Mapping the innovation terrain: exploring patent analytics and the evolving role of the analyst

Chris Harrison

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EPO Patent Knowledge Week

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- UK Intellectual Property Office 2008-2023
  Patent Analyst since 2010
  Head of IP Analytics and Data Insights (2017-2023)
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What is patent analytics?

Leveraging the wealth of knowledge contained in patent data to provide added-value information and supporting informed decision-making

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What is patent analytics?

Analyzing different patent fields to identify technology trends, key and emerging players, existing and potential markets, opportunities and collaboration

Scope varies – from very narrow to very broad

Type of analysis and insights vary depending on the specific needs and questions to be answered

- Patent Landscaping
- Patent Analytics
- Patent Knowledge
- IP Analytics
- IP Intelligence

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FORTUNE™ BUSINESS INSIGHTS

Patent Analytics Market Size to Surpass USD 2,364.6 Million by 2030, exhibiting a CAGR of 13%

As per the report by Fortune Business Insights, the global Patent Analytics Market size is projected to reach USD 2,364.6 Million by 2030, at a CAGR of 13% during the forecast period.

May 24, 2023 09:00 ET| Source: Fortune Business Insights Follow

https://www.globenewswire.com/en/news-release/2023/05/24/2675319/0/en/Patent-Analytics-Market-Size-to-Surpass-USD-2-364-6-Million-by-2030-exhibiting-a-CAGR-of-13.html

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Target audience

Government

Business

Investors

Researchers

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Patent analytics for government

Do we have start-ups to support?

How to develop our industrial policy?

What are the technologies to come?

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Patent analytics for business
including start-ups

What partnership opportunities are available?

What new technology should be patented?

What are the strengths and weaknesses of our own patent portfolio?

Where should we invest our R&D resources?

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Patent analytics for investors

Which companies are most active in patenting of a particular technology?

What are current technology trends?

Who is actively acquiring patents in the sector?

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Patent analytics for inventors, researchers and universities

What new technology should be patented?

What is the leading technological solution in the area?

What companies can we partner with to commercialize our research?

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Unlocking the value of patent data

Patent analytics presents patent data, search results and findings in a **structured way**

Creates an output that makes technical data **easily understood by non-experts**

Includes **visualization of the results** making the information **easy to digest**

Facilitates interdisciplinary dialogue between various stakeholders

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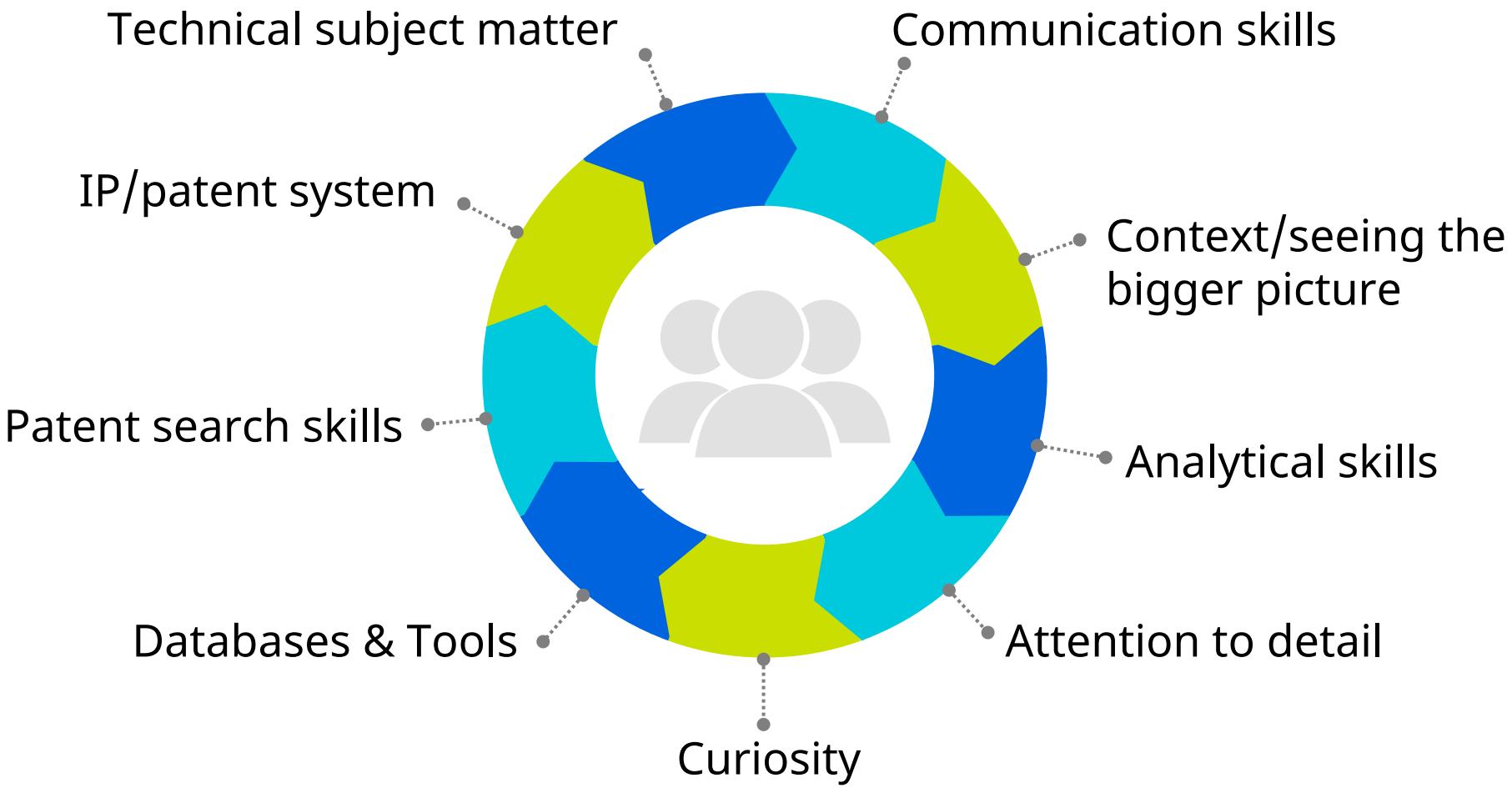
The key skills of a patent analyst



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Patent database and analytics tools providers

Free-of-charge patent databases

PATENTSCOPE
Google Patents
DEPATISnet
LENS.ORG Solving The Problem Of Problem Solving
专利检索及分析 Patent Search and Analysis
Espacenet Patent search

Open source analytical tools

python
Gephi
R Studio
Open for Innovation KNIME
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Commercial patent data and analytics providers

Clarivate Analytics
Orbit Intelligence
ambercite Find better patents faster
STN ANAVIST
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PATENT INSPIRATION
PatBase
Amplified
InnovationQ PLUS POWERED BY IEEE AND IP.COM
Patent iNSIGHT Pro Transform Patents to Intelligence
LexisNexis
东方灵盾 EAST LINDEN

Commercial analytical tools

X
tableau SOFTWARE
vantagepoint Search Technology
Power BI
rapidminer
STATA

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Open source tools

Typically used by researchers, data scientists, IT and business analysts

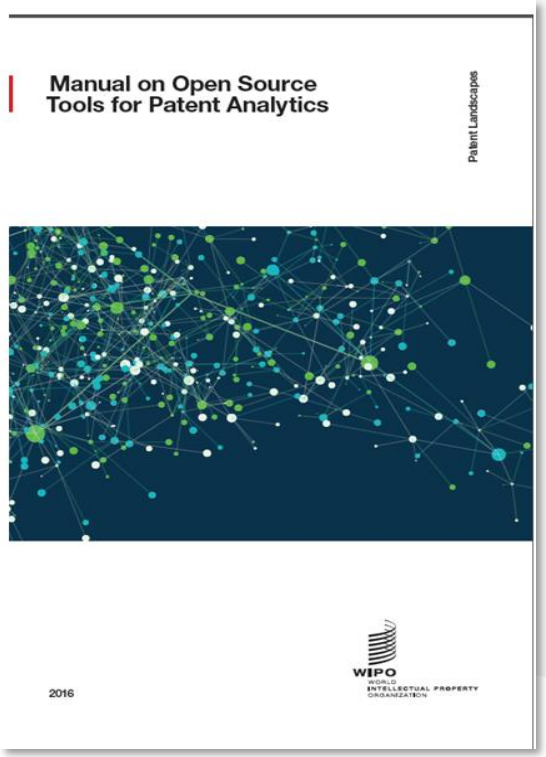
Pros:

- Free of charge
- Customizable to specific needs
- Give flexibility to experiment and choose the tool(s) that is more adapted to the user needs
- Support / troubleshooting by programmers and other users in various online fora

Cons:

- Not as intuitive or user-friendly as commercial tools
- Require some programming skills, time and practice
- Several bugs/problems
- No commercial support

Keep voting in the live poll!
Slido.com #2836777



https://wipo-analytics.github.io/manual/

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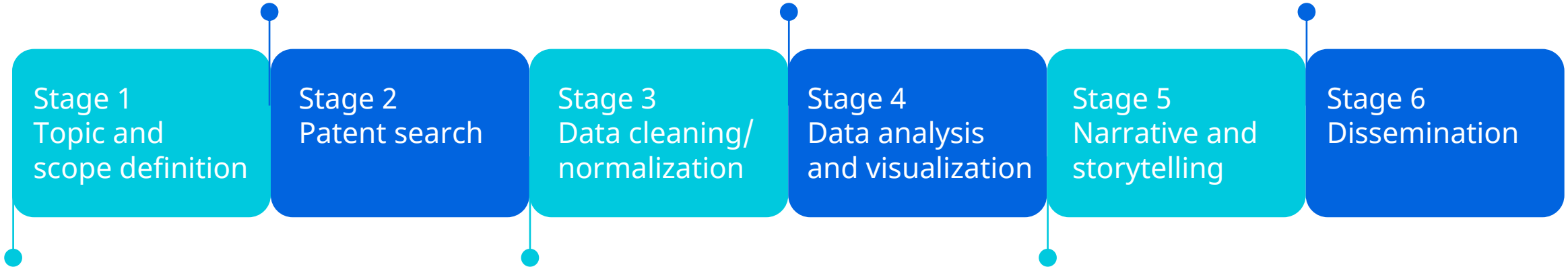
The patent analytics process



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Topic and scope definition

The importance of a clear project specification

- Detailed understanding of the business need (the question behind the question)
- Brainstorming and discussion to better define the specification
- Sufficient background information
- Defining project scope and the most useful and appropriate analysis – an iterative process

Managing expectations

- Options and limitations of patent analytics
- Timelines and feasibility

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Patent search

Selecting the most appropriate data source

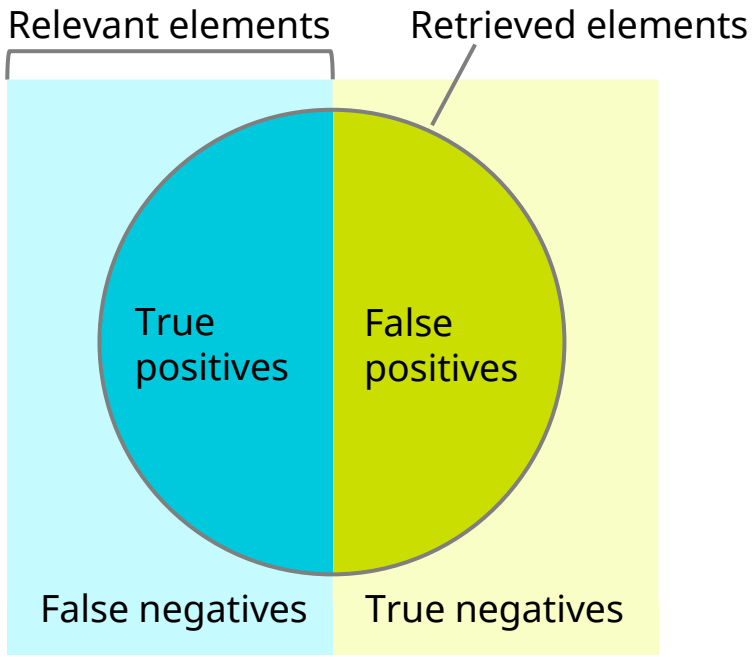
- Required geographical and historical coverage

Iterative search strategy

- Preliminary searches to explore the field and define approach (classification and/or keyword)
- Search strategies need to be tailored and refined such as to optimize precision and recall

Minimize dataset noise

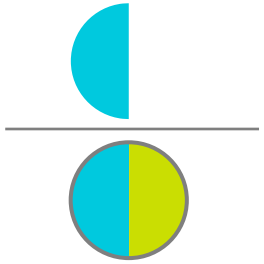
- Aim is to eliminate false positives and false negatives (although the reality is the minimize these)



How many retrieved items are relevant?

How many relevant items are retrieved?

Precision =



Recall =

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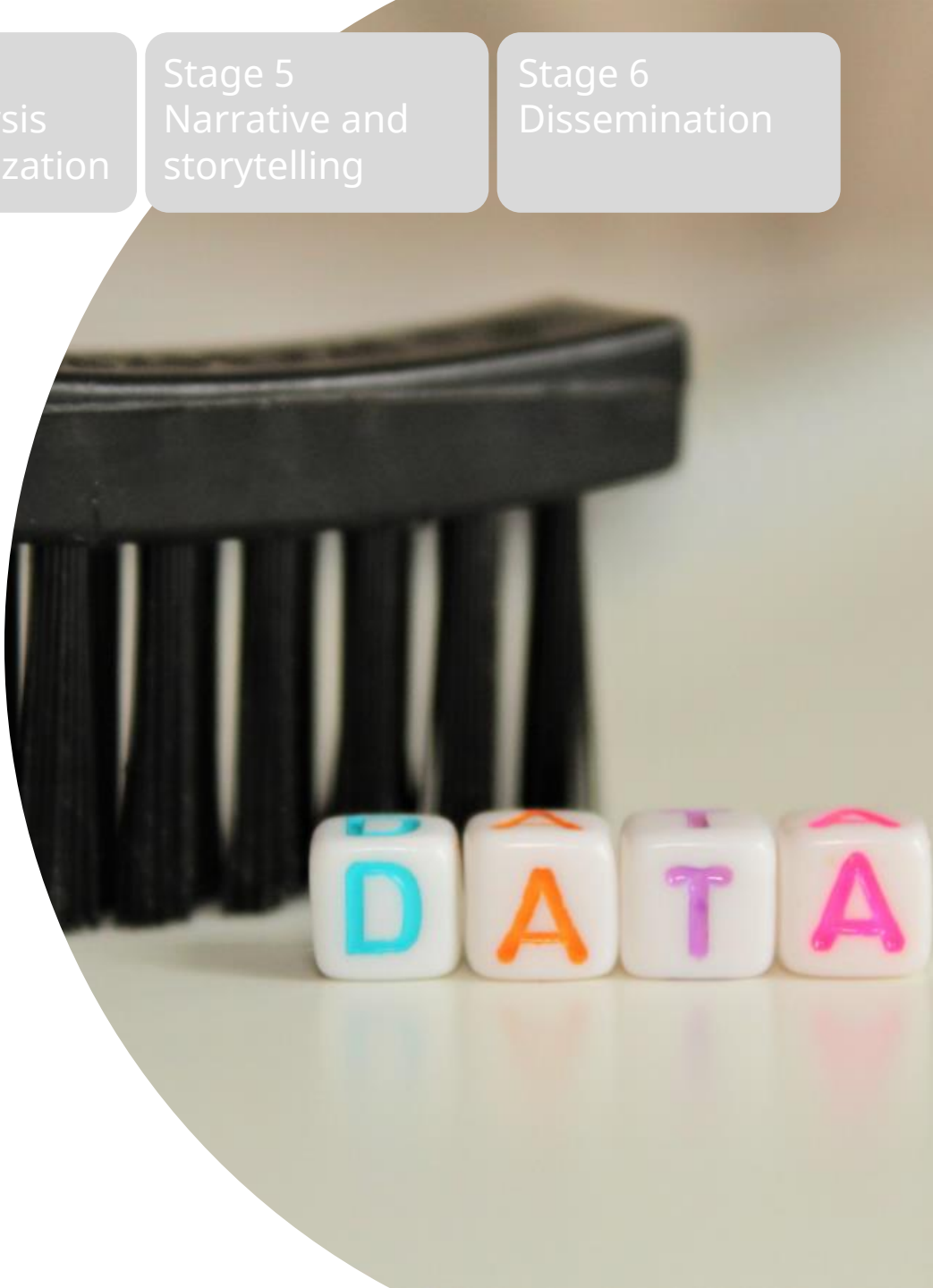
Data cleaning / normalization

A critical step

- How does the exported data look? Applicant / inventor name variations and misspellings, patent number normalization etc
- Clustering / grouping (by affiliation, M&A information etc)
- Manual or semi-automatic (commercial data providers often have their own data cleaning tools built-in that aim to reduce the data cleaning workload)
- If you do not clean your data then any analysis derived from it will be wrong (applicants, inventors, CPC/IPC)



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Data analysis and visualization

Allow yourself to be led by the data

- Avoid using a predefined list of charts/graphs
- Make sure the analysis covers the questions to be answered

Technology monitoring

- ✓ Which technology trends exist and how have they developed over time?
- ✓ Where are the crowded areas?

R&D decision-making

- ✓ Are there any gaps or white spaces, i.e. areas with little patent protection, that permit business opportunities?
- ✓ What further applications or uses are possible?
- ✓ Which further adaptations or embodiments could be explored?
- ✓ Identify solutions for technical problems

Competitors monitoring

- ✓ Which players are the most active?
- ✓ Patent portfolio of competitors?
- ✓ Who bought or sold IP rights?

Investment and collaboration decisions

- ✓ Which other patents are most relevant for our own activities?
- ✓ Check for potential infringements of IP rights (FTO, product clearance; in licensing)
- ✓ Monitor expiry of protected technologies for later use
- ✓ Identify business opportunities (out-licensing; potential partners with know-how; marketing opportunities)

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Data analysis and visualization

Simplicity is a virtue

- Humans naturally focus on information that stands out (peaks etc), and we tend to look for patterns and draw our own conclusions
- The same information can be presented in multiple ways so experiment to see which is the most appropriate, and more self-explanatory visualization

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“Everything should be made as simple as possible, but no simpler”

Albert Einstein, 1879

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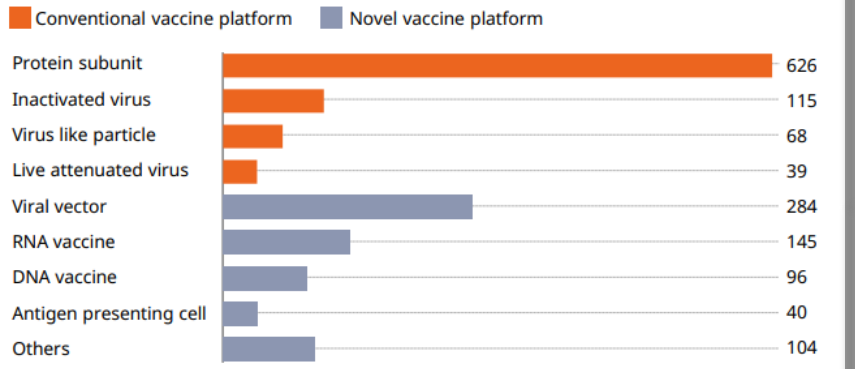
Distribution of patent applications across vaccine Platforms

48% of the vaccine patent dataset related to protein subunit vaccines, followed by patent filings related to viral vector vaccines), which accounted for 22% of the vaccine patent dataset.



Patenting activity related to COVID-19 vaccines and therapeutics is nearly equally distributed between companies and universities/research organizations

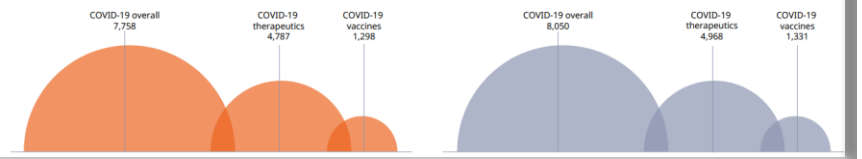
Contribution to COVID-19-related vaccine datasets, by patent applicant profile

Contribution to COVID-19-related therapeutic datasets, by patent applicant profile

Patent applications related to COVID-19 in general, COVID-19 vaccines and COVID-19 therapeutics

Number of patent families first filed January 2020 through September 2022

Number of patent families first published January 2020 through September 2022



COVID-19-related patent application filing peaked in April 2020, followed by a corresponding peak in COVID-19-related publications in October 2021

Patent applications related to COVID-19, first filed and published January 2020 through September 2022, by patent filing and publication month

Applicant locations

Most patent applications were filed by patent applicants in China and the United States.

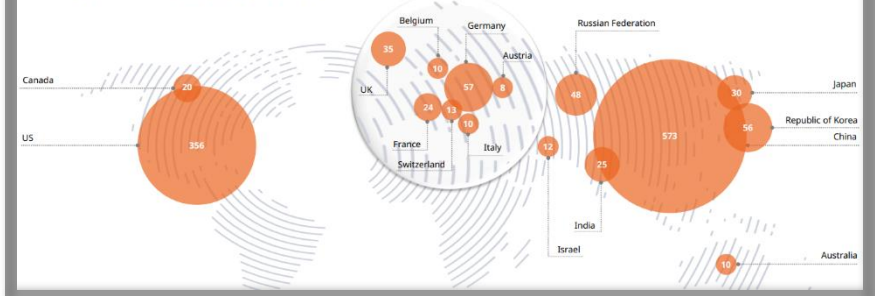


Figure 11. Network analysis of the top collaborating entities in COVID-19 vaccine patent applications

Among COVID-19 vaccine patents, Chinese companies and research institutions show greatest cooperation, followed by French corporates and research institutions.

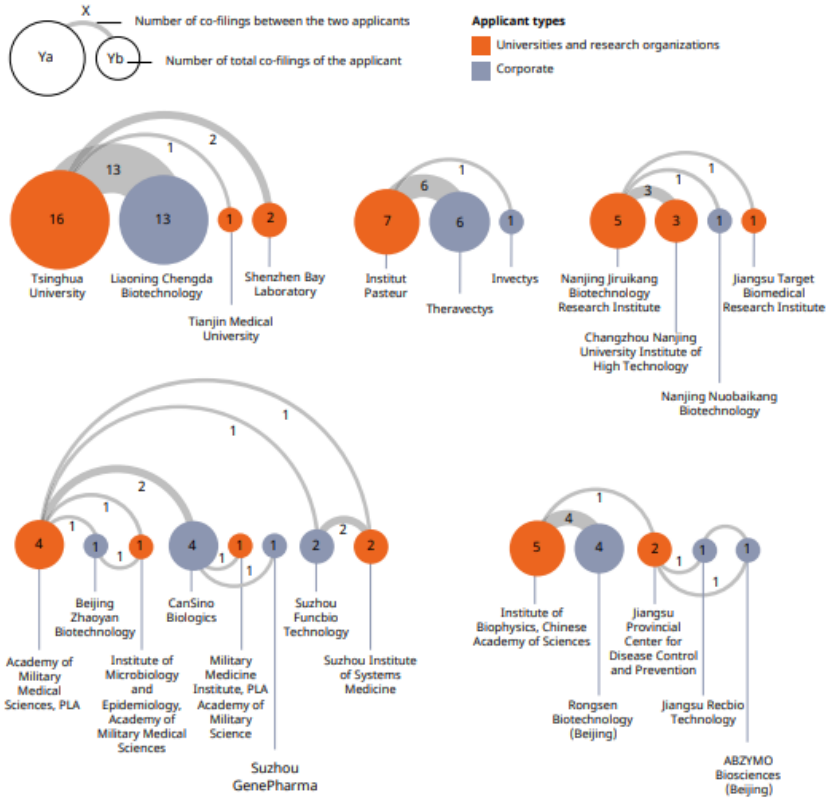
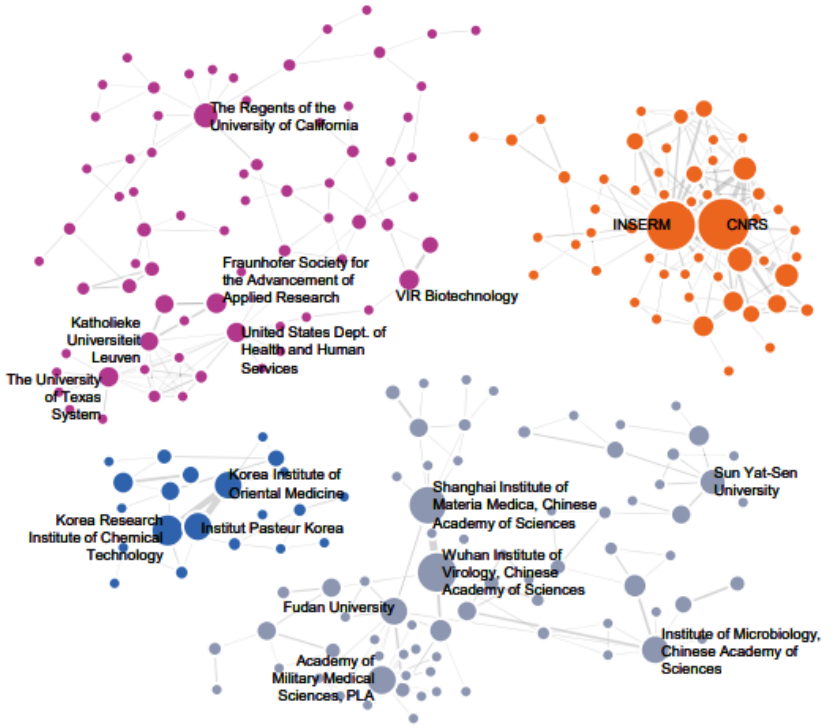


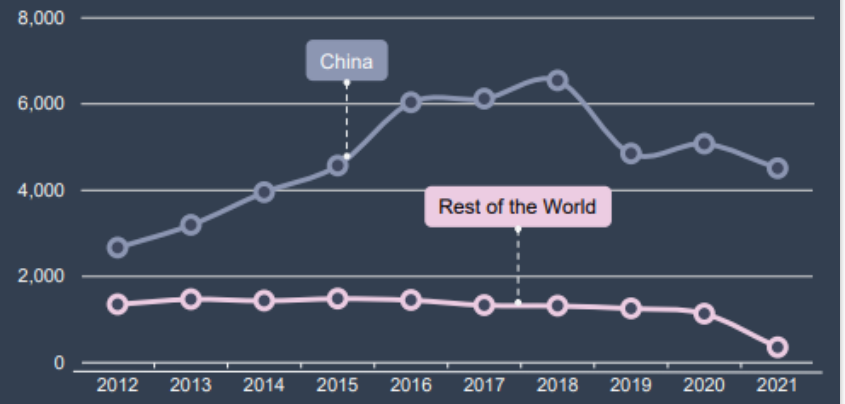
Figure 15. Network analysis of top collaborating entities in COVID-19 therapeutic patent applications

Analysis shows four main collaborating communities: a community primarily composed of United States and European universities and research institutions (purple), a group centered around two French research institutions, CNRS and INSERM (orange), a group centered around research institutions from the Republic of Korea (blue) and a group primarily composed of Chinese corporate entities and research institutions (gray).



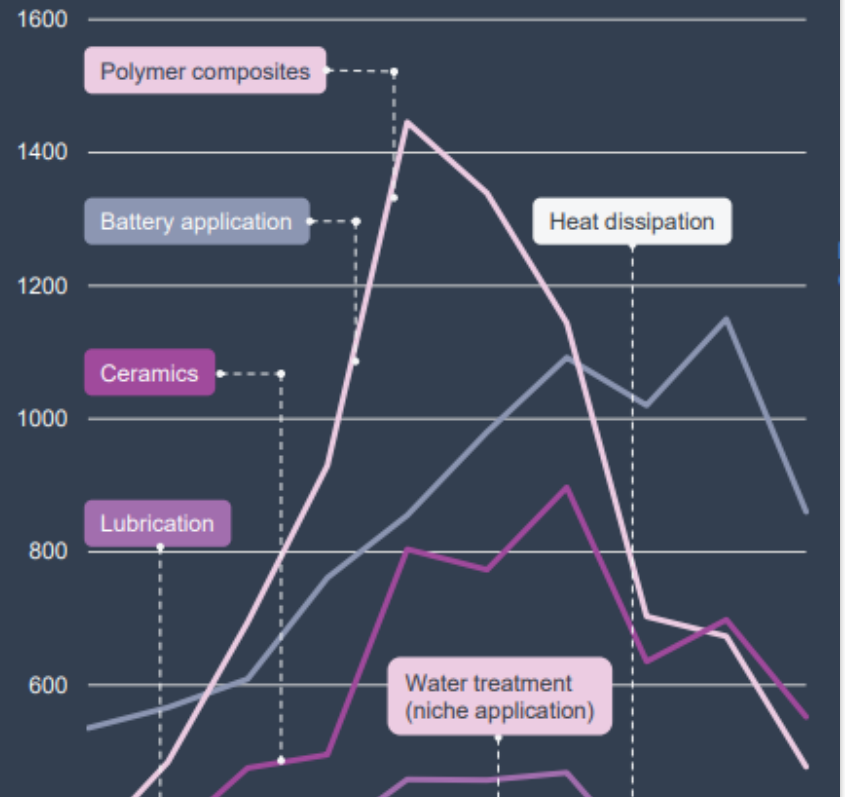
China dominated patent filings, with more than 47,000 patent families

Comparison of graphite-related patent families filed in China and rest of the world, by earliest priority year, 2012–2021.



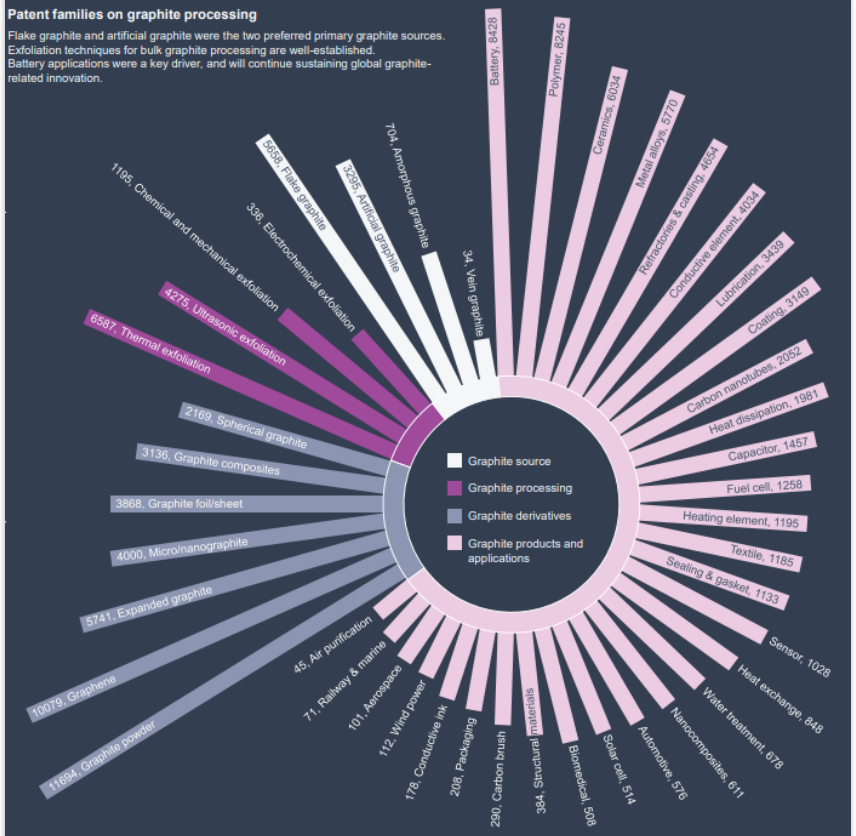
Current innovation hot topics and niche applications

Number of patent families by year of filing, 2012–2021.



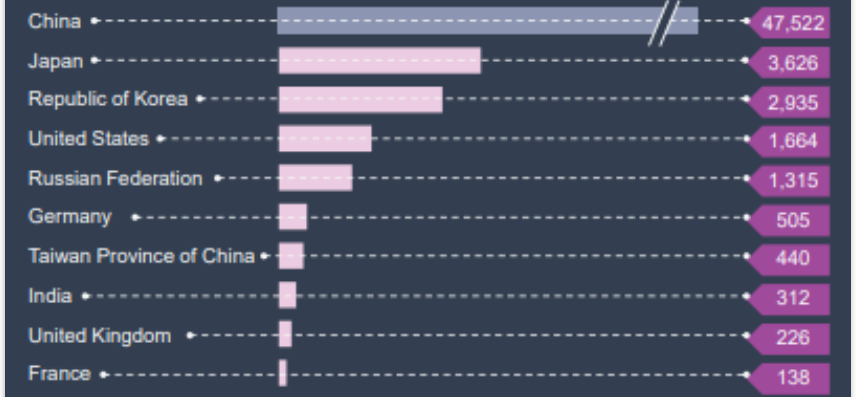
Patent families on graphite processing

Flake graphite and artificial graphite were the two preferred primary graphite sources. Exfoliation techniques for bulk graphite processing are well-established. Battery applications were a key driver, and will continue sustaining global graphite-related innovation.



Besides China, inventions have been concentrated in just a few other geographical regions.

Graphite-related patent families for the top 10 origins, by earliest priority year, 2012–2021.

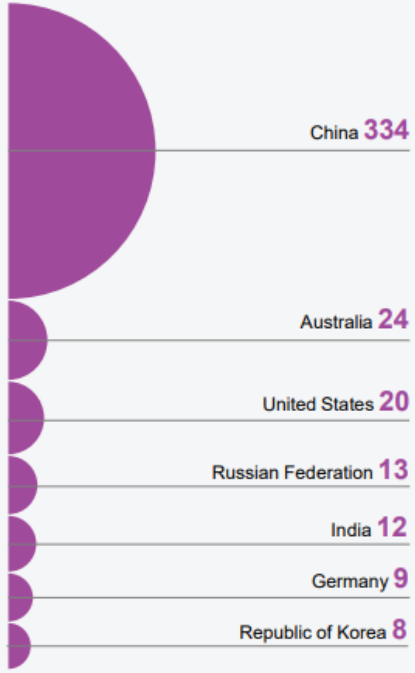


Innovation maturity matrix of graphite applications

The Innovation Maturity Mat
graphite application, based
how recently patent applicat

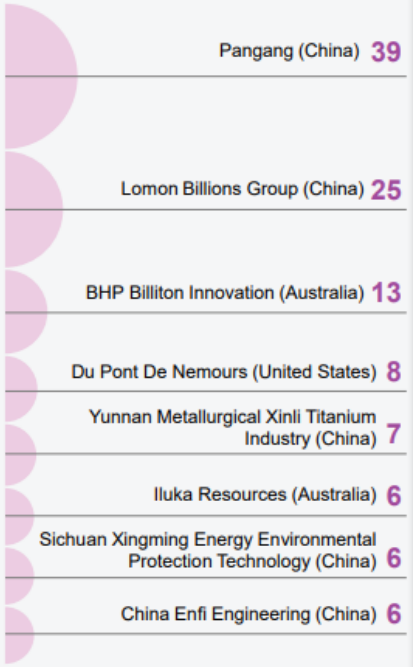
Where were the patents filed?

Relevant patent families by jurisdiction of first priority, 2002–2021



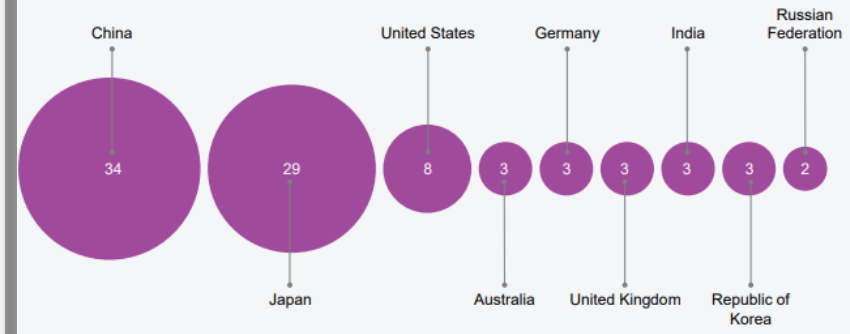
Who were the top patent filers?

Relevant patent families by patent applicants, 2002–2021



Where were the patents filed?

Relevant patent families by country of first priority, 2002–2021.



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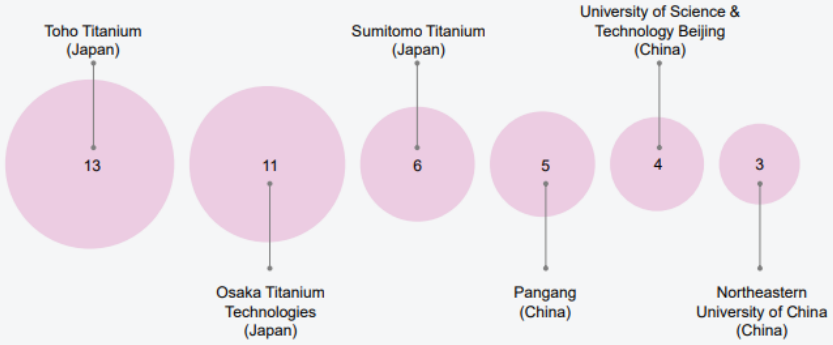
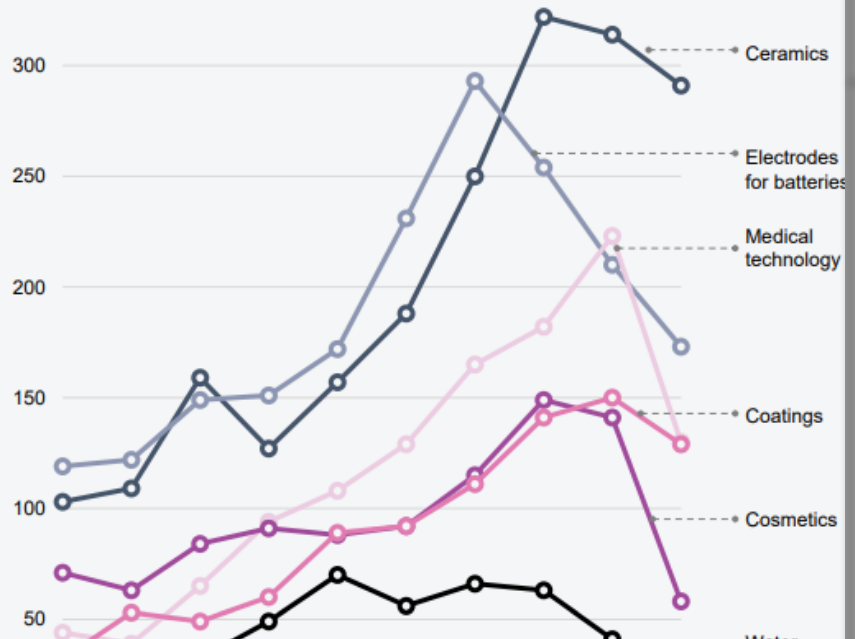
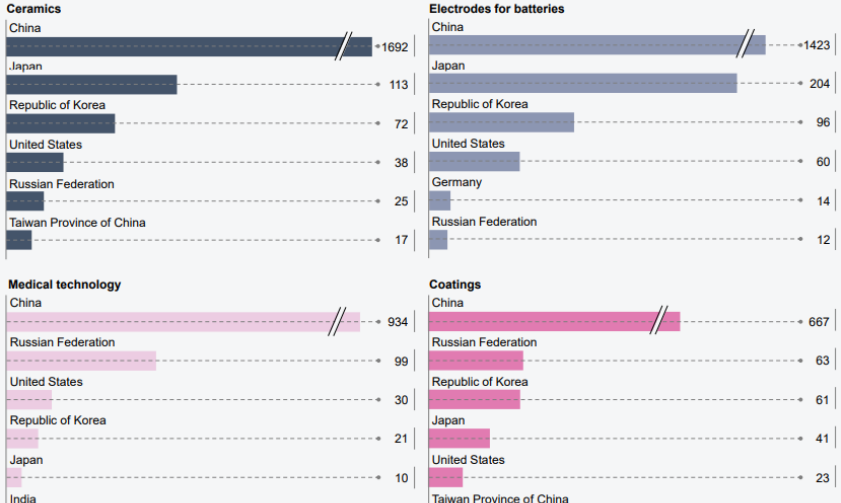
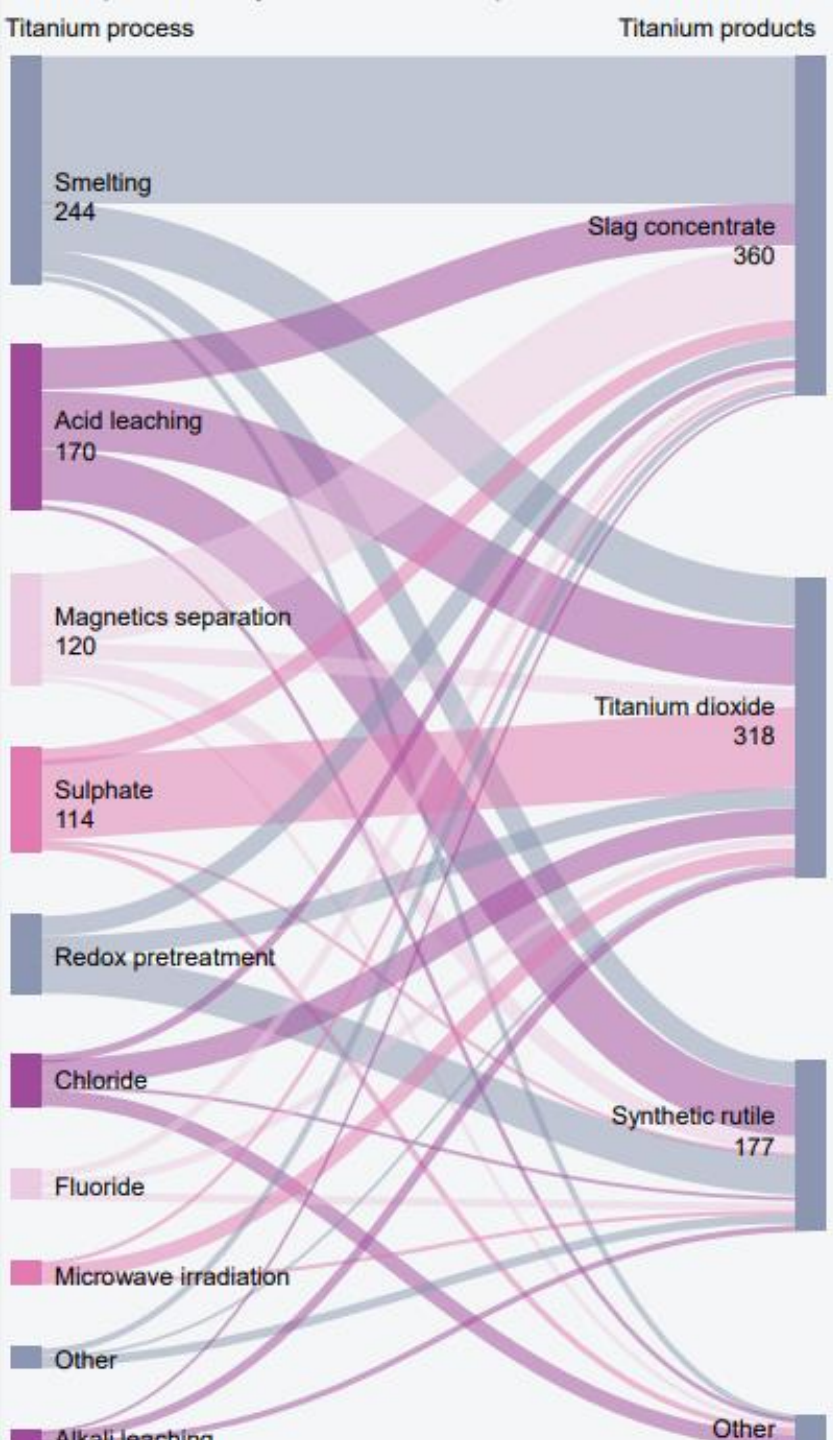




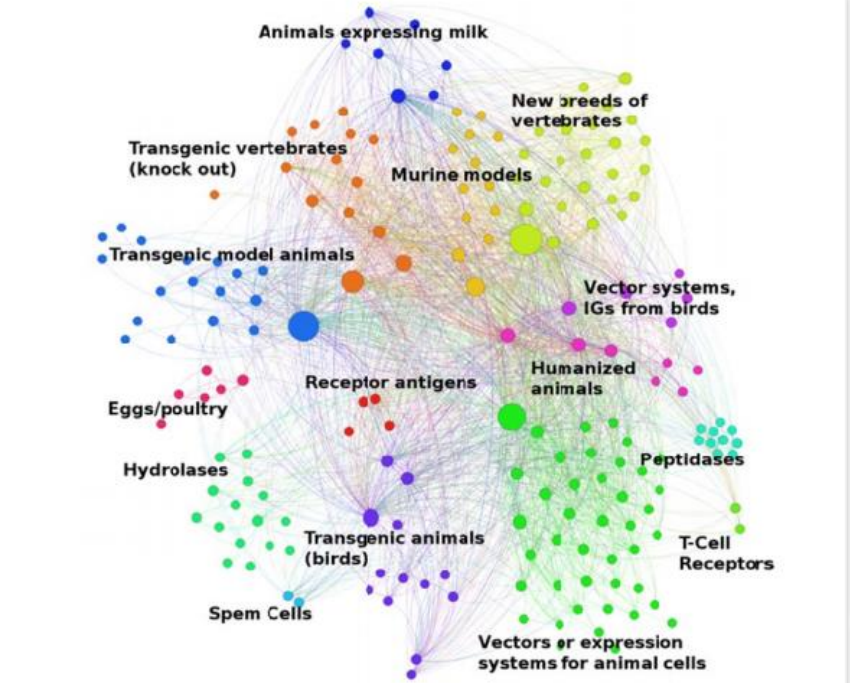
Where were the patents filed?

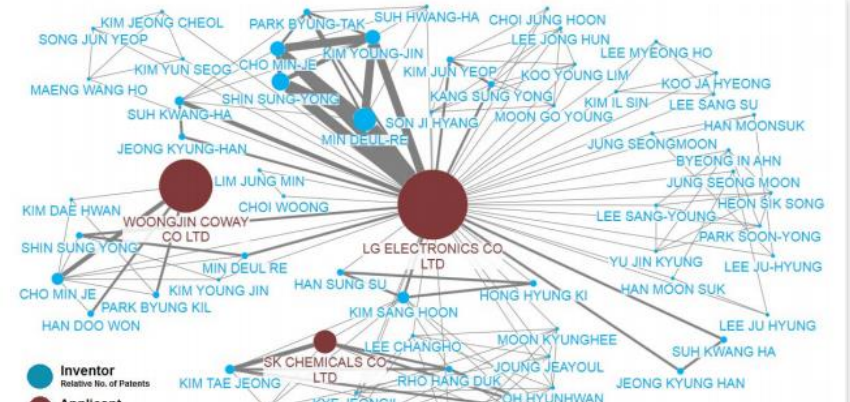
Patent families on different industrial applications of titanium dioxide and titanium by jurisdiction of first priority

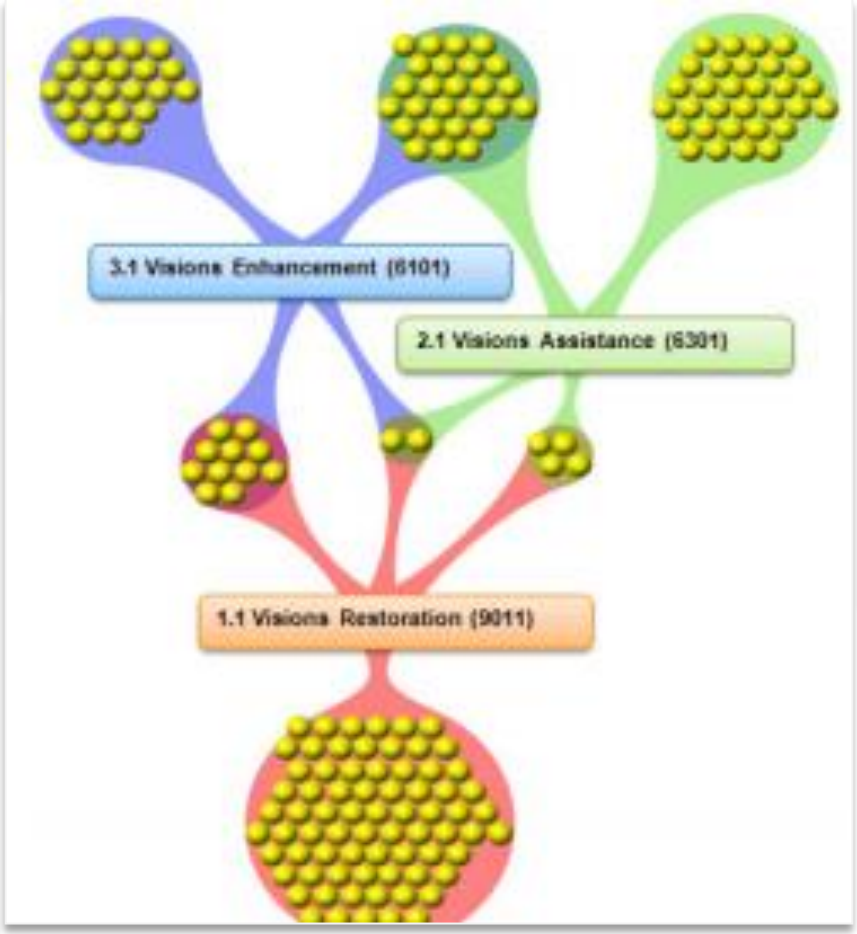


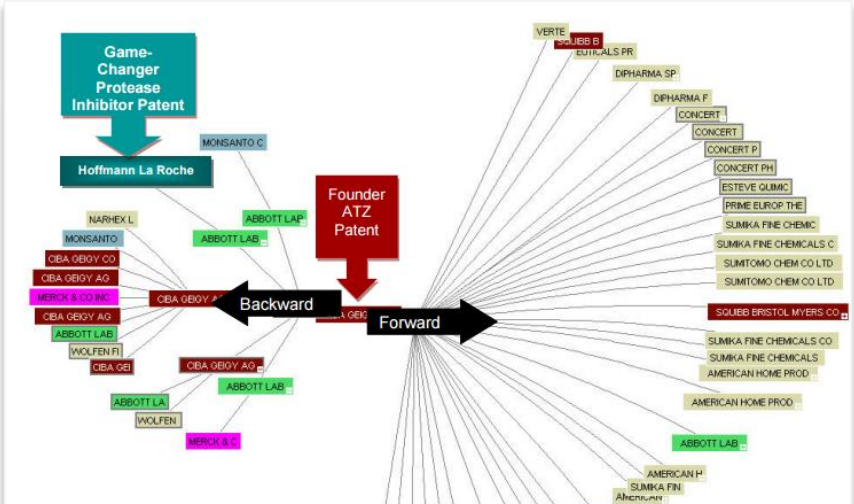


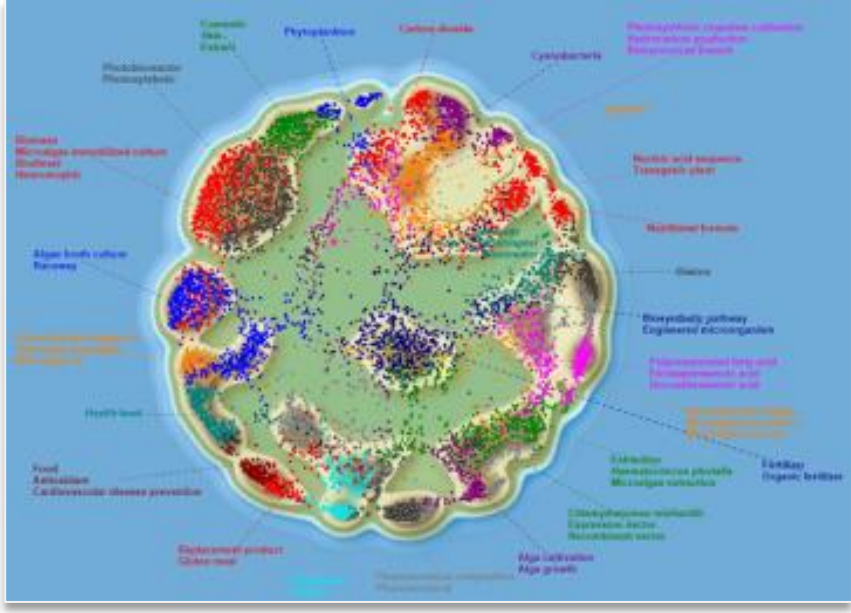
Select Assignee	Earliest Priority Years															# Inventions
	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	
ENANTA PHARM INC												4	12	9	15	40
GILEAD SCIENCES INC								3	4	3	1	6	8	8	4	36
ABBOTT LABORATORIES								4	18	1	11	5		5	4	48
ZIRUS INC														2	4	6
GLAXOSMITHKLINE							1	7	3	2	7	15	14	12	3	64
AICURIS GMBH & CO KG														4	3	7
MERCK & CO INC		4	3	5	19	14	23	19	6	15	10	7	6	2	3	134
RANBAXY LAB LTD											1			2	3	6
BOEHRINGER INGELHEIM INT								1	3	4	1	4	8		3	24
CONCERT PHARMACEUTICALS INC													4	2	2	8
BRISTOL MYERS SQUIBB CO					1	2	3	8	10	24	14	12	11	8	1	92
SCHERING CORP						1					1	4	7	5	1	18
NOVARTIS AG	1	2								1	12	7	5	3	1	31

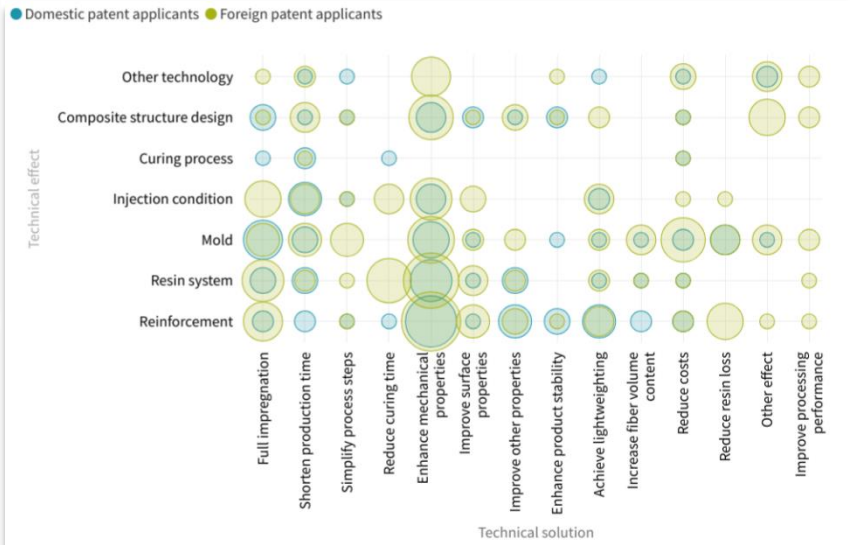


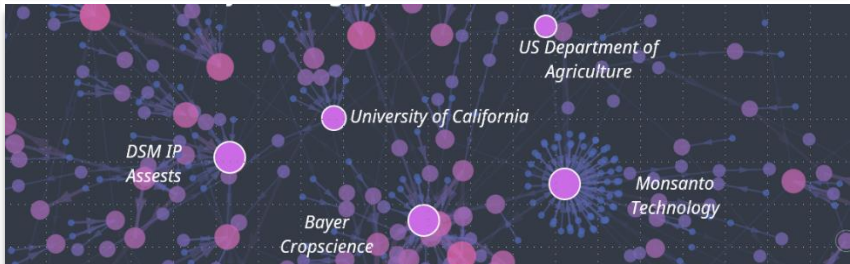












Narrative and storytelling

Tailored to the audience

- Report style, language and length should be adapted to the target audience
- Multiple reader profiles (e.g. lawyers, managers, scientists)
- The report should be easy to read, the messages and results clear and the visualizations intuitive and meaningful

Bringing the report to life

- An accompanying infographic, a storytelling approach, and/or a dashboard may be appropriate based on specific objective of the report
- Do not underestimate the importance of this step to ensure your report lands well

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Narrative and storytelling

Data » Sorted » Arranged » Presented visually » Explained with a story

Image credit: B.Rossen and K.Lurie

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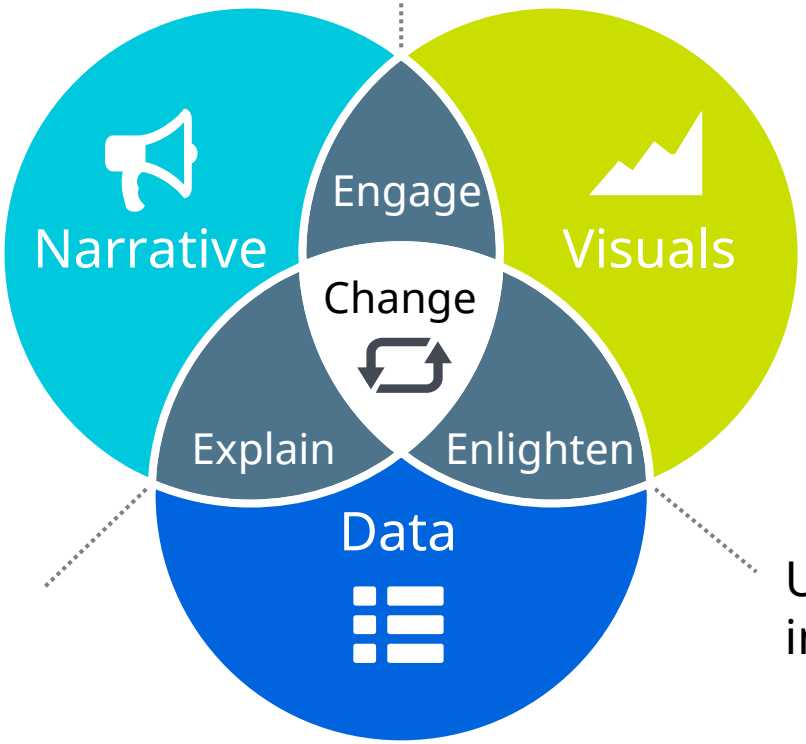
Narrative and storytelling

Combine narrative with visuals to connect with your audience.



Help your audience interpret and understand your insights.

Use data visualizations to reveal insights hidden in the data.

Taken from Effective Data Storytelling: How to Drive Change with Data, Narrative and Visuals by Brent Dykes

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Dissemination

A valued and useful resource, not a dust collector

Content Sharing

- Accessible reporting
- Presentation vs. sharing only a written report
- Static vs. interactive
- Infographics
- Background data / dataset / methodology

Target Audience

- Publicly available vs. shared privately
- Sharing with end-users of the report or intermediaries

Distribution Channels

- Social media
- Website
- Conference / seminar / workshop

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The rise of AI-powered patent analytics tools

- The number of patent analytics platforms utilizing artificial intelligence is proliferating
- AI algorithms that run them have developed substantially in recent years
- Vast quantities of patent data can now be analyzed much more quickly

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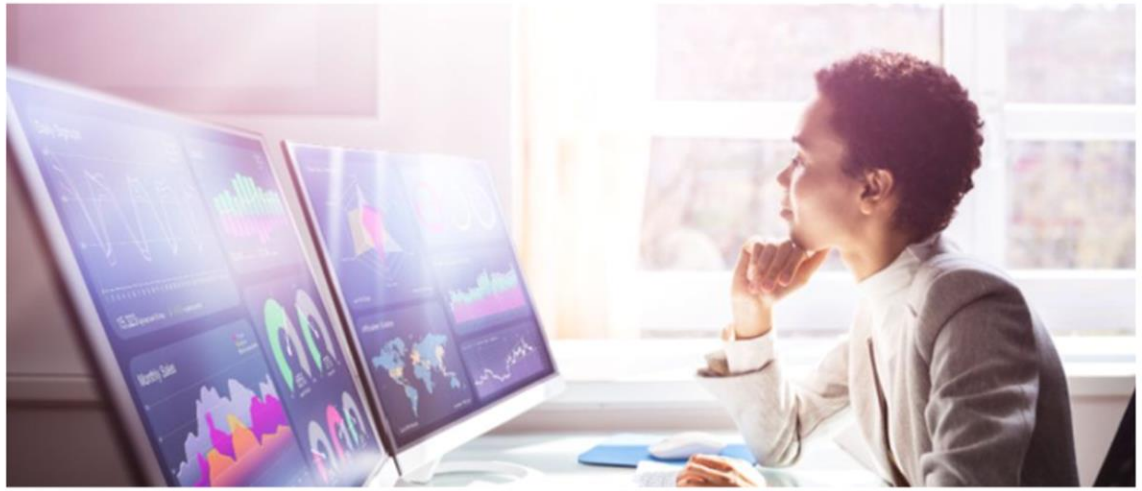
AI-powered patent analytics tools are transforming IP professionals' work

Angela Morris
19 July 2023

Print article



https://www.iam-media.com/article/ai-powered-patent-analytics-tools-are-transforming-ip-professionals-work

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AI tools are changing the patent analyst’s role

- AI tools will not replace the analyst
- But the use of AI tools will allow day-to-day tasks to be completed much faster
- And potentially deeper insights will be uncovered to better inform decision making

- AI tools are already very effective at speeding up data cleaning
- Massive improvements made in AI-assisted patent search too
- ChatGPT data storytelling?

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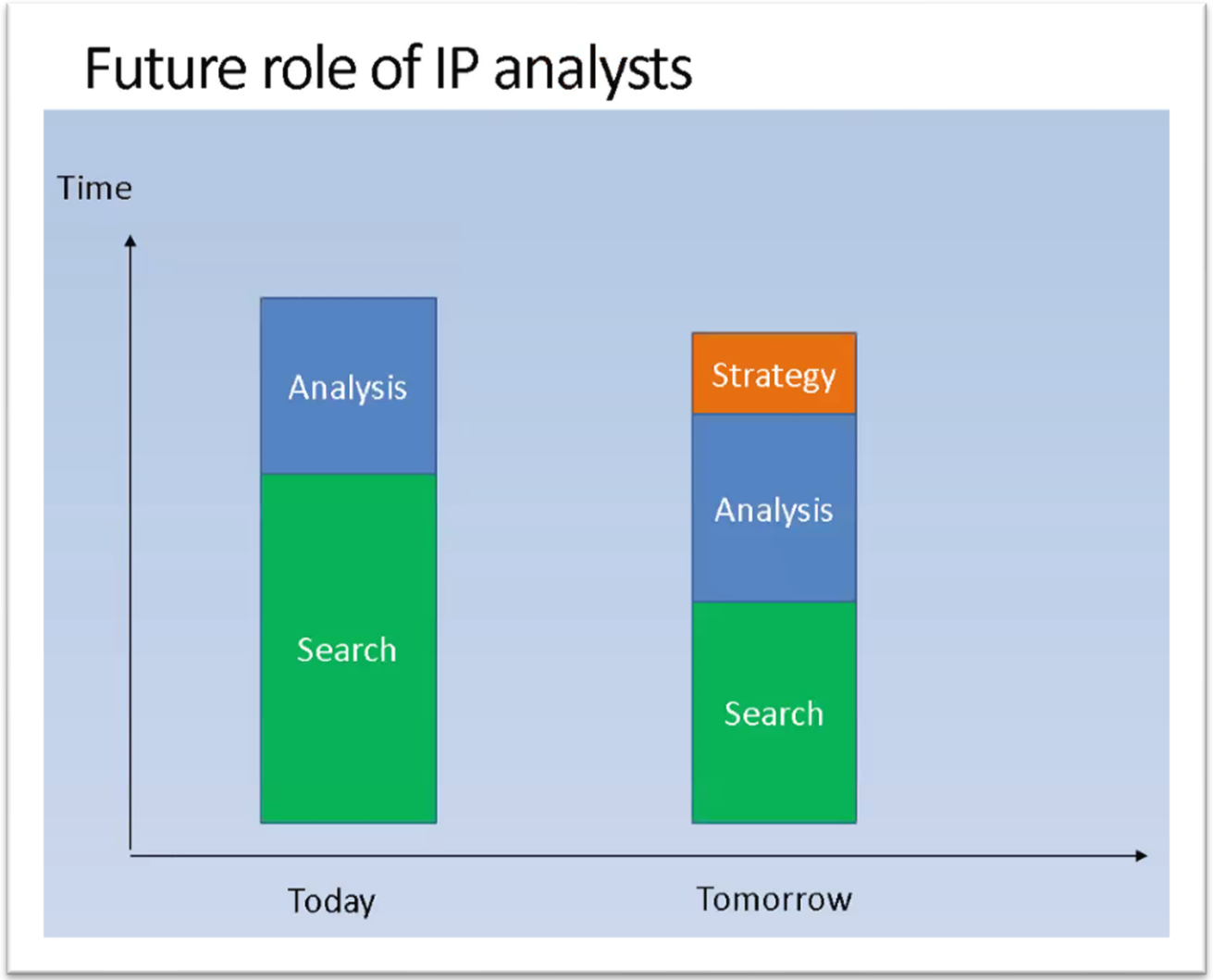
Improving resource efficiency



Linus Wretblad, IPScreener (EPO Patent Knowledge Week 2022)

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“In a world deluged by irrelevant information, clarity is power”

Yuval Noah Harari, 2018

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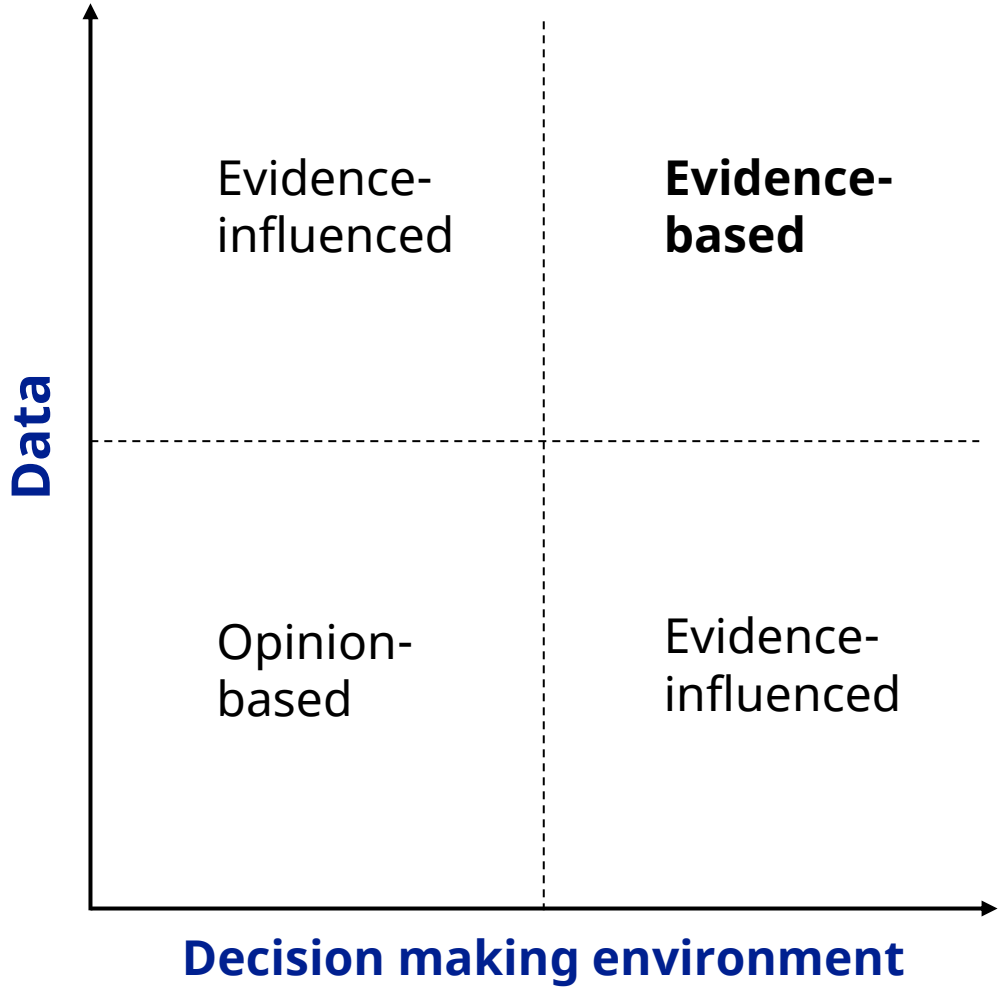
Why evidence-based decision making is important?



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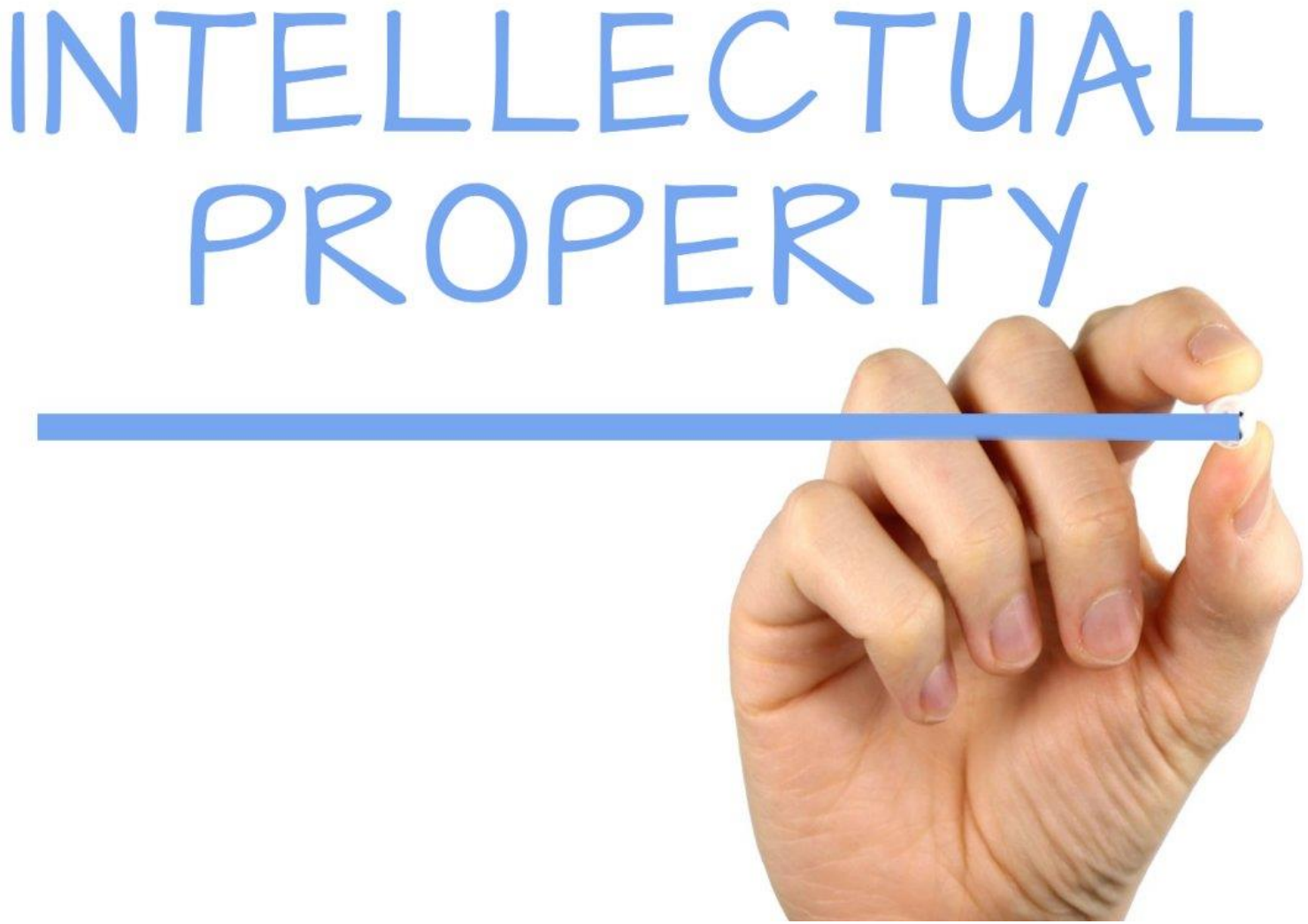
Why the problem exists?



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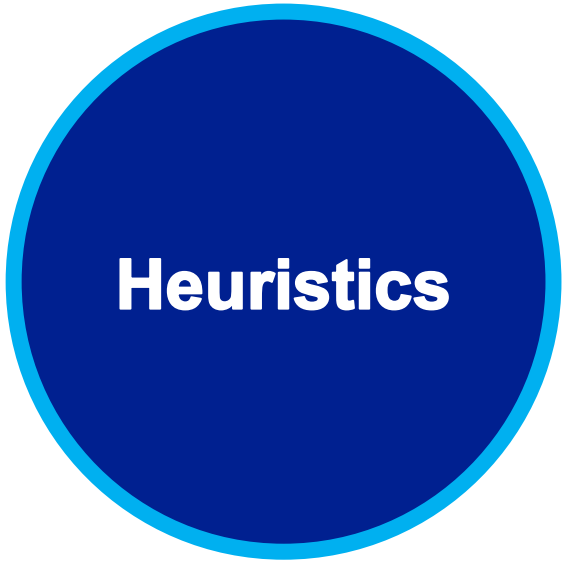
The science behind it



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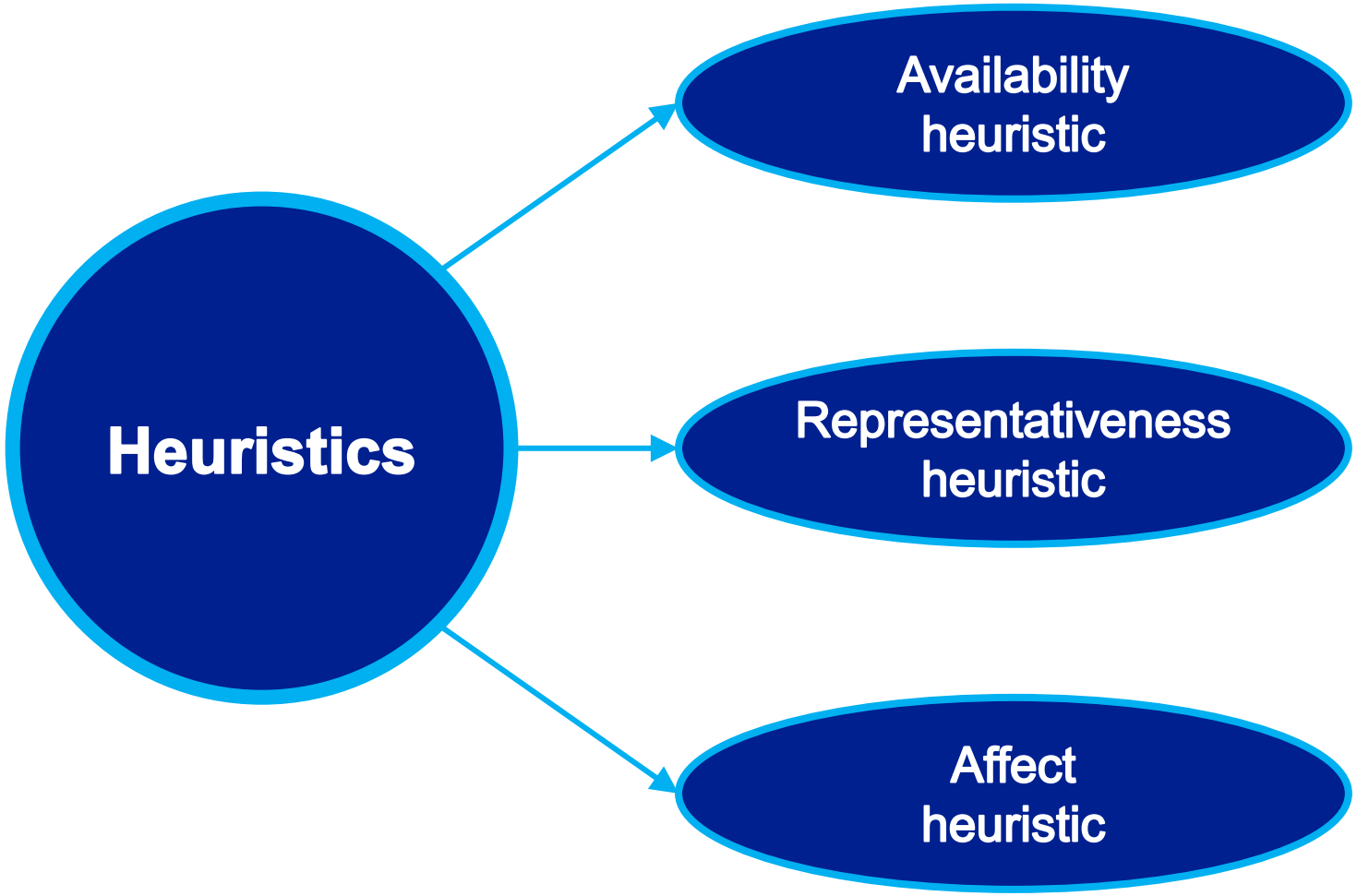
The science behind it



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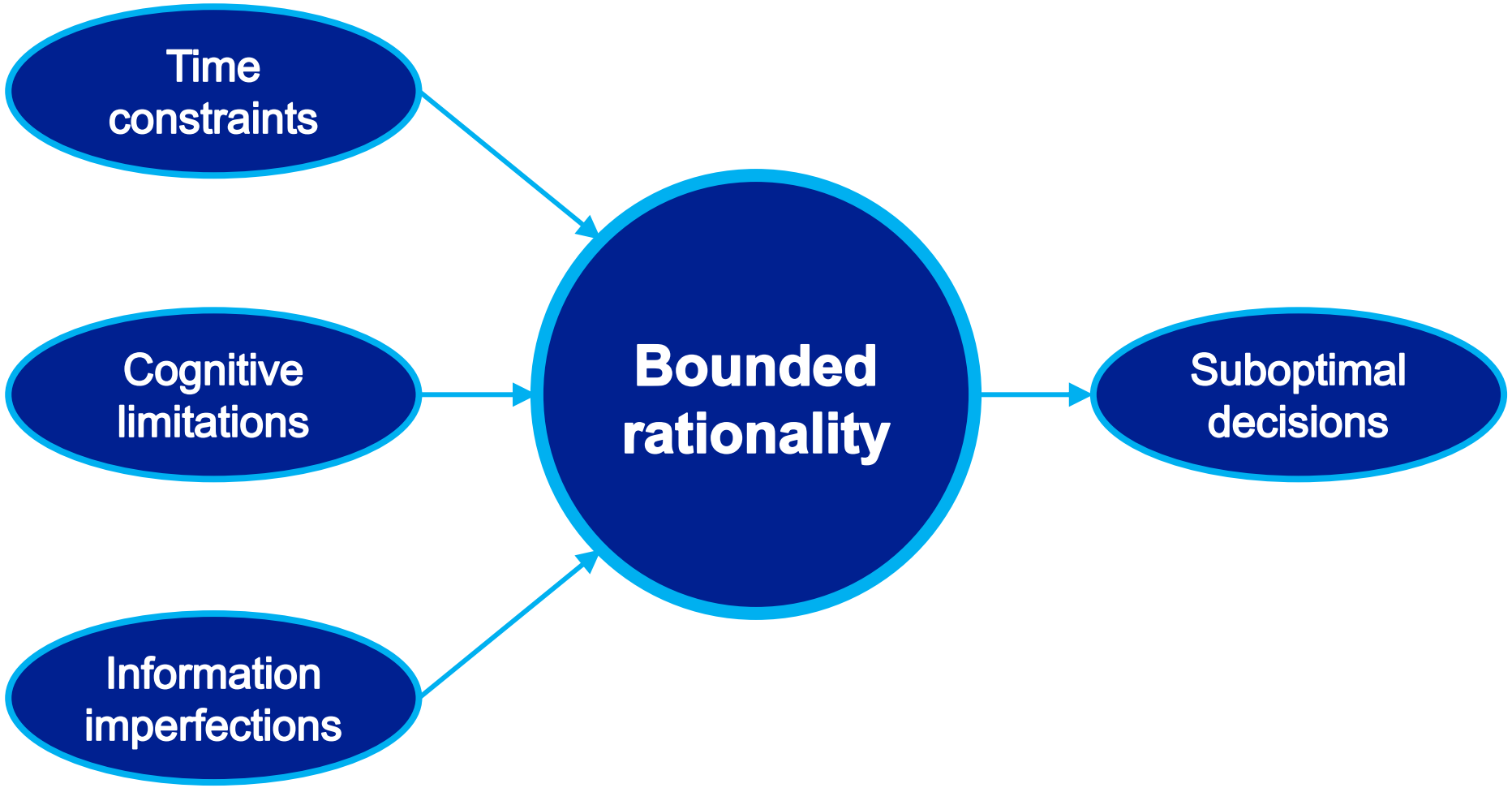
The science behind it



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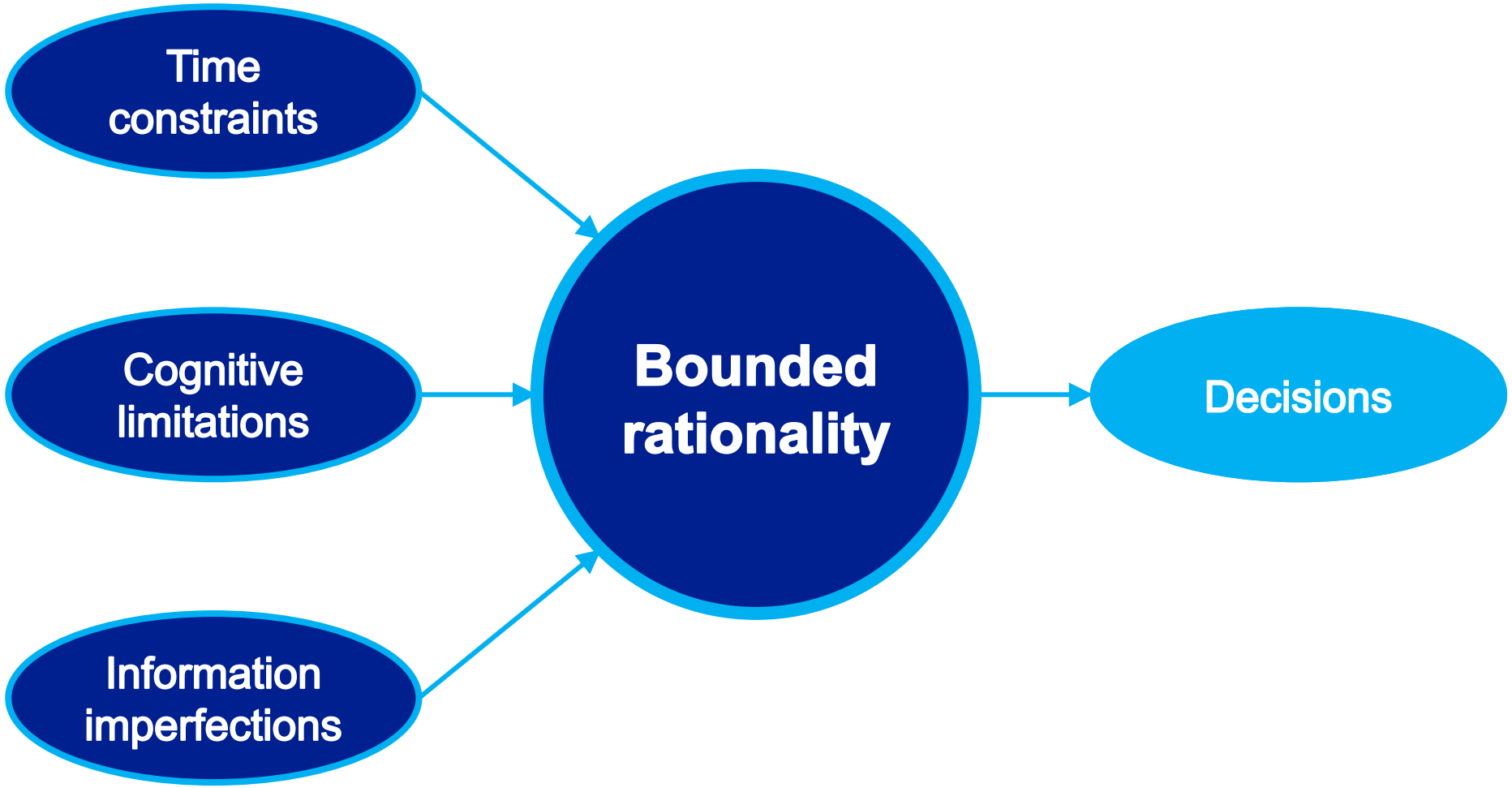
The science behind it



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How do we try to communicate effectively?

- The importance of IP education
- The question behind the question
- The power of advanced analytics software
- The role that visualizations play
- Data storytelling
- The feedback loop

Policymakers want to engage with the decision…

not necessarily the data

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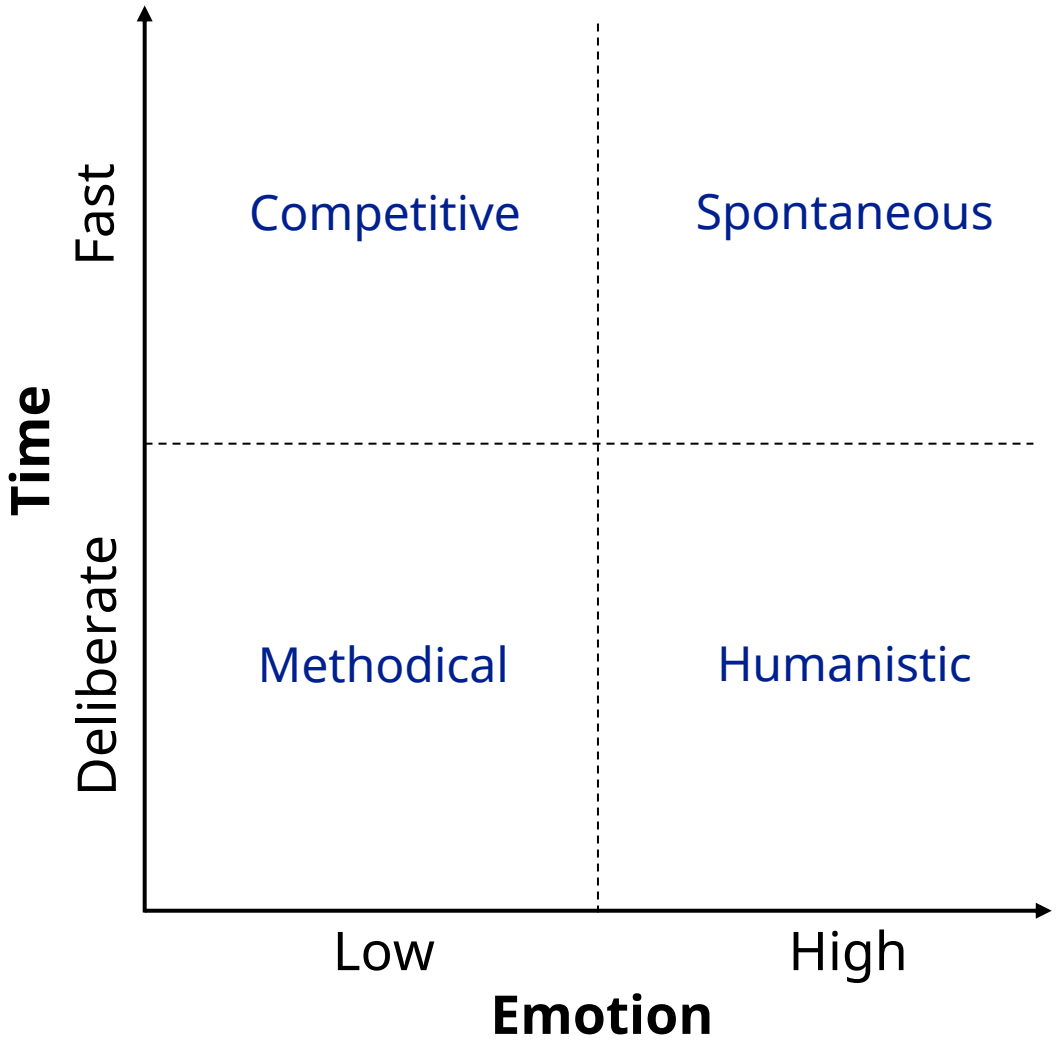
Effective decision making



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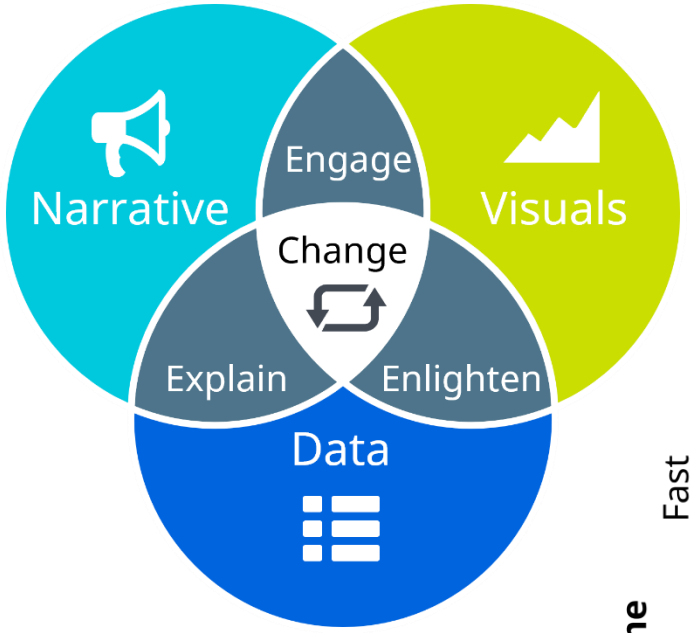
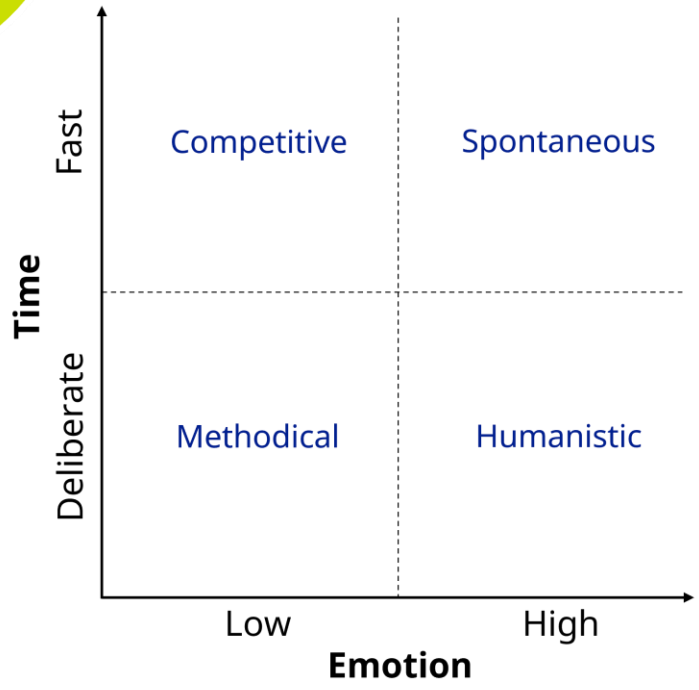
Data storytelling





People hear statistics, but feel stories

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WIPO

AI is changing the role of the patent analyst, so embrace it

How you communicate your analysis is key; people hear statistics, but feel stories

Patent analytics at WIPO

WIPO patent landscape reports

- Over 15 PLR reports on various topics prepared since 2010
- Compilation of publicly available PLRs

WIPO technology trends

- Big-scale patent landscaping exercise with additional data analysis, contextualization and expert inputs

Patent analytics methodological resources

- WIPO guidelines for preparing patent landscape reports
- Manual on free and open-source tools for patent analytics
- Handbook on patent analytics

Patent analytics training

- Introductory and advanced training webinars/seminars and workshops

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Thank you for listening!

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INTELLECTUAL PROPERTY
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