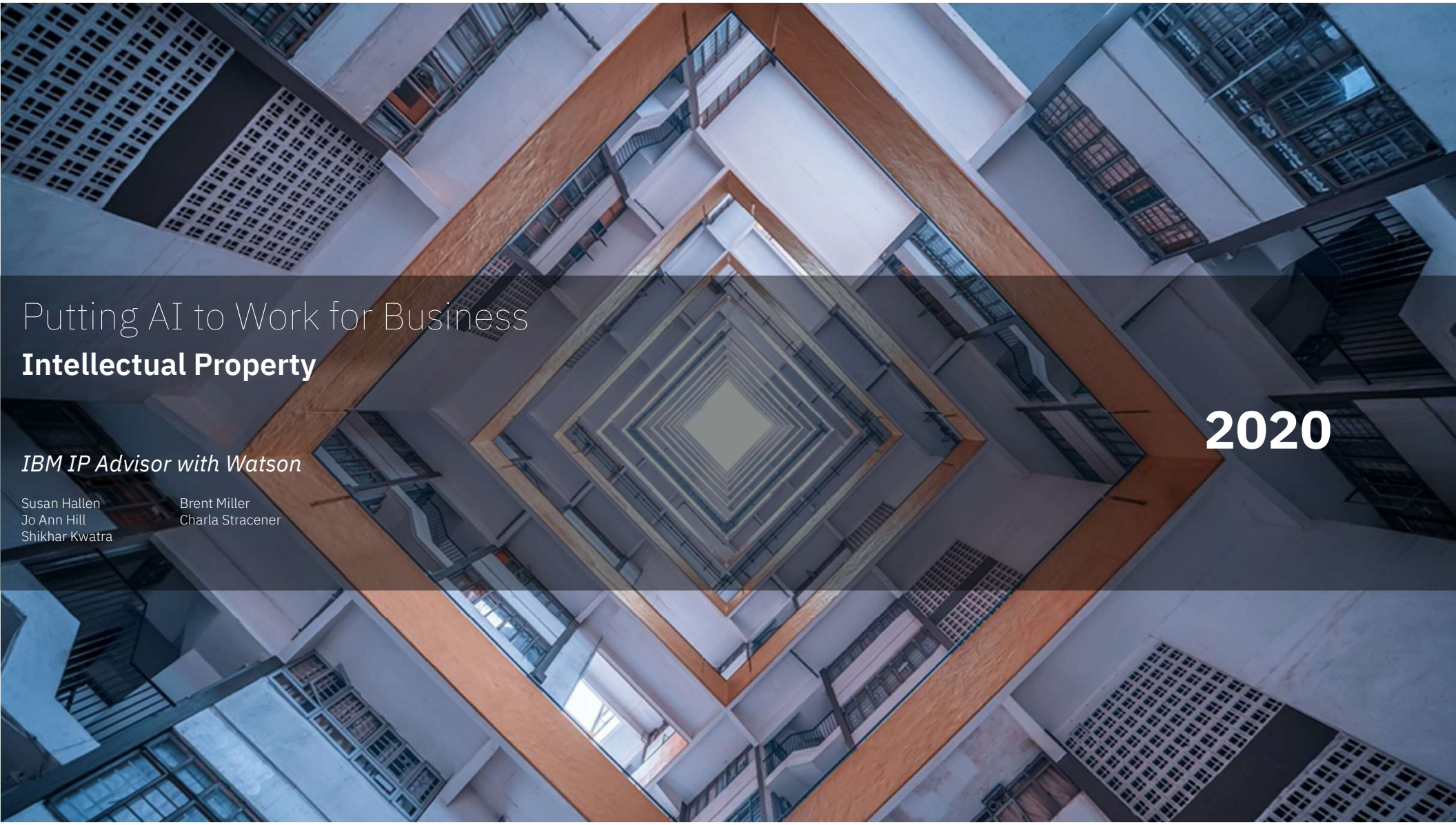

Putting AI to Work for Business

Intellectual Property

2020

IBM IP Advisor with Watson

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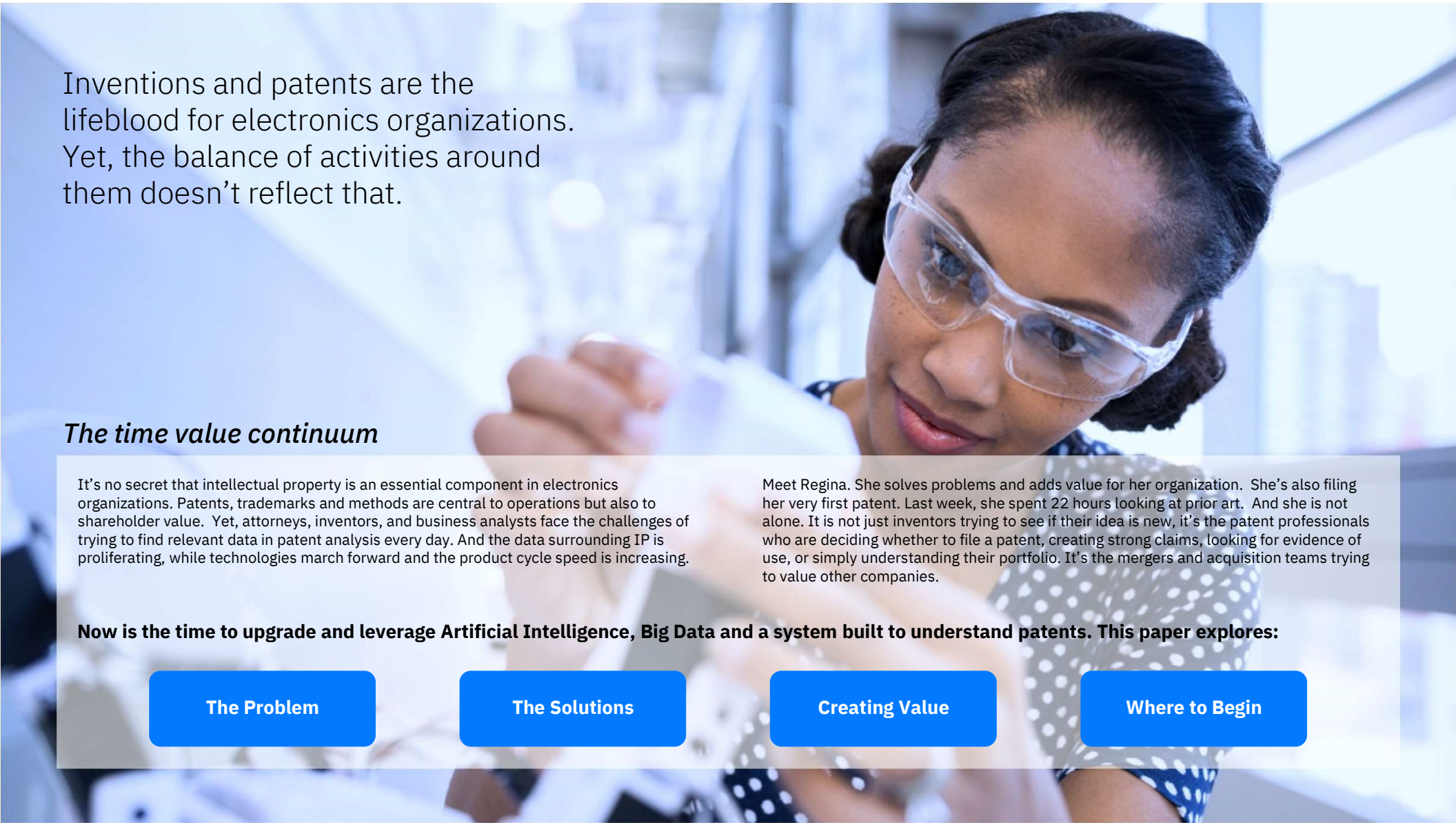


Inventions and patents are the lifeblood for electronics organizations. Yet, the balance of activities around them doesn't reflect that.

The time value continuum

It's no secret that intellectual property is an essential component in electronics organizations. Patents, trademarks and methods are central to operations but also to shareholder value. Yet, attorneys, inventors, and business analysts face the challenges of trying to find relevant data in patent analysis every day. And the data surrounding IP is proliferating, while technologies march forward and the product cycle speed is increasing.

Meet Regina. She solves problems and adds value for her organization. She's also filing her very first patent. Last week, she spent 22 hours looking at prior art. And she is not alone. It is not just inventors trying to see if their idea is new, it's the patent professionals who are deciding whether to file a patent, creating strong claims, looking for evidence of use, or simply understanding their portfolio. It's the mergers and acquisition teams trying to value other companies.

Now is the time to upgrade and leverage Artificial Intelligence, Big Data and a system built to understand patents. This paper explores:

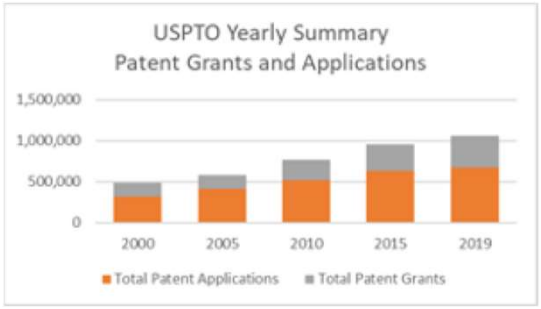
The Problem | **The Solutions** | **Creating Value** | **Where to Begin**

The Problem

It's all too familiar: mountains of data, resource constraints, technologies seeming to change in weeks not years, a shifting competitive landscape and time that seems to be moving faster.

Inventors, like Regina, and patent professionals are inundated with data and ideas. She has a choice of putting her considerable talents to creating game changing technologies or performing a thorough analysis for a patent. Should she read up on changing technologies and competitors? Does she understand new processes and specifications? Where does she find relevant information in a timely fashion?

In the United States alone, the number of patent applications and patent grants are increasing year over year. Concurrently, the accompanying non-patent literature, from research papers to product documentation to web site details and surrounding video, audio and news captured digitally is growing. And it's not just growing, it's exploding.



IDC projects that our global datasphere (the sum of the world's data) will grow to 175 zettabytes (ZB) in 2025 from 33 ZB in 2018; growing about 400%[2]

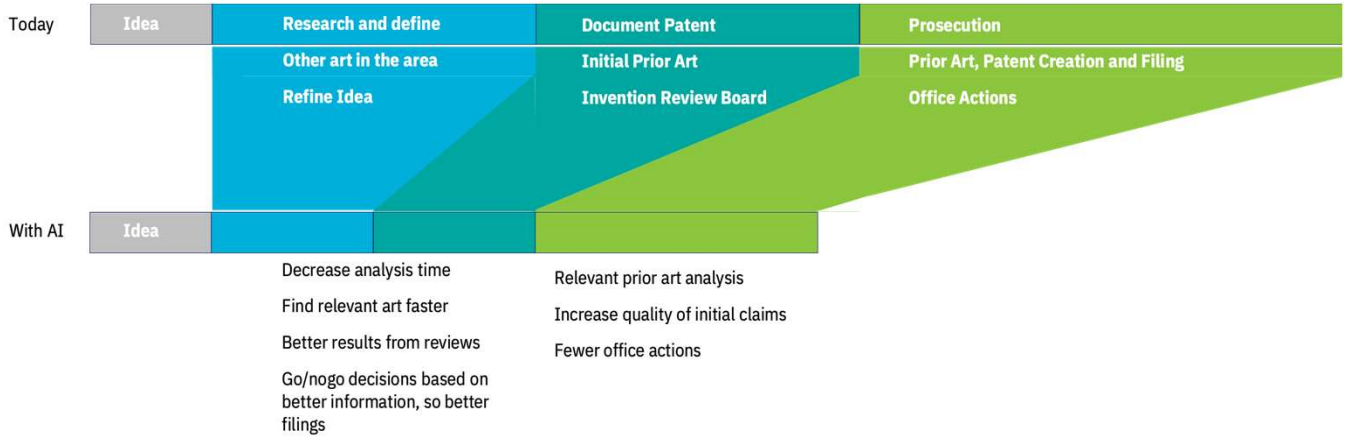
Left: data source[1] : https://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.html

Example 1: Regina submits a disclosure for a new idea to her companies Invention Review board. She does her due diligence describing the novelty and non-obviousness and the board decides to recommend filing for a patent. Now the fun begins: the attorneys invest time and $$ to write the patent application, sometimes with outside counsel. During prosecution, the patent went through three office actions, each taking time and more money. Eventually, several years later the patent is granted. And in the meantime, Regina has used to idea on several products.

Using AI to find relevant data faster in the invention review and prosecution processes would have resulted in better claims and fewer office actions, all saving time and money, and resulting in better patents.

Example 2: A patent licensing team believes another company is infringing on one of their patents. The team needs to find information on the products they think the patent reads on, create the proof charts, approach the company to either license the technology, buy the patent, or take them to court and sue for infringement.

Using AI enables finding additional relevant patents and speeds up the identification of the matching passages, cutting down time to relevant answers by up to 60%, adding as much as 50% additional relevant results.



New solutions: State of the Market in IP tools

Market research shows that the global Intellectual Property Software Market Size will reach 6943.29 million US$ in 2025, from 2555.36 million US$ in 2018, with a CAGR of 14.73% during the forecast period.[3] Overall, the Intellectual Property Software products performance is positive with the current environment status.

Figure Global Intellectual Property Software Market Size (Million US$) Status and Outlook (2014-2025)

Source: Secondary Sources and QYR Software Research Center, May 2019

Watson Inspiration

Artificial Intelligence has moved into the mainstream but it is still in nascent stages and improving daily.

When the IBM Intellectual Property team saw Watson win on Jeopardy, and then move into a full-fledged product with a wealth of data, models and algorithms behind it, we saw tremendous power in patent analysis.

Leveraging natural language processing, machine learning and other AI techniques, we applied Watson Discovery to patent analysis.

Since beginning to use IBM IP Advisor with Watson internally in late 2017, we have had tremendous results in speed of analysis and better searching, directly impacting licensing deals, assertion research and Standard Essential Patents (SEP) pledge identification.

With the increase in globalization and the transition toward the knowledge economy, organizations are increasingly dependent on their intellectual property intangibles to generate, maintain, and extend their competitive advantage.

Successful technology companies need to have an effective intellectual property strategy as an integral component in their business strategies and models. This often becomes a key source of competitive advantage.

Across the value chain, there has been an increased focus on maximizing the return on investment from R&D, which has triggered a spike in participation in the IP Marketplace. According to Frost & Sullivan, AI will be leveraged by organizations to increase operational efficiency.[4]

Intellectual property and legal areas include trademark, patent, copyright, design and litigation IP management software, and search and competitive analysis software.

Digitalization is driving adoption of advanced IP management systems. These systems are leveraging emerging technologies such as AI, blockchain, deep learning, machine learning and natural language processing.

Because technology development time is getting shorter and technologies are becoming obsolete faster, the need to build, manage, and monetize IP Assets are becoming key challenges.

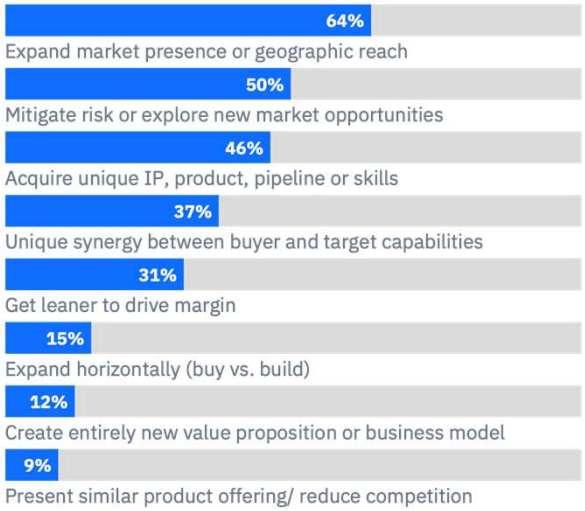
To that end, companies are keenly looking for new business models to address these issues.

According to Effectual Knowledge Services Pvt Ltd, “Even patent offices are hunting for best possible AI solutions to handle the ever-increasing volume of the literature and to increase efficiency for examiners. AI and machine learning also analyze the behavior of the searcher, compare and include competitor and market information with patent data and thus, incorporate market and business information in the analysis.”[5]

Insights into applying AI to IP

Patent interpretation by law firms, companies or the PTOs across the world is defined by basic rules and precedent. However, there is also subjectivity involved. How can AI be used to understand novelty or the most important elements of a claim? How can AI be used to quantify the value of an M&A target?

In a 2019 Institute for Business Value study on "Stronger M&A strategies through AI-driven processes"[6], Electronics company CEOs bought companies in order to:



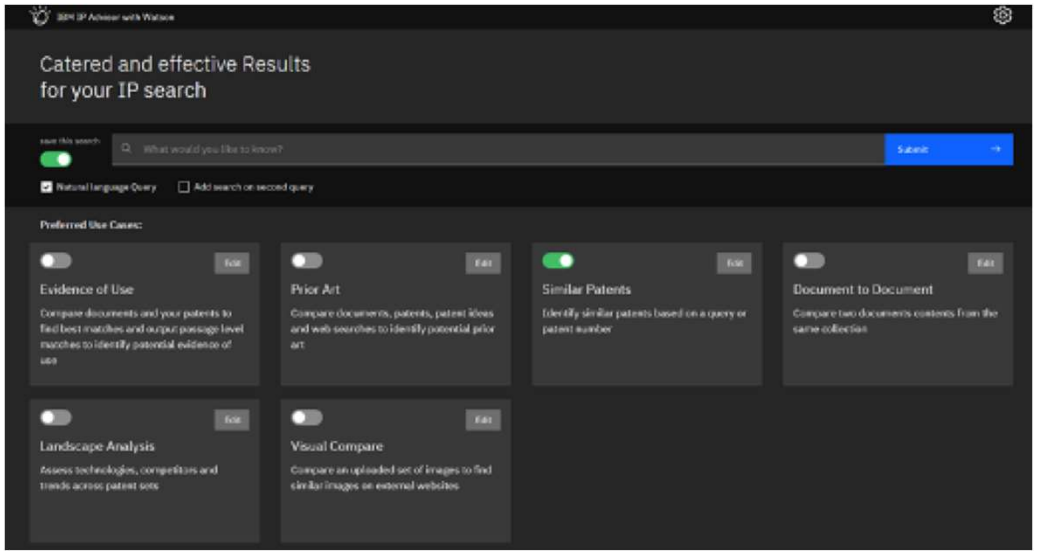
The first step is identifying the IP that will provide added value either for your product line, a new product line or moving into a new business area. Of the 46% of companies that bought others for the purpose of acquiring unique IP, product, pipeline of opportunities, they reported a 22% decrease in time to market. Including analysis of a company's existing IP and research areas, then overlaying that with your own companies IP, products and research, provides valuable insights into synergies, complimentary areas, and overlap areas. Using AI techniques of Natural Language processing, Machine Learning, Deep Learning, Elastic Search provides faster and more complete results.

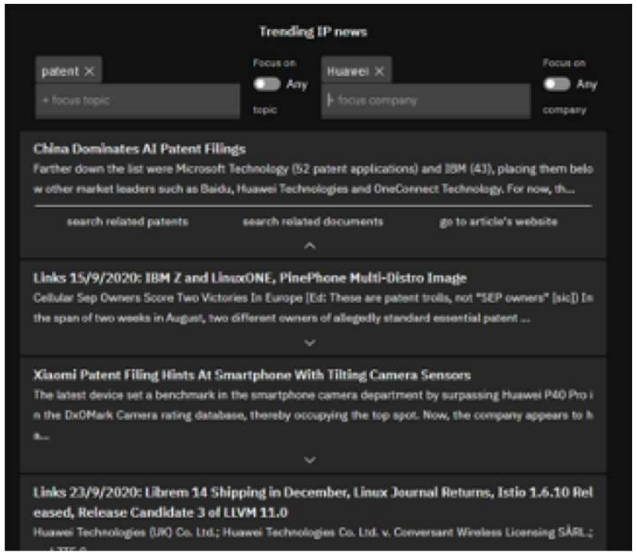
M&A Tenets	AI IP Analysis
Identify and quantify value	• Assess portfolio and pipeline of innovations • Overlay strategy and IP; identify gaps, overlap, synergies • Assess the strength of the IP and impact to your business
Understand and mitigate value at risk	• Assess the value of the incoming IP: will you use it? Sell it? License it? What is the potential value? • Assess value of the new markets the target company can open for you
Realize and maximize value	• Divest of the parts of the portfolio that do not add value • Leverage the IP that does add value

Solution: IBM IP Advisor with Watson (IPA)

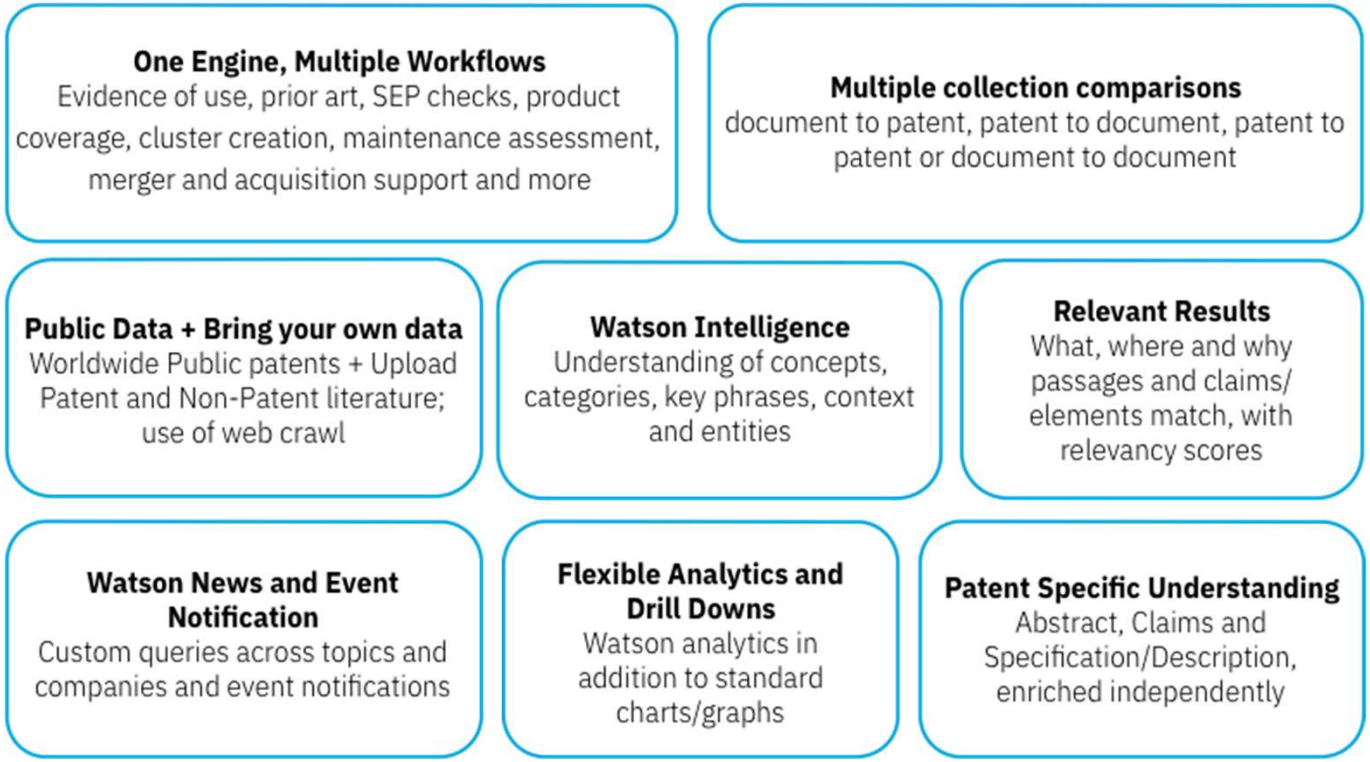
IP Advisor with Watson (IPA) enables users to easily navigate complex documents and patents to identify relevant patents for possible infringement and show evidence about the results. By digesting and analysing large amounts of data, sorting it for relevancy and enabling natural language processing of queries, IPA saves patent engineers, IP attorneys and inventors time, while increasing accuracy of results.

IPA is a cognitive patent search platform that combines deep IP and patent knowledge with AI from Watson Discovery, News, Analytics and Knowledge Studio. It leverages natural language processing for analysis in addition to standard structured queries. IPA is Kubernetes-based for multi-cloud implementations. It is currently on the IBM Public Cloud, and the security around the Watson collections and cloud access ensure that your proprietary data is secure. This solution is easily supported on other cloud solutions and supports multiple use cases





Each use case has specific default workflows and settings. For example, Evidence of Use focuses on granted patents and claim matching, because that is what is needed to prove infringement. Prior Art focuses on all patents, regardless of status, because a broad search benefits discovery. All filters can be modified dates, tags, assignees, patent status, direction of search and depth of search. The engine underneath the use cases is the same, and has some basic tenets:



Example Use Case: Evidence of Use (EoU)

Imagine that Regina was able to get a patent on her robotic invention that uses a Bluetooth connection, but at a trade show she sees another robot that she believes is infringing on her patent. She raises her concern to the patent legal team. They have a patent analyst research the case.

Step 1: Using IPA, the patent analyst researches the company and product that Regina identified. The web crawl saved considerable time in downloading the publicly available information directly into IPA. The patent analyst loads additional documents and web scrapes into IPA.

Step 2: Perform a patent-to-document search, using Regina's patent number in the query and the appropriate document tags.

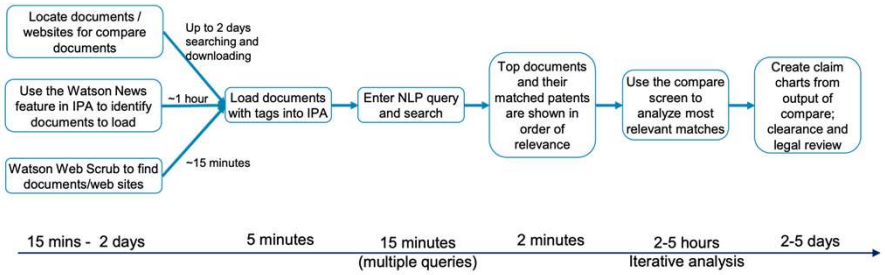


Figure 3: Example workflow for evidence of use

Step 3: Analyze the results using the analytics, comparison and landscape features as needed.

Initial results show the documents in relevance order. Comparisons of the claims and claim elements provide a basis for quickly creating evidence of use. IPA helps patent professionals to find the most relevant information quickly, so that they can apply their experience and expertise to narrow and validate the results.

Step 4: Create the evidence of use materials and negotiate a license deal with the company that infringes Regina's (her company's) patent.

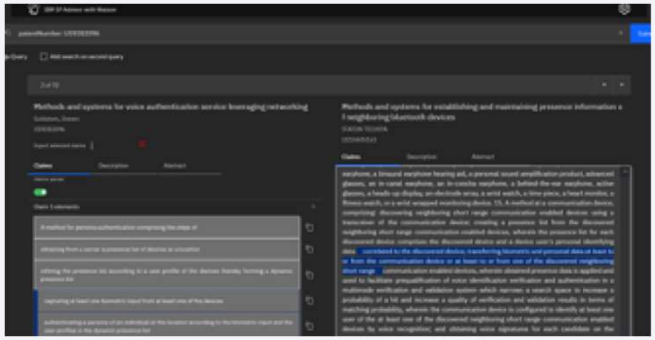


Figure 4: Compare screen using claim elements

Creating Value: Importance of IP Advisor

It's not easy: IP challenges for companies, law firms and other organizations include infringement identification, prior art identification, office actions, landscaping and merger and acquisition analysis. Leveraging the value of intellectual property, including monetizing.

To fully understand an IP portfolio, determine whether others are practicing what your patents protect, negotiate fair licensing deals, determine if litigation is appropriate and all the other activities involved in monetizing IP, requires specialized and uncommon technical, legal and business skills. It takes a substantial investment in time, labor, skills development and tools.

These tools can make a difference! Because deriving value from IP is labor intensive and skills dependent, increasing productivity leads to higher value. Some of the results observed with IBM IP Advisor with Watson include:

- **50 percent increase in additional patents found** and use in licensing deals driving increased license value
- **70 percent decrease in time to find relevant patents** for licensing evidence of use and prior art
- **60 percent decrease in time to create a short list of patents** to pledge to a standard
- **50 percent decrease in time to find similar patents** for maintenance and prior art analysis
- These outcomes were achieved by gaining new insights, thanks to IBM IP Advisor with Watson's artificial intelligence capabilities.

Creating Value: IP Advisor Differentiators

IBM IP Advisor with Watson is one of the first IP tools that leverages AI throughout the process, enabling users to easily find and navigate complex documents and patents. Although some other IP tools advertise AI, IBM IP Advisor is built on the foundations of Watson Discovery, part of IBM's powerful AI offerings from one of the world's leaders in AI.

IBM IP Advisor with Watson helps to increase productivity by rapidly ingesting, reading, analyzing and generating insights about a large corpus; analyzing an entire corpus simultaneously without bias; and generating results, with supporting evidence, in seconds for activities that might take days for an IP professional to accomplish using typical tools.

IBM IP Advisor with Watson also improves accuracy through the infusion of natural language understanding that is more robust than keyword or semantic searching; machine learning that could improve results over time and expand the scope of knowledge with new training data; determining entities and relationships with relevance scores; and clearly displaying and reporting results, supporting evidence and comparisons.

IBM Watson Discovery uses natural language processing and understanding, along with enrichments for concepts, categories, key phrases and entities. IPA is an application layer that puts the power of patent knowledge and use cases at the forefront. This combination enables users to provide queries using natural language, rather than spending time to construct the "perfect query" or "perfect keywords" to obtain the best results. Gaining understanding about the context of patents and companies, based on partial query constructs, allows for a significant advantage by providing meaningful insights. However, in cases in which structured queries are most appropriate, IBM IP Advisor with Watson also leverages a structured query capability.

AI capabilities also assist in comparing and analyzing results. This is not merely simple keyword comparison, or even semantic comparison – AI enables sophisticated conceptual analysis and comparison of various document types across a large corpus.

IBM IP Advisor with Watson also enables users to add their own data. Public collections include worldwide patents. Private collections for documents and pre-published patents are available to the client's private URL. Documents can be anything digital: product manuals, papers, articles or any other documents that you want to understand relative to a particular set of patents. The pre-published patents collection can contain invention disclosures prior to filing or non-public filings, which could be used to quickly assess prior art before time and energy is spent in filing.

Additional capabilities that differentiate IBM IP Advisor with Watson include:

- Comparison of two documents from the same collection.
- Comparison within a patent to analyze where and how a term in a patent claim is defined in the description of that patent.
- Analyze an uploaded set of images to find similar images on external websites.
- Analytic reports, including custom reports, to aid understanding, show patent landscapes and more.

IBM IP Advisor, with built-in AI, offers significant benefits in terms of productivity and accuracy, with demonstrated real-world results. All of its capabilities are built to provide IP professionals with a powerful tool that enhances business value.

"IP Advisor has become an integral search tool for use in assertion mining. Watson's cognitive approach complements both IBM's internal portfolio management tools and conventional third-party databases to quickly sort the wheat from the chaff. As it stands today, any comprehensive assertion effort requires IP Advisor because it finds assets that other tools do not."

- Dr. William LaFontaine Jr., General manager, Intellectual Property, IBM

Creating Value: Summary

Managing Intellectual Property (IP) is becoming more complex and difficult as customers become more IP mature. Also, there is an excessive amount of data, which continues to become more complicated and includes such things as news, litigation, patents, products, financial information, competitor data and so on. Another inhibitor is that companies have limited resources, so they tend to analyze once, or use keywords to limit searches, and move on.

IP Advisor with Watson improves analysis of increasing amounts of complicated data, improves data analytics and provides unbiased insights and recommendations.

IPA also presents an effective and rapid way to manage and leverage all aspects of intellectual property using cognitive computing. By extensively employing IBM's Watson offerings, this solution uses machine learning to learn and understand the ins and outs of IP data management.

IPA harnesses the value of this data while laying the foundation to scale with the exponential needs of rapid technology advances. IPA combines IBM's deep IP and patent knowledge with AI from Watson Discovery, News, Analytics and Knowledge Studio to create a solution that:

- Manages massive amounts of data with improved data analytics;
- Automates infringement identification;
- Provides visibility into new unbiased insights and recommendations;
- Provides for better and more informed decision making;
- Reduces time and saves money;
- Reduces manual processes; and
- Provides faster and stronger results than a keyword or semantic search.

Where to Begin

AI can add significant value to your patent analysis functions. Every company or law firm needs a reason to apply new tools. Based on our real-world experience, we recommend these actions and questions for patent professionals beginning the AI journey:

Identify your pain points and high cost factors in patent analysis and identify the top use cases that can move the needle for your company. (perhaps these are litigation, infringement, prior art searches. office actions, counterfeit identification, landscapes or strategy).

Identify data sources: What databases (internal or external) do you commonly use to find prior art or evidence of use? Are they publicly available or behind paid firewalls? Are there specific websites you leverage frequently?

Identify high cost, high resource bottlenecks or low throughput in your patent processes – invention, prosecution, licensing, mergers and acquisitions, litigation, maintenance.

IBM provides consulting for a wide range of IP processes, from strategy to invention to commercialization, in addition to providing access to IP Advisor with Watson.

Contact IBM via IPAdvise@us.ibm.com for more information.

About the Authors

Sue Hallen is an engineer by trade, and is the Offering Manager for the IP Advisor with Watson tool and IP consulting services. She has experience in IP licensing, inventing and commercialization along with a strong background in consulting and product development. She is a member of the IBM Industry Academy. She is active in STEM advocacy with events like GirlCon Chicago, CyberDay4Girls and mentoring PTECH students at Sarah Goode STEM Academy.

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Brent Miller is a Senior Technical Staff Member with years of experience as a Patent Engineer. He is an IBM Master Inventor and member of the IBM Academy of Technology.Brent was part of the team developing the IP Advisor with Watson asset.

Charla Stracener has been recognized by three US Presidents for her commitment to Science, Technology, Engineering and Math (STEM). She is a member of the IBM Industry Academy and is the Electronics, Automotive, Aerospace & Defense Industry Lead for the IBM Solution Center. Charla and her team assisted in the first prototypes of IP Advisor with Watson.

Sources and Detail

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