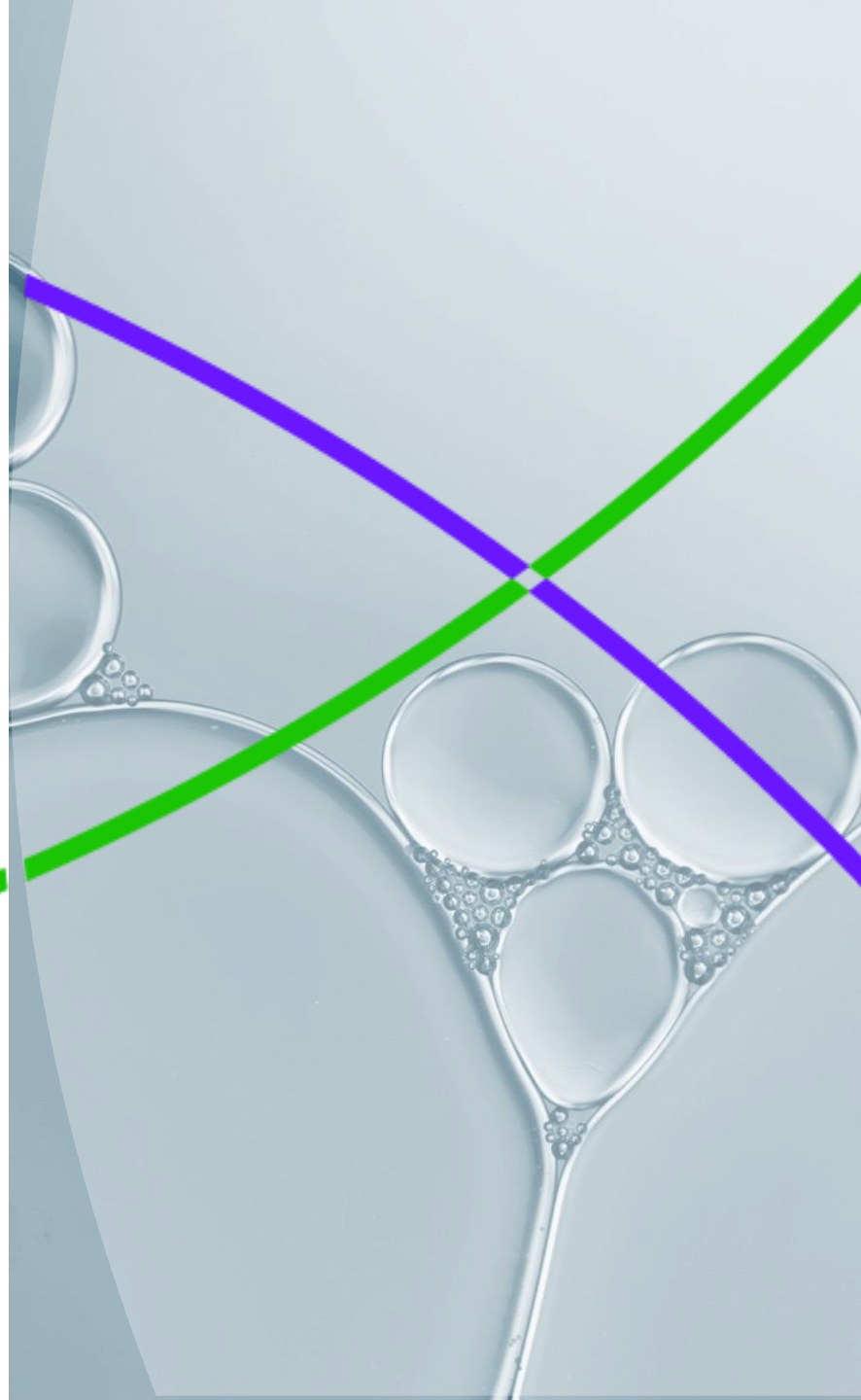
The nature of innovation



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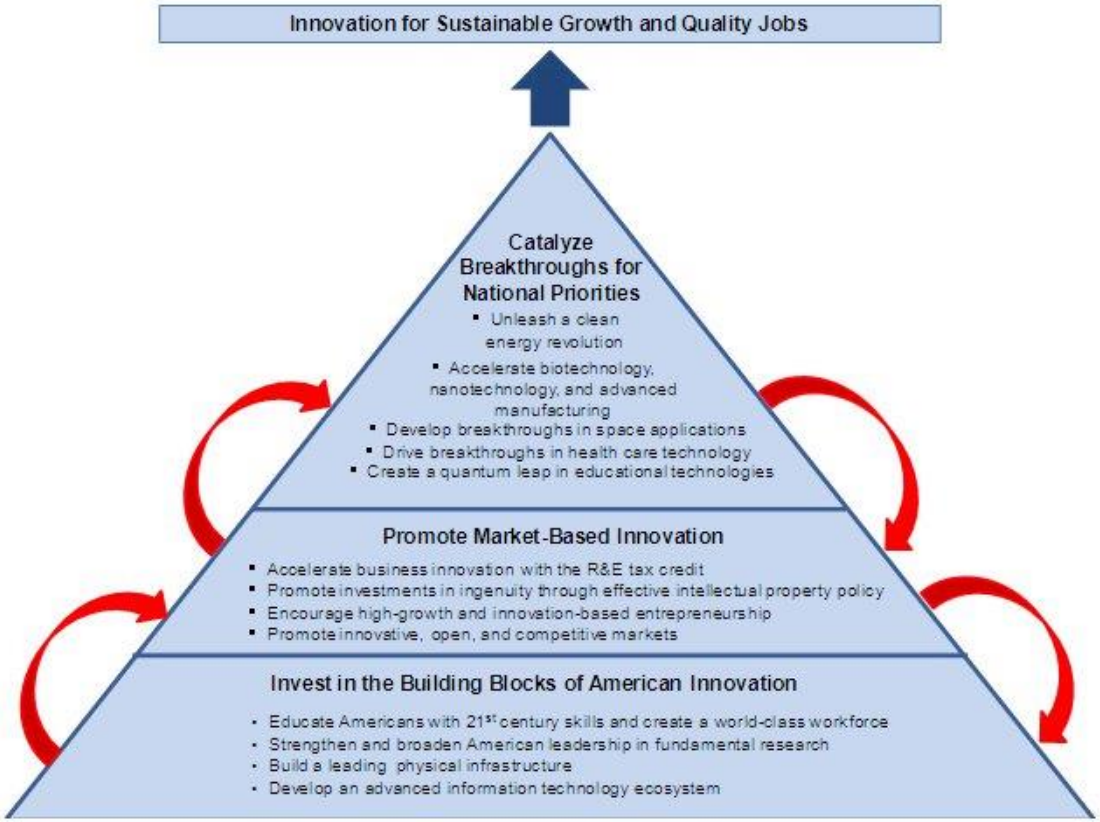
Innovation in support of growth

Innovation as a key driver of a nation's economic growth is a common theme in economic policy in major countries around the world



"A Strategy for American Innovation: Securing Our Economic Growth and Prosperity"
US National Economic Council and Office of Science and Technology Policy February 2011

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Innovation – the exception and the rule

The Exception	The Rule
Flash of insight	Comes from immersion and planning
Creates a disruptive technology	Builds on/enhances existing technology
Individual Genius	Hard collaborative work
Results in new knowledge	Evolution/expansion of existing knowledge
All about the idea	All about the way the idea is turned into a successful outcome
Looking to the future	Looking sideways, backwards and forwards
Focus on new learning	Unlearning is just as vital

This is often not fully understood by governments

The role of IP in innovation

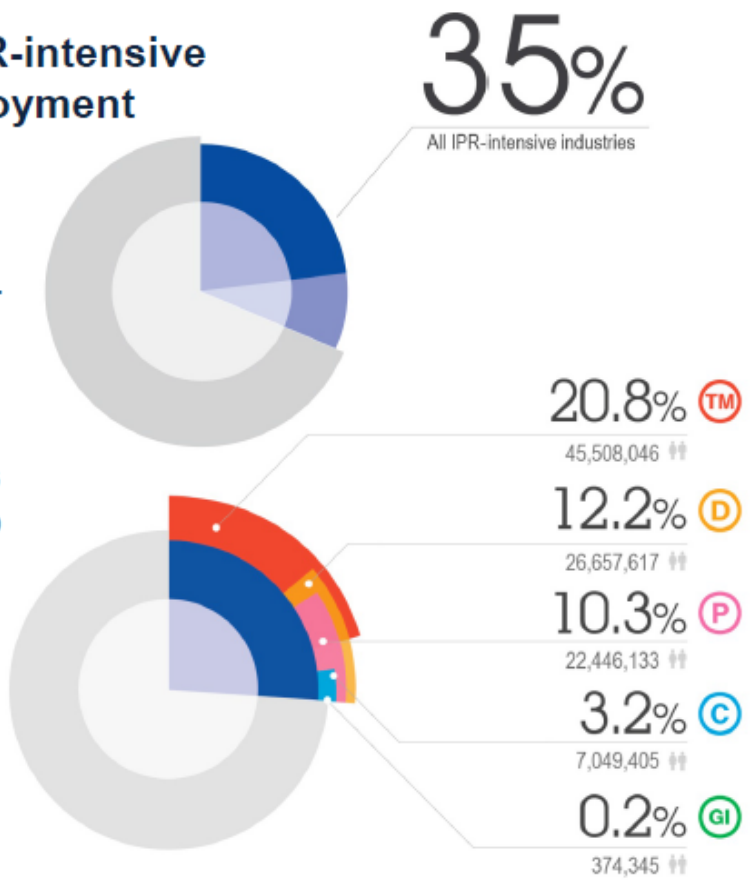
- Incentivises invention and creativity
- Protects innovators from unauthorized copying
- Provides a platform for financial investments in innovation
- Supports startup liquidity and growth through mergers, acquisitions, and IPOs
- Enables a more efficient market for technology transfer and trading in technology and ideas

Contribution of IP to the economy

Contribution of IPR-intensive industries to employment

26% of all EU jobs were directly generated by IPR-intensive industries during the period 2008-2010.

An **additional 9%** were generated indirectly, by industries that supply goods and services to the IPR-intensive industries, for a total of **35% of all EU jobs.**



TM trade mark
D design
P patent
C copyright
GI geographical indication

€ 4.7 trillion annually in the European Union is generated by IPR-intensive industries

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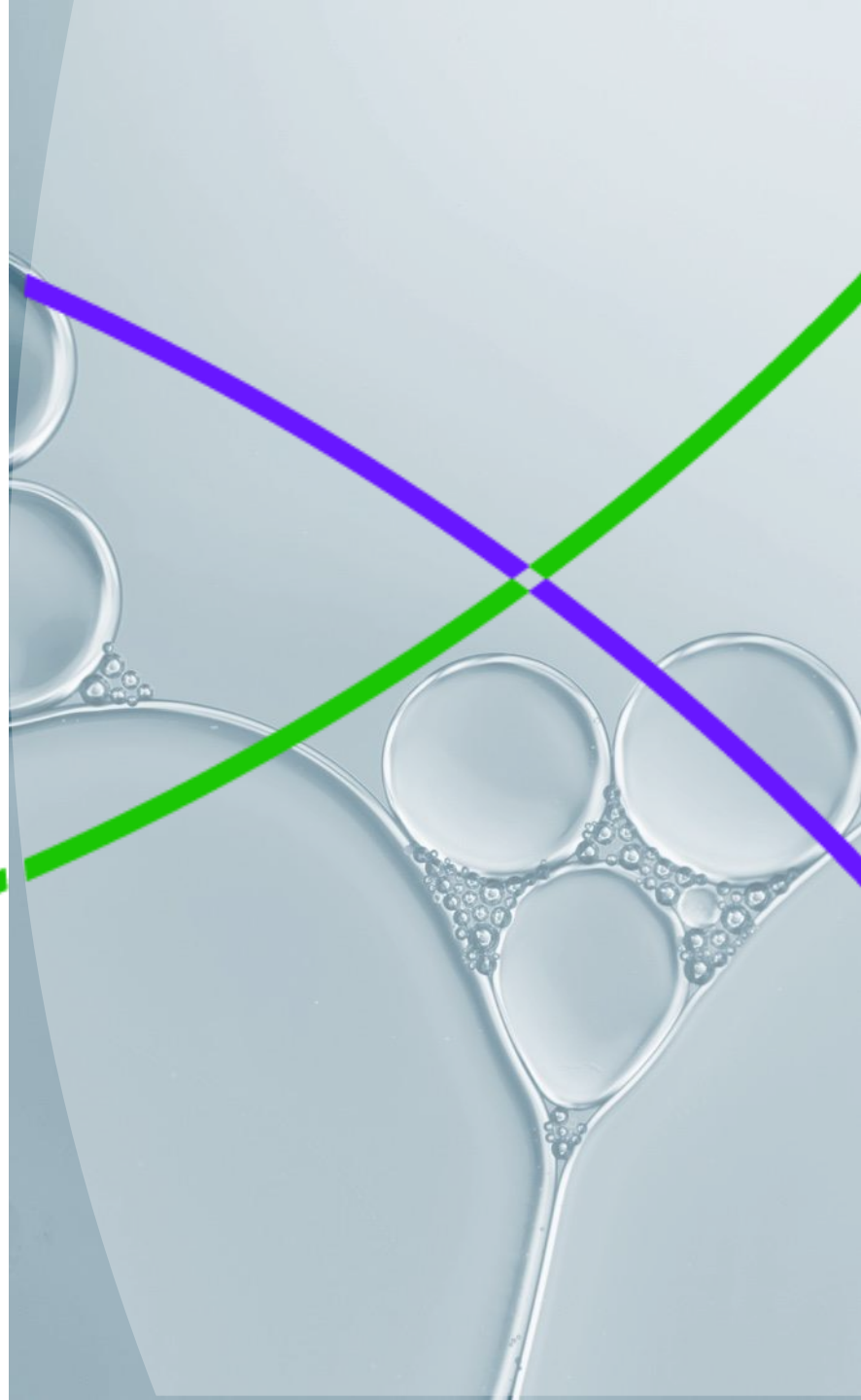
The role of data in national innovation policy



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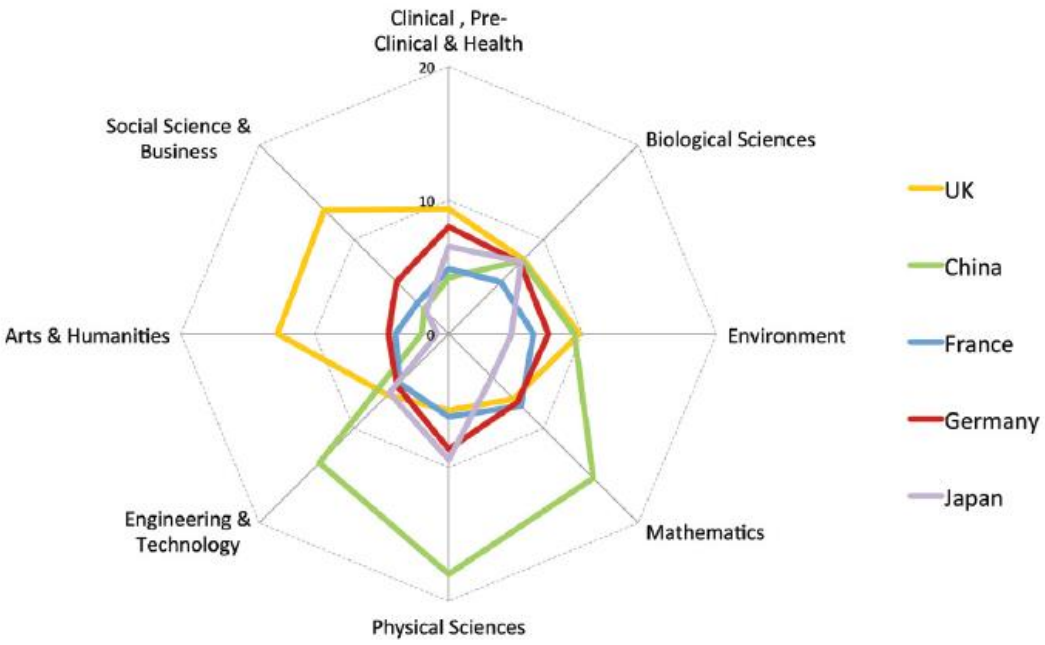
Measuring innovation

- R&D as a measure of scientific output



Source: *Web of Science InCites*

Relative share of R&D via scientific literature output

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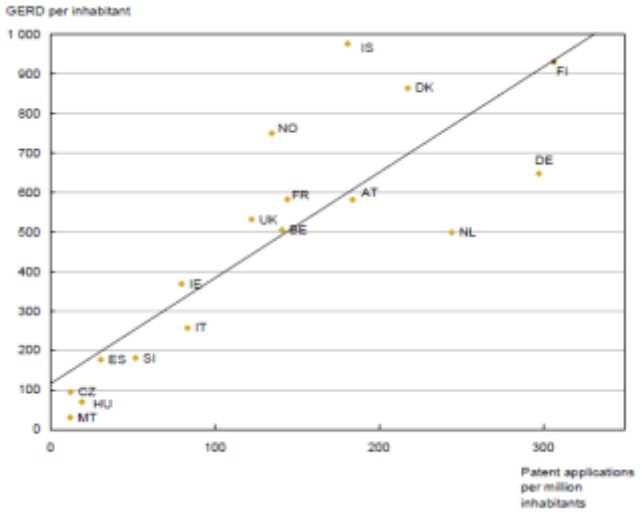
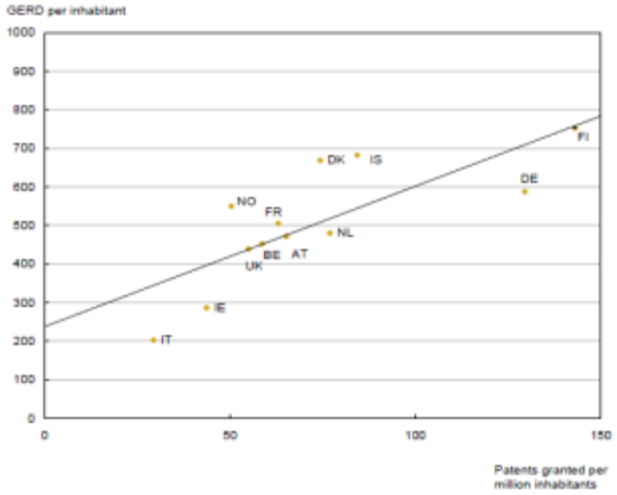
Measuring innovation

- A relationship exists between R&D expenditure as input and patents as output

EP Apps vs R&D expenditure



US Grants vs R&D expenditure



There is a positive correlation between R&D expenditure and patent volumes by industry[1] and by country/region[2].

1. "Study on the Trend of Research and Development from Patent Application," NISTEP, Report No. 9.
2. "Patents and R&D expenditure", Bernard FÉLIX, Statistics in focus - Science and technology, 16/2006.

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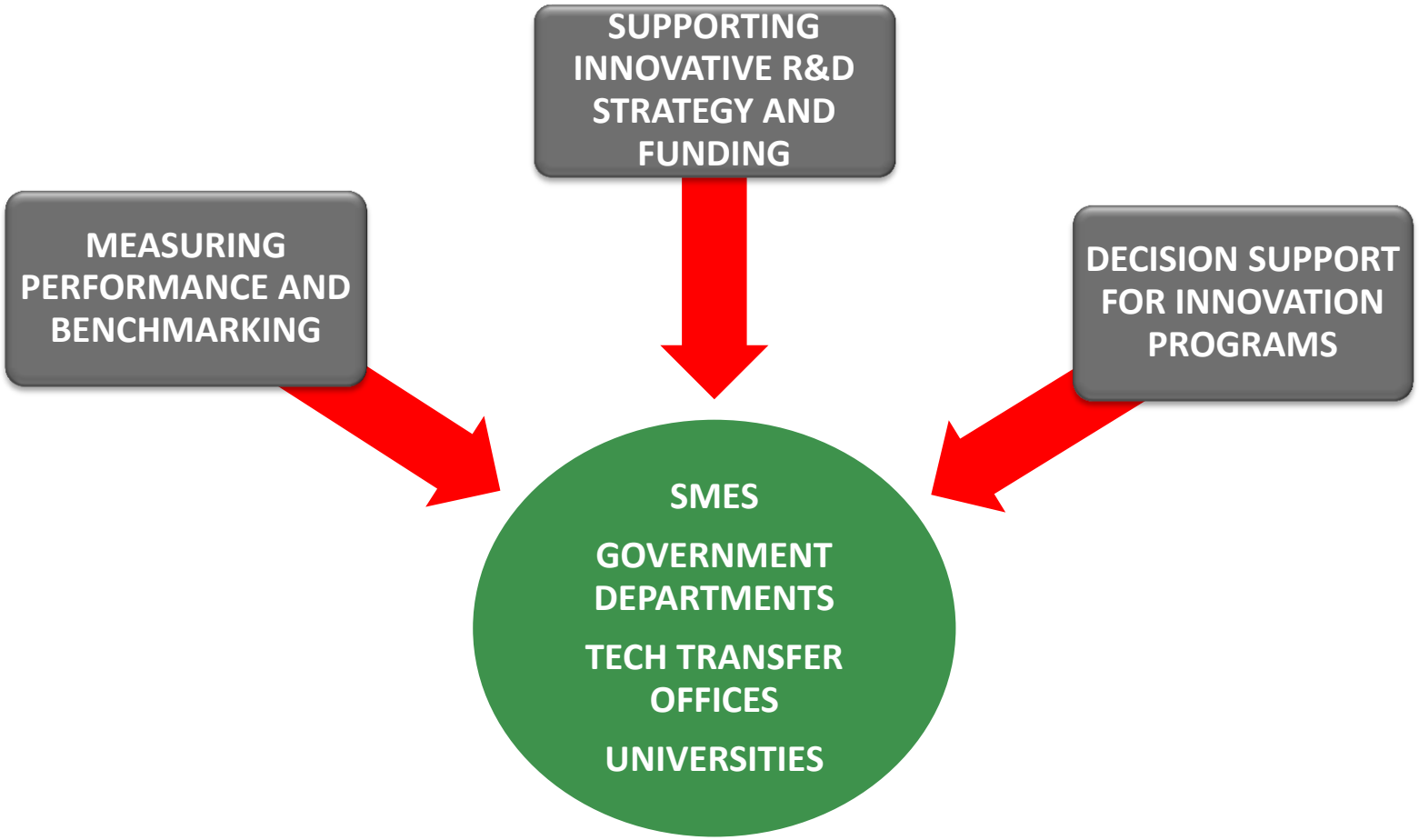
Information in support of innovation strategies



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Measuring performance and benchmarking

- IP as a downstream measure of the economic outcome from government funding programs
- Benchmarking R&D performance
  - Nationally
  - Internationally
- As a measurement of Return on Investment
  - Justifying/refining investment in specific technology sectors, e.g. for public/private collaboration
  - Planning future government funding programs

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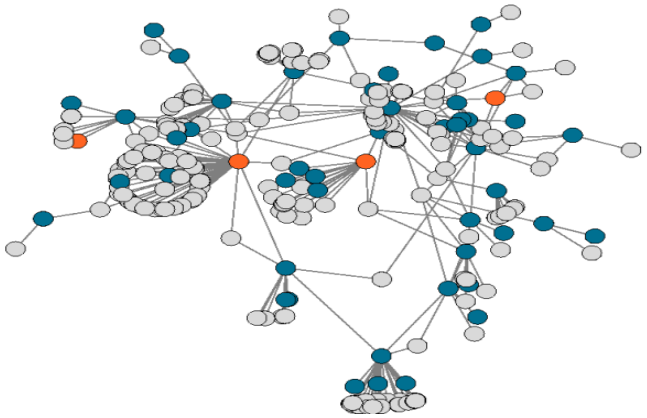
Supporting innovative R&D

- Planning government research funding programs
  - Determining the IP Landscape
  - Determining the state of technology
    - White space
    - Complementary technologies
  - Initial assessment of potential for commercial exploitation (freedom to operate)
  - Identify opportunities for licensing and research collaboration
  - Identifying experts for funding planning and review boards



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Decision support

- Ongoing monitoring of technology/IP changes that impact on the success of a research program
- Fine tuning innovation support programs to support economic growth and wealth creation e.g. domestic vs. international exploitation of research vs. attracting inward investment

Aircraft navigation and tracking systems Alert Results 2017-06-25

Here are your alert results from Derwent Innovation.

Details about this alert:

Alert name: Aircraft navigation and tracking systems

Query: ALLD=(aircraft or airplane* or aeroplane* or air ADJ plane*) AND (MC=(W06-A03* or W06-B01B1) OR IC=(G05D000100));

Collections: DWPI

Date range: 2017-06-23 to 2017-06-24

Number of results: 8

Results for this alert:

Alert results are in the attached CSV file.

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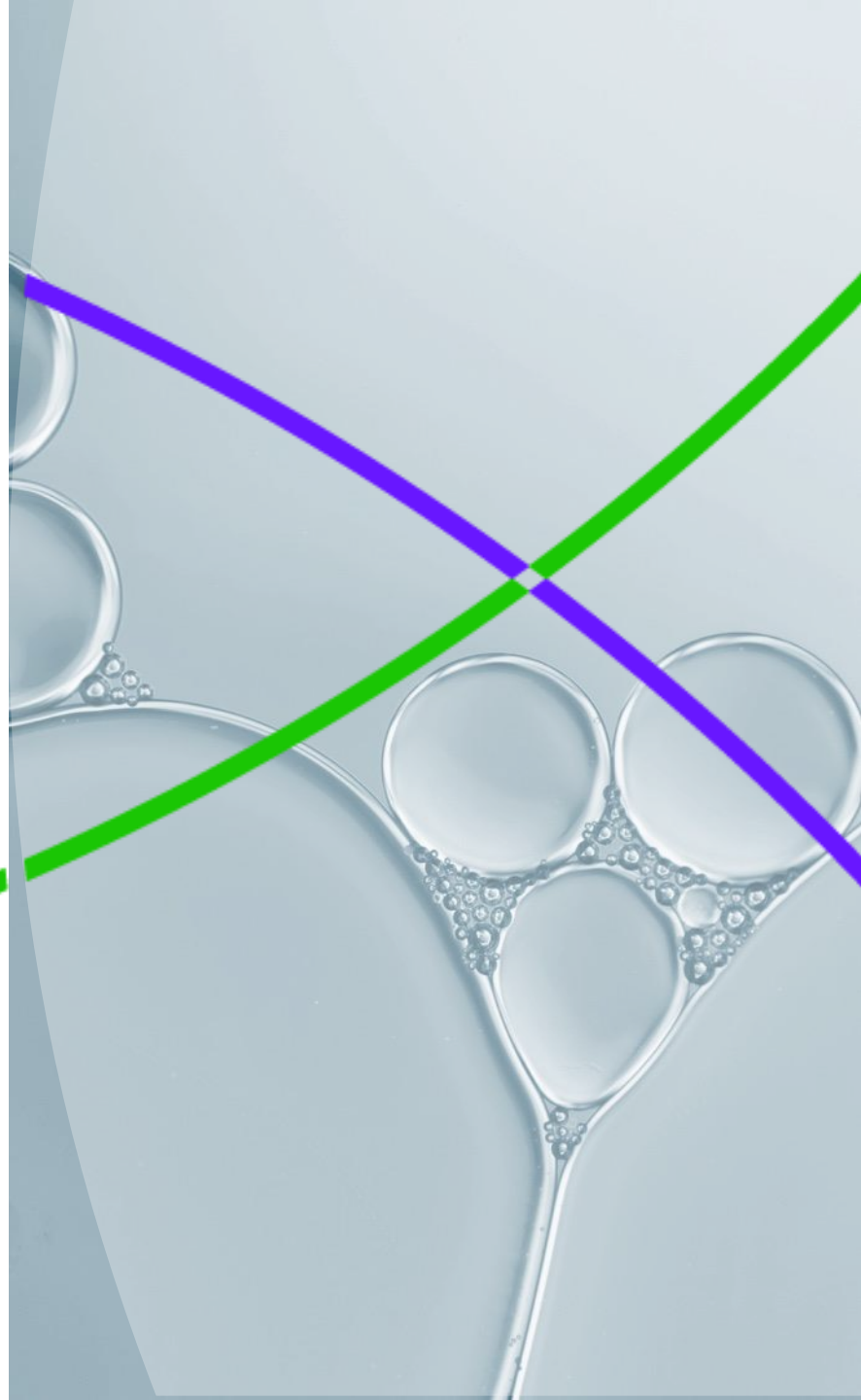
Realizing value from innovation through technology transfer and collaboration



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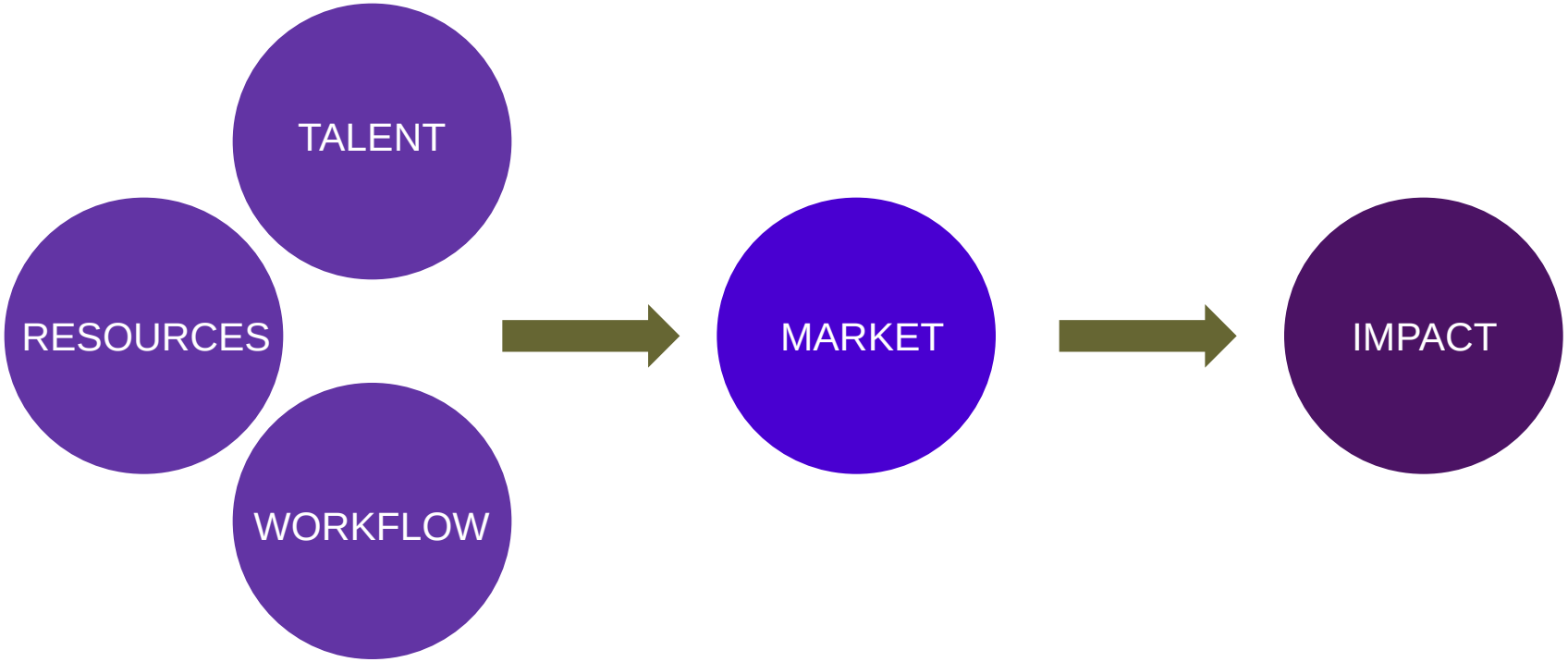
The technology transfer framework



Collaboration between academia and industry plays a major part in this process

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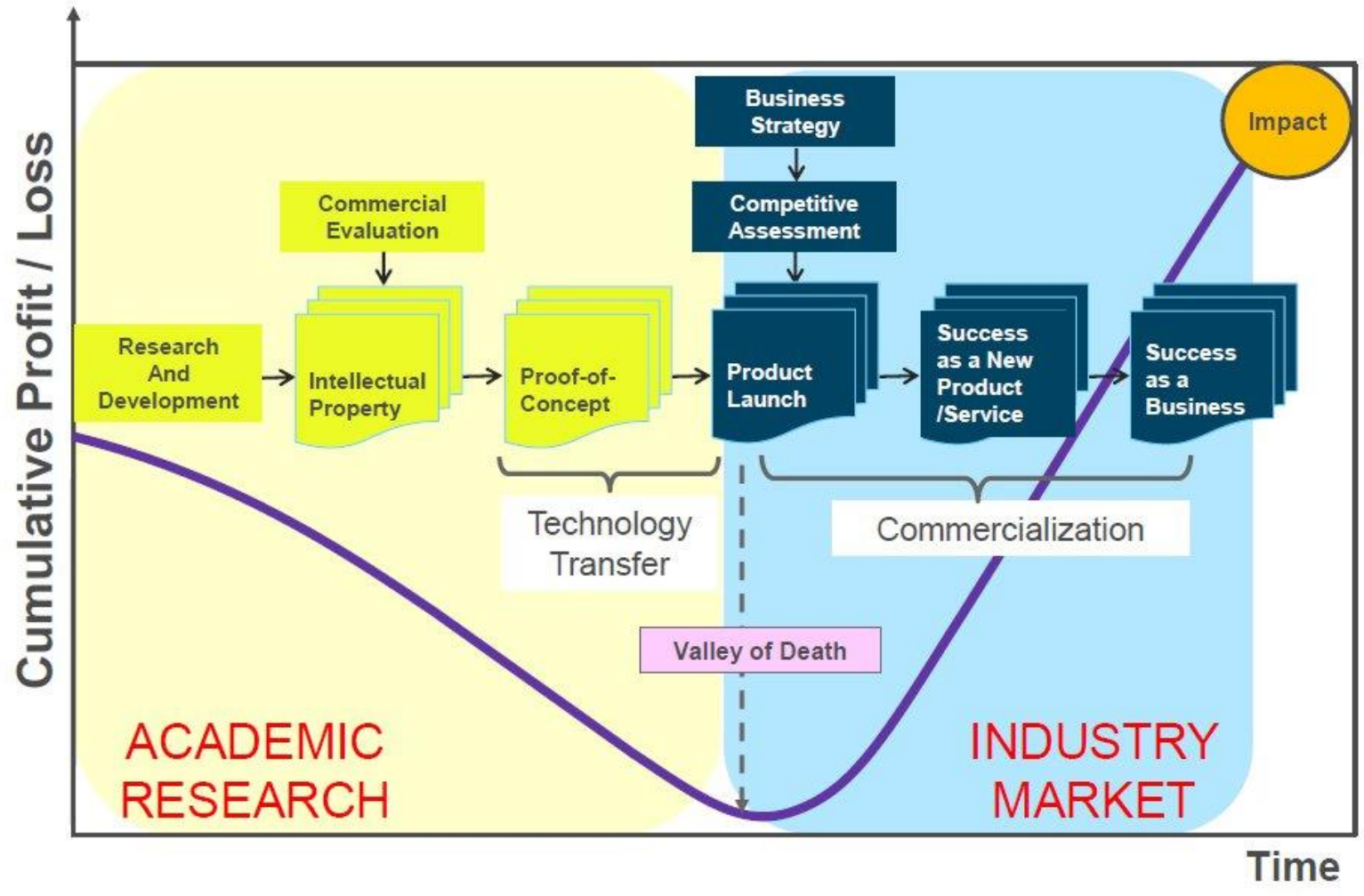
Transcending the Valley of Death



Meeting market needs is key

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Challenges in industry-academia collaboration

- The fundamental drivers of academia and industry are different
  - For industry, the focus is on realizing commercial return and creating value for stakeholders
  - For academia, the tradition has been to focus on basic research and educating the citizens of the future with less regard for commercial return
  - Industry is driven by obtaining protection for innovation to develop new products and new revenue
  - Academia is typically concerned with publishing research results to enhance knowledge and reputations

Global best practice for industry-academia collaboration

- Successful industry-university collaboration is built on mutual benefit
  - For universities, typical incentives for collaboration with industry include improved access to funding, business insights & practices, and enhancement of reputation
  - For industry, incentives for collaboration with academia include access to academic expertise, publicly funded resources, the latest research insights and innovative new methodologies, and opportunities to provide training to potential future employees
  - Companies may also benefit by sharing the costs of R&D, and by potentially influencing the academic and research program of universities

Current state of innovation

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The State of Innovation

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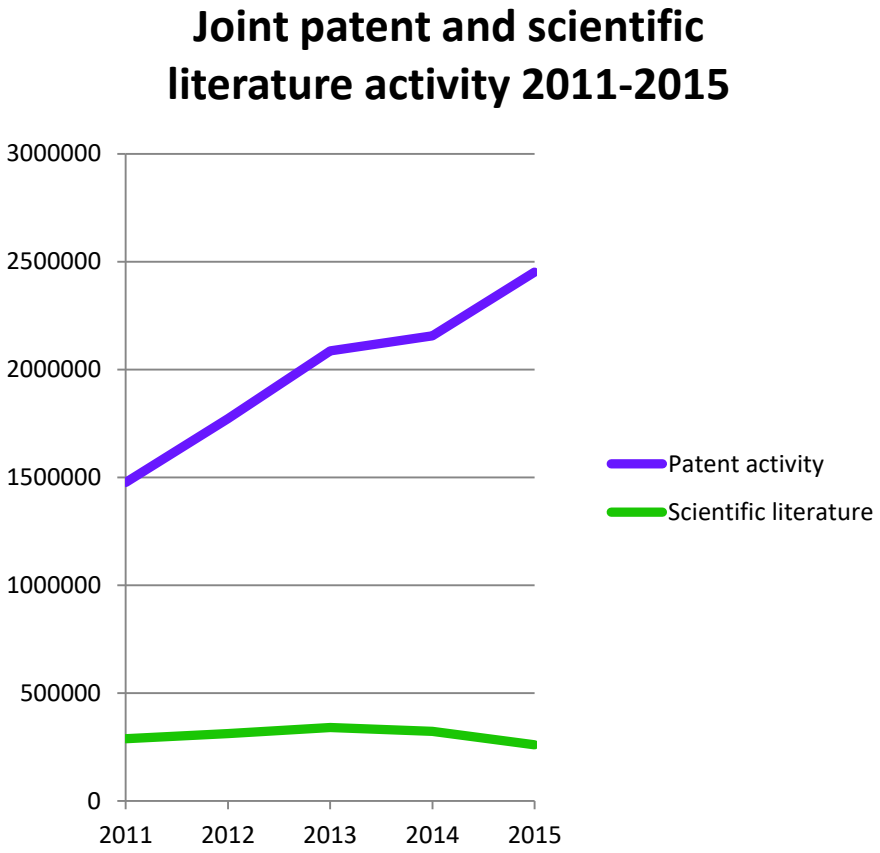
Global innovation trends

- Patenting saw double digit growth from 2014 to 2015, but scientific literature production is declining in almost every industry
- Industries with largest growth in patent volume were:
  - Medical Devices
  - Home Appliances
  - Aerospace
- There is growth in collaboration between academia and industry



Source: *Derwent World Patents Index® and Web of Science*

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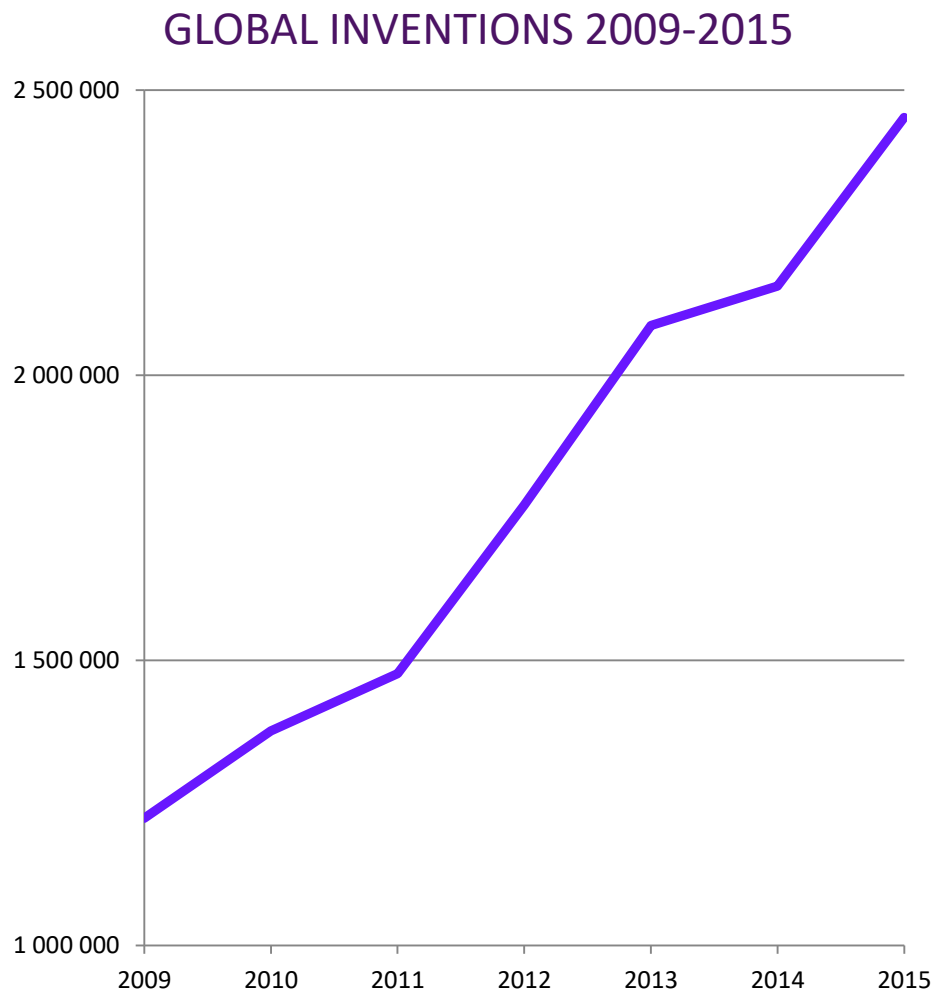
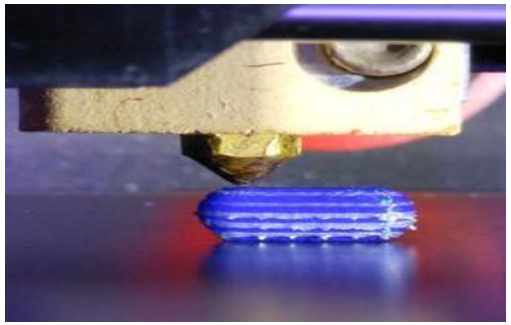
Disruptive innovations drive double-digit growth



13.7%



Source: *Derwent World Patents Index®*

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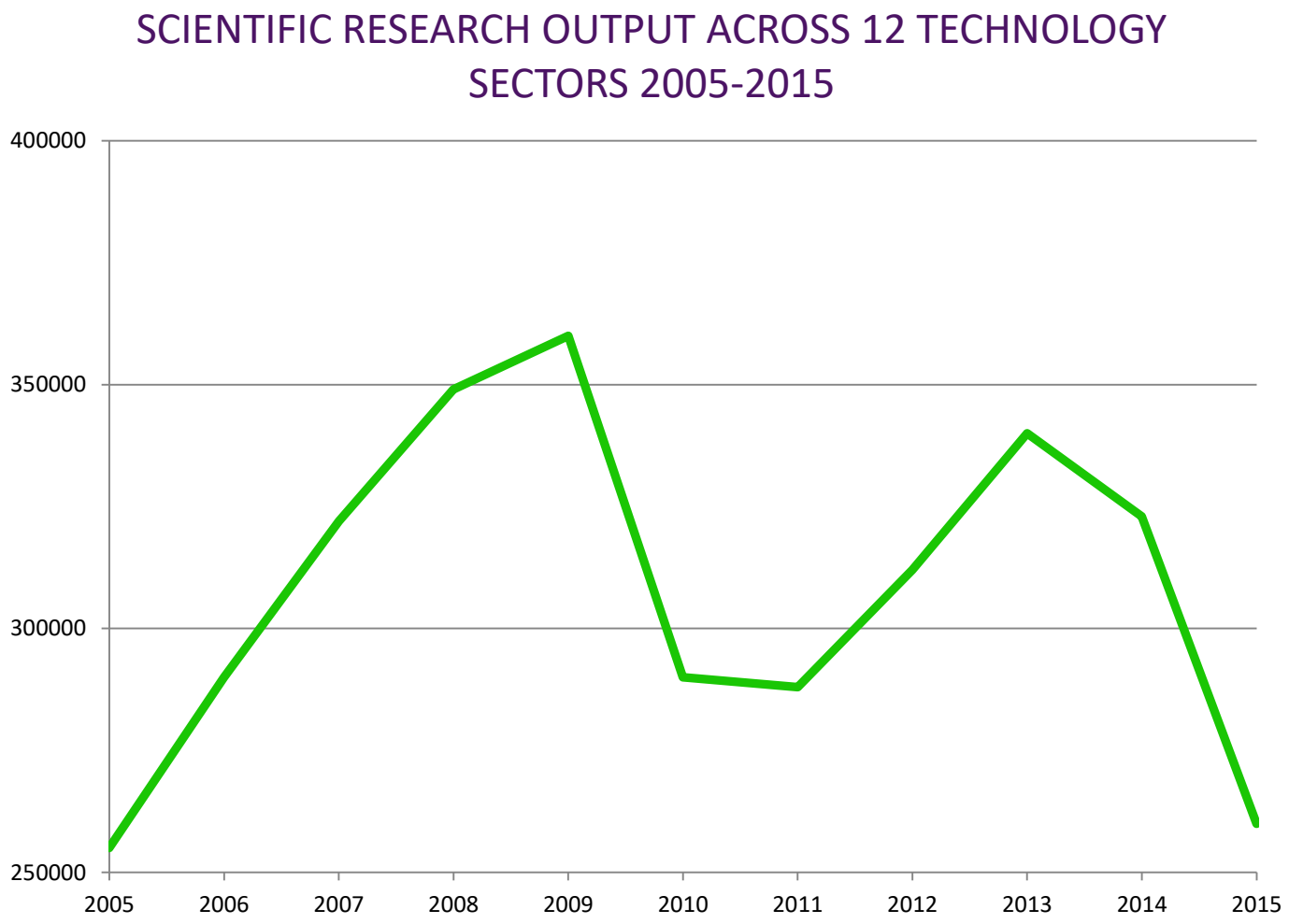
But shadows ahead?



Source: *Web of Science*

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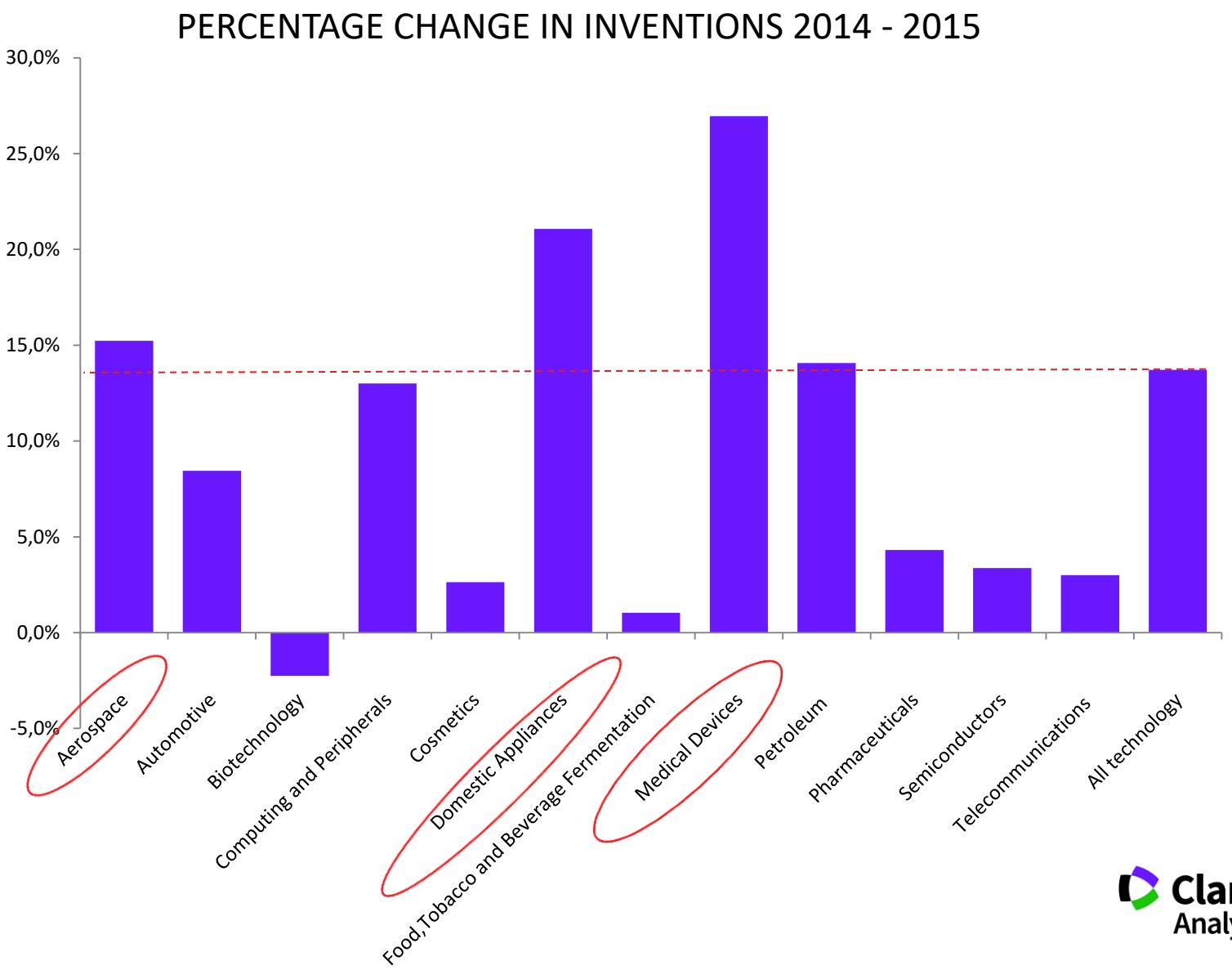
Global industry sector growth



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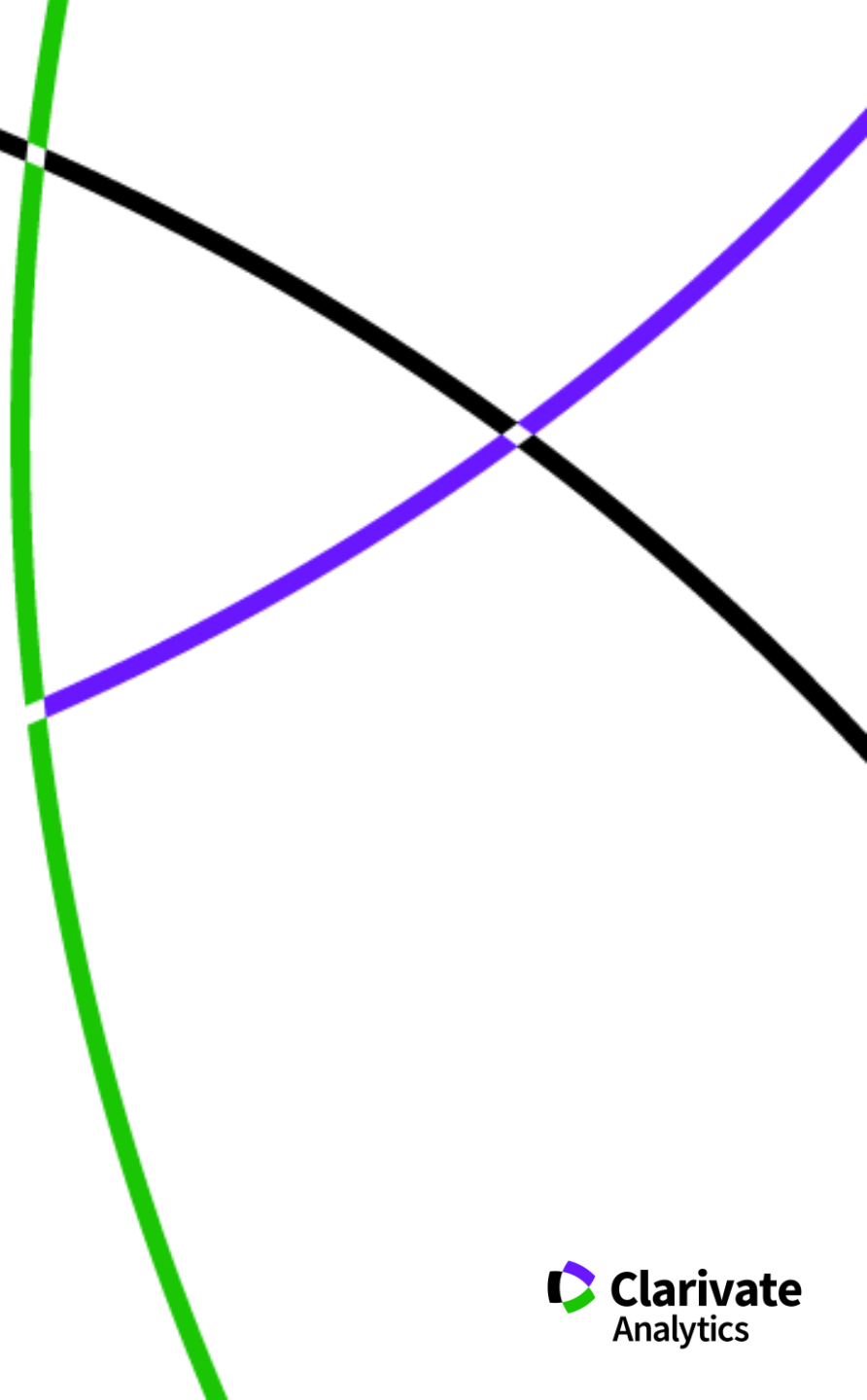
Future of innovation



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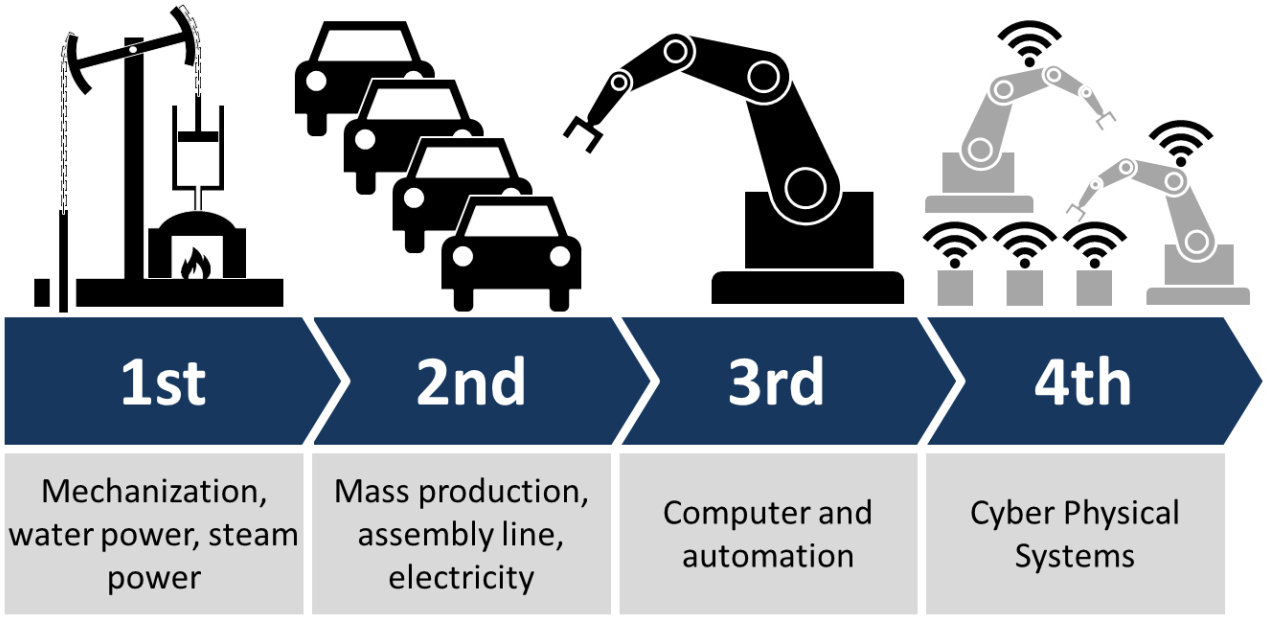
Industry 4.0

- Automation and data exchange in manufacturing
  - Cyber-physical systems
  - Internet of Things
  - Cloud computing



Christoph Roser at AllAboutLean.com http://www.allaboutlean.com

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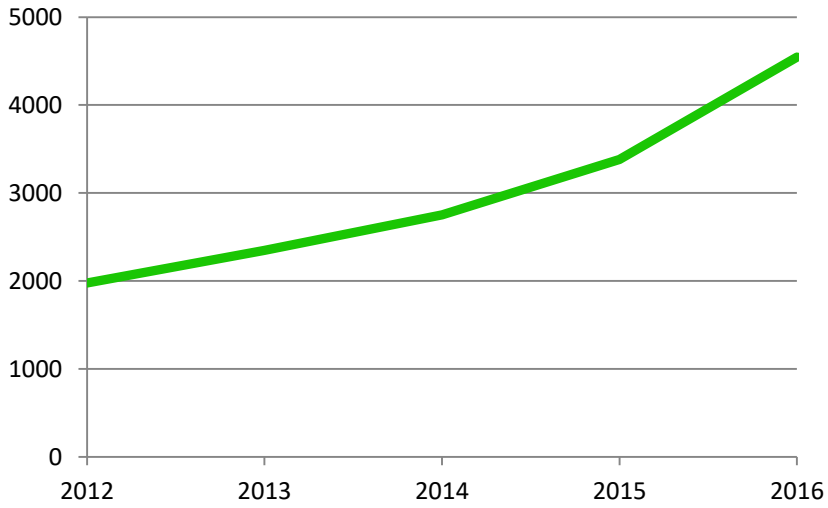
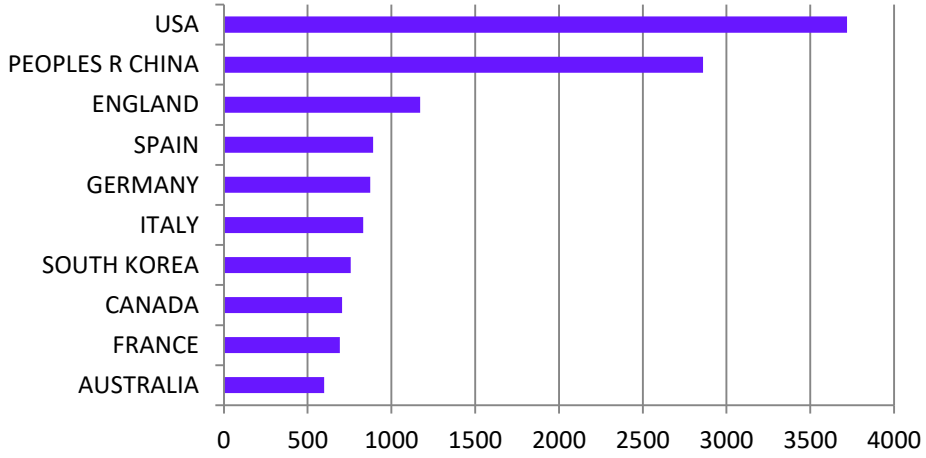
Internet of Things - literature

Scientific papers 2012-2016



Scientfic papers 2012-2016 by country/region



Source: *Web of Science*

Highly cited article:
Toward Ubiquitous Massive Accesses in 3GPP Machine-to-Machine Communications, National Taiwan University, IEEE COMMUNICATIONS MAGAZINE, **49,** 4, Published: APR 2011; Pg: 66-74; **Cited 102 times**

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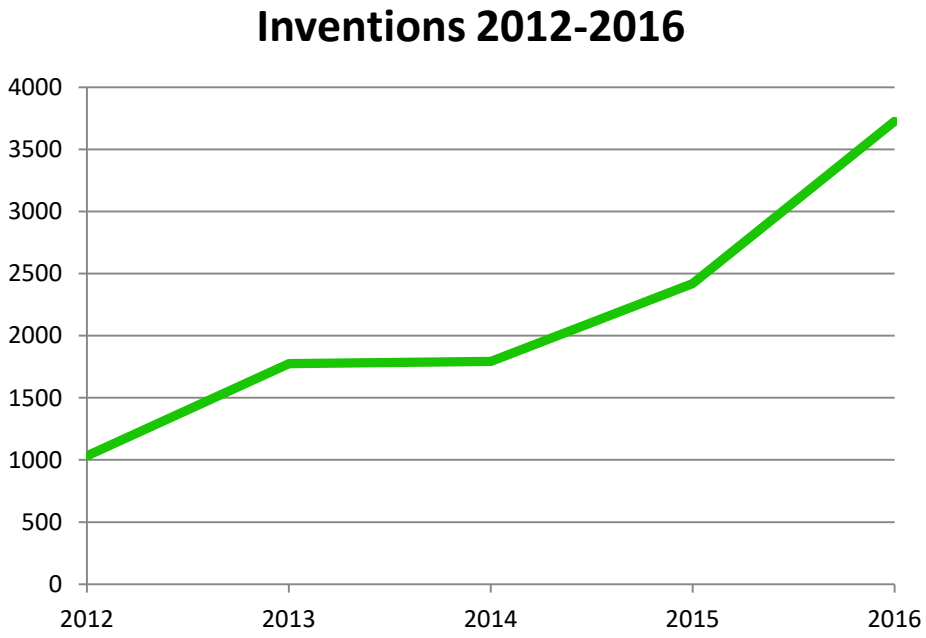
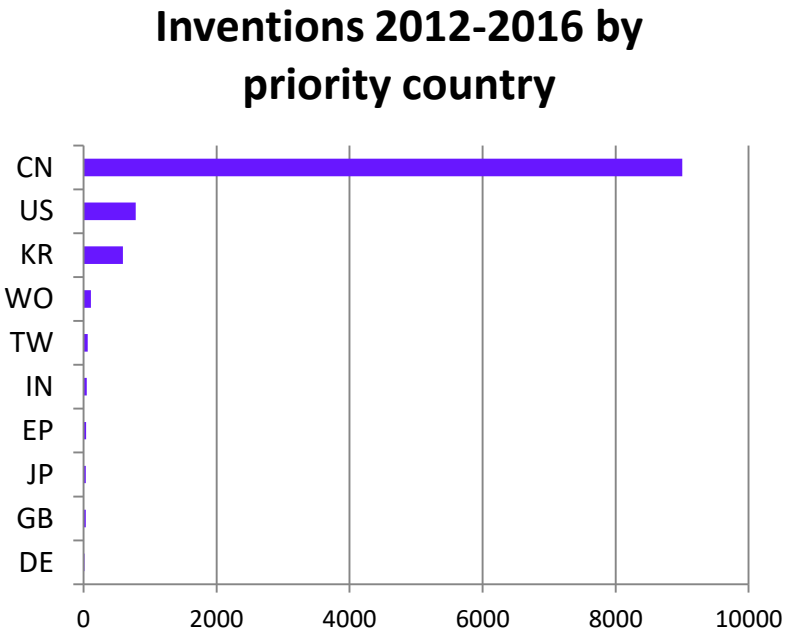
Internet of Things - patents





Source: *Derwent World Patents Index*

Highly cited patent:
Method for performing load balancing e.g. uplink load balancing, in machine to machine communication by wireless transmit/receive unit
INTERDIGITAL PATENT HOLDINGS INC., Wilmington, DE, US
US20110199905A1, Published: APR 2011; **Cited 80 times**

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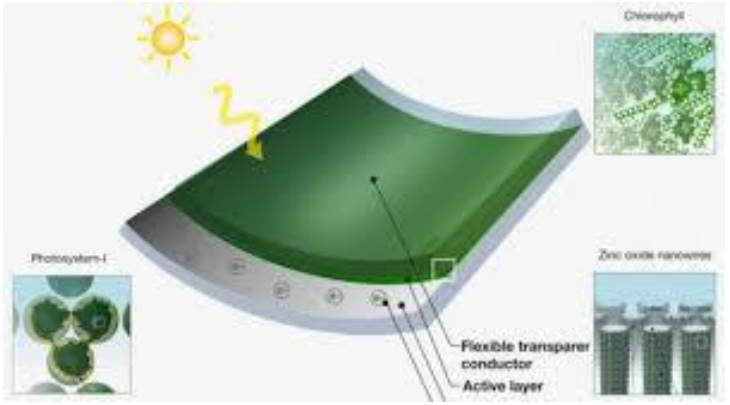
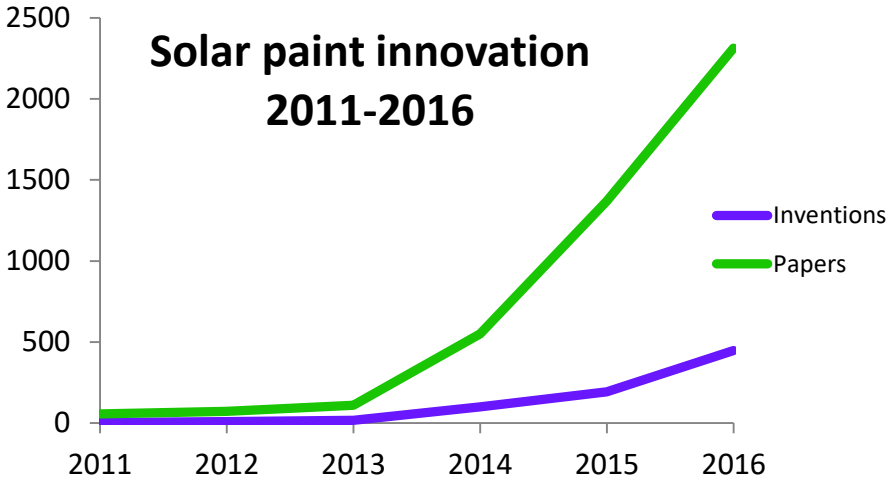
Clean energy developments – solar paint

- The world's energy consumption will increase by 35 percent by 2035
- Fossil fuel supplies are dwindling
- Satisfying global energy demands will require the development and adoption of ever more efficient alternatives:
  - Solar
  - Wind
  - Water
  - Nuclear
  - Geothermal
  - Biomass





Source: *Derwent World Patents Index*

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Why work with Clarivate Analytics?

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Strong international track record working with governments to drive innovation

Project	Relationship	Outcome
Science and Technology Agency Japan	▪ Extensive technological support of Japan's effort to expand information and connectivity to improve research and decision making in scientific research	**Expand knowledge base, align research strategy to national priorities**
King Abdulaziz City for Science and Technology Saudi Arabia	▪ Consulting services to refine strategic priorities, with products to improve and increase the visibility of their research	**Develop human capital, and elevate research output onto world stage**
Ministry of Education and Science Russia	▪ Enable Ministry to track leading researchers in Russia based on 130 indicators; modernise key citation and publication metrics	**Increasing cooperation and communication between researchers and government bodies**
National Patent and Trademark Office United States	▪ Exclusive knowledge partner to the USPTO, providing the Derwent World Patent Index	**Provide national and global benchmarking, covering 50 jurisdictions**
National S&T Information Network Egypt	▪ Innovation ecosystem for the Egyptian Government, based on current and ongoing research as well as patent information, in order to identify potential opportunities for new discoveries	**Link academia with industry and the patent office, to drive wealth and job creation**
World Intellectual Property Organisation Global – United Nations	▪ Public-private partnership that gives research institutions and patent offices in developing economies access to valuable information ▪ contained in patent documents	**Support developing economies in exploiting their innovation potential**

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Clarivate Analytics as strategic partner

- Strategic partnership proposal to realise Saudi Arabia vision to become a global hub for innovation

- Strategic Review of Oil & Gas Industry for King Abdulaziz City for Science & Technology

- Review and evaluation of global scientific research and patent activity within Oil & Gas technology

- Oil & Gas technology is experiencing a shift from more fundamental research to more applied science

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We also work with the world's most innovative companies and institutions

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