

By John R. Yuva

# Open the Window to INNOVATION WITH PATENTS

**Improve and enhance your innovation process by incorporating patent intelligence into your decision-making**

**H**ow does the process of innovation occur within your company? What are the sources of innovative ideas—internal business units, supply partners, a combination of both? Innovation can derive from anywhere, even from patents that are already protecting new technologies and processes. Patents are significant to engineers during new product development because of the insights, problem solving and decision-making that are documented within patent applications. And with the World Intellectual Property Organization (WIPO) citing 233,000 global patent applications filed in 2016, engineers have a window into how other companies approach innovation that can strengthen their own product offerings.

When companies file a patent application with WIPO or the United States Patent and Trademark Office (USPTO), they're establishing a limited monopoly protection on a practice. Once granted, those protections are generally upheld for 20 years prior to entering the public domain. It's a clear competitive advantage for companies that file a patent before the competition, locking in innovation and owning that process.

Jim Belfiore, managing director, client innovation services for IHS Markit, says despite patent protections on a specific invention, engineers can attain valuable insights and significant detail from patents that open doors to new innovative solutions and processes. Engineers and their companies can leverage and protect



## AVOID THE DATA ABYSS to Optimize Engineering Efficiencies

Companies today are inundated with immense amounts of data. It was once thought inconceivable that data would eclipse gigabytes of storage capacity. Yet, many enterprises operate with over 50 terabytes of data in their systems. Much of this data is scattered across the company and siloed in any number of knowledge bases—most of which have been forgotten about (or are not even known to exist) by current employees.

For engineering organizations that require answers to questions during new product development, such large data volumes are posing significant challenges to the very knowledge-intensive tasks involved in innovation and problem solving. The result is data flows that are unstructured with little sense of order. This leads to knowledge reuse that can prevent engineers from finding answers to the most pressing questions critical to the innovation pipeline.

Kevin Raney, consulting associate director for IHS Markit, says engineers are unable to be engineers because the majority of their time is spent researching

and digging through mounds of unstructured, disparate data trying to find answers to their questions. Often, engineers tasked with solving a problem will first try to locate individuals internally with the knowledge to address those questions, which consumes a large amount of time. And, what happens when those experienced engineers retire or otherwise exit the business?

"Our clients tell us that nearly 40 percent of their engineers' time is consumed by searching for answers scattered on hard drives, shared drives and enterprise systems, because many companies lack an effective federated or enterprise search solution. And if the data is centralized, engineers are unable to locate it among the layers of information," says Raney. "Unless the information is quickly searchable, the decision is to reinvent the wheel again—despite knowing that the problem was previously solved, possibly multiple times."

How does this affect enterprise innovation and new product development? Raney says there's less pressure for originality in innovation and more

those discoveries within their own patent applications. "Patents not only describe the protected practice, but also the problem being solved," says Belfiore. "The description of the problem and its constraints can be as or more important than the technology or methodology protected by the patent."

As engineers dissect patents, they can uncover emerging trends, new classes of demand and untapped markets for innovation. Those shifts may not be evident within just a particular product or technology, but entire industries as well. Patent intelligence can truly be the impetus that spurs innovative thinking and problem solving.

## DISSECTING PATENTS FOR INNOVATION

When analyzing patents, engineers can approach them from an individual or group perspective. Both approaches can glean critical information and provide an evolutionary context.

**Individual patent.** An individual patent includes several narrative sections that form a factual story. Consider the patent breakdown for a new technology:

➤ **Abstract:** A concise description about the technology, its criticality and reason for being protected.

➤ **Title:** Short but insightful about the focus of the patent. For example, "Process and method for removing oil spills from oceans using a vacuum apparatus."

➤ **Claims:** Technical specifications about the protected technology. Claims offer insights as to why a protected technology is better able to perform a function than anything before it.

➤ **Detailed description:** This is often a detailed narrative on how the technology functions, critical design constraints, why previous versions were unsuccessful and how this technology solves those setbacks. A summary of the technology's evolution in the marketplace may also exist. This section often requires significant input from the engineer and designer due to the technical nature of the information.

➤ **Background summary:** Contextual description about the

importance of this patent to the marketplace and why the current market conditions are ideal for this technology. Also, what historically has been a constraint for related technologies and why? With a solution to those prior constraints, the patent application should be accepted, granted and issued as a limited monopoly.

When examining individual patents, both the detailed description and background summary sections often provide the most insightful data. Understanding the evolution of a technology or process is critical to ensure the engineering team is not focused on an outdated solution. The patent also serves as a holistic view into the parameters an engineer should qualify and quantify within his or her own patents. For example, details about prior versions and current market conditions should be known and documented by the engineering team before submitting its patent application.

**Grouping patents.** Belfiore says grouping patents is both an art and a science because you can group them by

emphasis on time to market. Develop an idea, design a working prototype and launch it into the market before the competition. With time of the essence, it's imperative to surface relevant concepts and answers quickly—freeing engineers and other technical workers to deliver creative customer solutions and explore new markets and technologies.

That's a difficult proposition when volumes of unstructured, aging and current data populate system databases. The aging data is losing value, while current data consumes the system without a means to analyze and organize the input. Raney says companies invest millions of dollars to put centralization and order into their databases with varying success.

So, what's the solution? Raney says companies are spending too much time on initiatives to solve the data organization/centralization conundrum. Remove the hurdle of structuring and tagging data by leaving information where it resides and instead provide engineers with tools to pinpoint that knowledge.

"When you're an engineering company, you need to function as such. Engineers

need to know where the data is indexed, but with solutions like Engineering Workbench, we can read through your content with natural language processing," says Raney. "There is growing interest in semantic technologies and machine learning that do the heavy lifting of sorting through the unstructured data to find answers to engineering questions."

**"... REDUCE THE TIME  
REQUIRED TO MINE THOSE  
ANSWERS BY AS MUCH AS  
30-40%"**

Raney worked with a client that submits large proposals for government contracts. The client was bidding on a contract and required technical information to justify its costs. With only 30 days to provide a proposal response, the client often spent six months with preplanning and research prior to submitting its proposals.

"Our findings revealed that if we know where the content resides within the company, we can index it and reduce the time required to mine those answers by as much as 30 percent to 40 percent," says Raney. "This provides the client with significant time to focus on more creative and innovative solutions that could separate its proposal from the competition and help it win the bid."

time frame, technology, classification, filing assignee or any of 30 metadata parameters that are associated with patent (and patent application) documents. "When exploring patents over a multitude of parameters, you begin to notice patterns and trends," he says. "It's those patterns that make applying an analysis, such as an innovation S-curve model, to patent groupings a valuable exercise."

In an *IHS Quarterly* article titled, "In Search of Blue Oceans," Belfiore writes that the curve defines the growth path from innovation through growth to maturity. "The classic s-curve traces the evolution of a product from the birth of an idea through the early stage of product introduction and adoption, to market maturation and saturation, obsolescence and, finally, to end of life."

Belfiore says the five inflection points on the s-curve provide a measurement of innovation value. The ideality increases as you reach higher on the y-axis, while the product lifecycle is reflected across the x-axis. "The first inflection point is the most difficult to determine but most valuable for companies to recognize because it identifies the next 'big thing' around the corner," explains Belfiore. "Only those engineers and companies that see it understand it's worth pursuing. Patents can be used to find those types of inflection points, particularly when you examine patents in groups."

What types of patterns signal an emerging but significant shift in the marketplace? An engineer, for example, deciphers that during the previous three years, a substantial increase in filings around a specific technology occurred. Or, a technology classification code that embodied 100 companies for a specific technology has now increased to 200 companies over 24 months with similar inventions and patent counts. "Those are the kinds of insights you

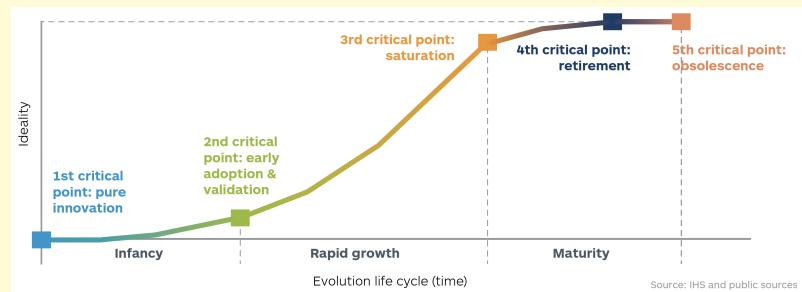
can only recognize by grouping patents together," says Belfiore. "Thus, you can see indirect but dependable indicators of movements within markets, evolutions in technology or even identifications of new market demands."

by those contexts provides deeper insights," says Belfiore.

Another critical piece of an effective patent search is applying appropriate time-blocking parameters. A three- to five-year period provides a manageable

## INNOVATION S-CURVE

The classic S-curve traces the evolution of a product from the birth of an idea through the early stage of product introduction and adoption, to market maturation and saturation, obsolescence and, finally, to end of life.



Source: IHS and public sources

### SEARCH PATENTS EFFECTIVELY

Engineers rely on patent groupings to confidently identify evolving and emerging trends. Despite the view of patents as late indicators of change due to filing delays and approval time frames, they remain a vital source for innovative perspectives—assuming you know what to search for.

Applying traditional search approaches using keywords or phrases to target patents around a specific technology are often ineffective. With millions of patent documents and applications in the USPTO database and globally using WIPO, engineers find themselves overwhelmed with the sheer volume of information. "Approach a patent search in terms of context, 'Patents about automotive exhaust management systems,' for example. Narrow the search further with specific phraseology and its variations, including why the technology is important, how does it fail and solutions to these issues. Examining contextual relationships to the technology and grouping them

overview of potential trends and patterns. However, comparisons among time periods in waves (three to five years versus five to 10 years versus 10 to 15 years) can result in valuable grouping data.

Other research parameters can include:

- Technology class groups
- Filings by company or assignee
- Industry specific or across industries
- Varying applications using the same or similar technology

In the case of an exhaust management system, what other environments or industries are applying the technology? For example, a search reveals that generators within a building management system are used for electricity production to supply back-up power. How is this being achieved? What are the results in terms of cost and sustainability efficiencies? Answers to these questions from an application with no relation to the automotive industry can help solve similar problems.

## **Patents for Progress**

The value of patents for problem solving and innovation during new product development cannot be understated. And while engineers examine patents for critical insights related to their own projects, there are other strategic reasons to incorporate patents into your engineering workflow. Jim Belfiore, managing director, client innovation services for IHS Markit, explains how engineers and companies are approaching patents for greater value add.

### **PATENT IDENTIFICATION PRACTICE**

Companies are creating an in-house patent practice with the purpose of identifying evolutions in technology and markets using patents as a primary source of knowledge. When reviewing and analyzing patents, the focus is on three areas.

**1) IDENTIFICATION OF INTELLECTUAL PROPERTY (IP)** where synergies exist with the company's technologies. The team scours portfolios of IP in markets within and outside its own space to make those connections.

**2) FUNCTIONAL NEEDS ANALYSIS** to determine how technologies work, what their function is and how key inventions solved problems that plague similar companies. This type of analysis is critical not only for problem solving, but also to identify potential barriers.

**3) STRENGTH OF IP TO AVOID PATENT INFRINGEMENT** where the team must develop a unique and distinct technical application that is different from what's described in the source patent. This often requires a legal perspective to ensure the company is not at risk for litigation.

### **IP INVESTOR TEAM**

To stay abreast of emerging technologies, companies are taking an entrepreneurial approach to patents in an effort to make smart investments. Are there IP portfolios that align with the core business, functions and technologies of the enterprise? If so, does the portfolio qualify as a potential acquisition target? These are the types of assessments IP investor teams need to conduct in the quest to strengthen their IP portfolios and market share.

### **LINE OF DEFENSE STRATEGY**

Utility patents are granted protection for 20 years prior to entering the public domain. Thus, for most patented technologies, obsolescence is a natural part of the lifecycle. However, if a patented technology is extremely lucrative or serves a critical function in the marketplace, companies want to build a line of defense around those patents to maintain their protection. In doing so, new products or additional value are created that incorporate the technology to extend its marketplace dominance. A line of defense for a new life on a product line.

### **PATENT BUSTING TECHNIQUE**

Just as companies want to build a line of defense around their patented core innovations, competitors want to exploit any vulnerabilities that could diminish their protection. Patent busting is a technique that serves this purpose. Engineers determine where the barriers exist from practicing in a particular space, such as product needs or functions. Solutions are then developed to overcome those barriers, effectively invalidating the patents previously holding the line. The Electronic Frontier Foundation launched its Patent Busting Project to bust patents that are limiting innovation in the software industry.

## **PATENTS IMPERATIVE FOR INNOVATION**

With the information and insights available in patents, engineers cannot afford not to include them as a critical source for innovative ideas. The use of patents during the innovation process ensures that you're not duplicating concepts and technologies that already exist. It also prevents the company from infringing on current patents by knowing what technologies are protected.

Another critical insight of researching patents is understanding their lifecycle. Once a patent has been granted, there are associated fees with maintaining the patent and protecting it. Within the Patent Electronic Business Center of the USPTO, engineers can enter patent numbers into the Public Patent Application Information Retrieval (PAIR) system. What Public PAIR provides is a patent history, but even more important, is whether those patents are current on fees and properly maintained by the filing entity.

Why is this critical to engineers during new product development? Belfiore says that lapsed and abandoned patents can be prime investment opportunities. "An abandoned technology patent is a rare case of a new technology that has prematurely entered the public domain. It can be improved upon by another company that can then file a new patent application and take ownership of the improved technology, without risk of infringement of the original filing company," he says.

Belfiore adds that by not researching patents, engineers open the door to myriad risks. The cost of ignoring potential threats far outweigh the litigation risks that companies worry about—and those risks are not insignificant.

"There's tremendous value to extract in the research, creation and management of patents," he says. "Adopting innovative practices that incorporate patent research are likely to add more substantial value to their product pipelines, as well as to their bottom line and to their shareholders." □