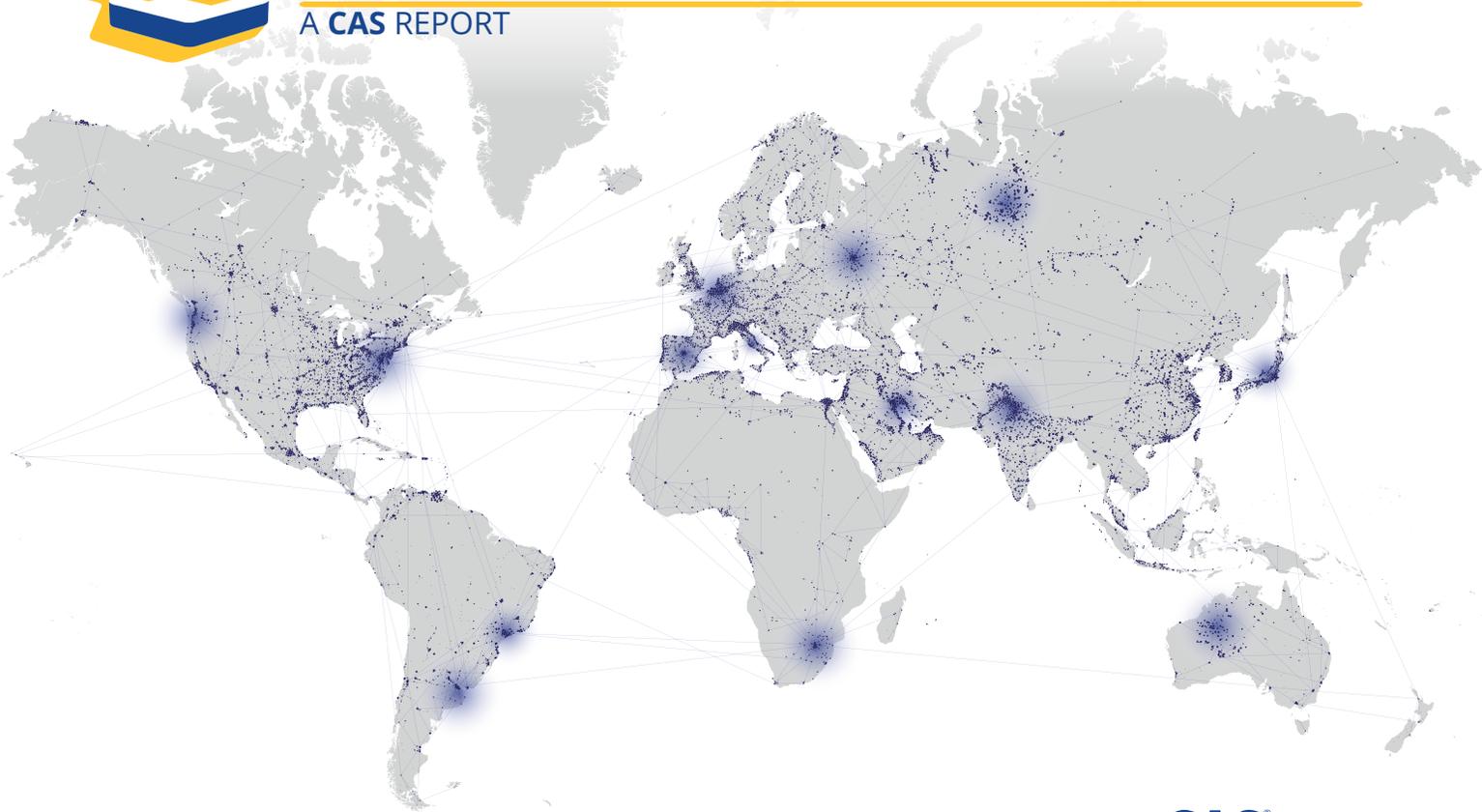




TRACKING INNOVATION: MICROTRENDS IN GLOBAL R&D GROWTH REVEAL RISKS AND OPPORTUNITIES

A CAS REPORT





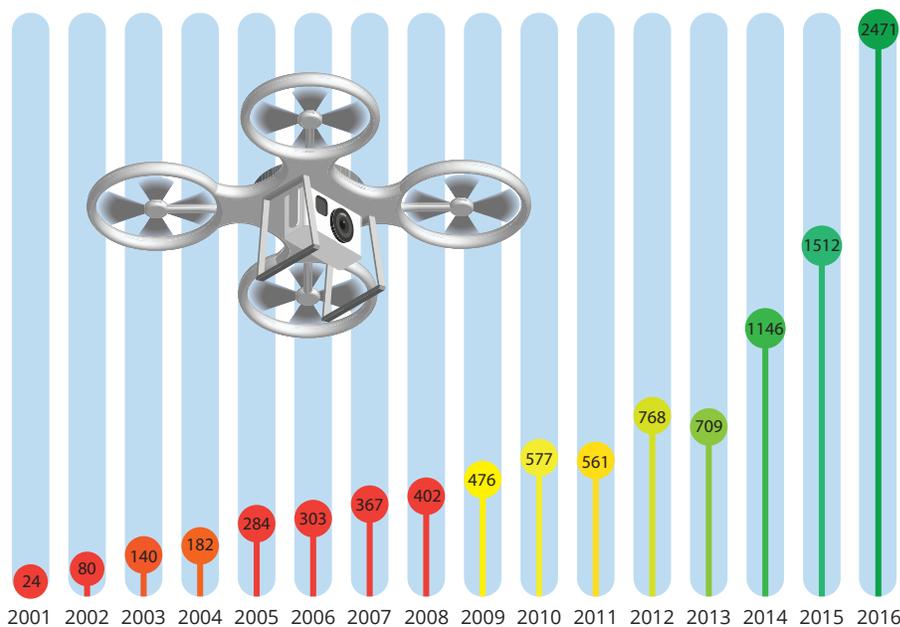
Global Innovation

By any measure, global innovation is accelerating at a dizzying pace. R&D spending, global patent applications, venture capital investment volume, and the pace of technology M&A all reflect the increase in activity. WIPO statistics show that global patent application growth has averaged 7% annually over the past 3 years. Annual reports by leading companies show unprecedented investments in research and product development to keep pace with the competition. However, when one looks a little deeper, this simple storyline, as with most, reveals more interesting underlying microtrends.

Though overall innovation measures are growing globally, that growth is not even. By now everyone has heard that Asia is the star of global patent growth, with China in particular dominating in volume and intensity. Beyond China, a steep increase in patent applications is also seen in emerging markets such as Korea, Brazil, and India. But what about the traditionally dominant markets? WIPO statistics show that the U.S. and many European countries such as Germany and Italy continue to show steady YOY growth as well. However, Japan has actually shown declining patent application activity over the same time period. But patent application activity alone is certainly an imperfect measure of innovation health, as factors including government spending,

economics, currency, and patent law changes, can significantly impact patent application volumes.

Diversification is another interesting measure of innovation. Today, new ideas and discoveries are coming from more diverse sources than in the past. This trend is empowered not only



US Patent Applications for Drone-Related Technology 2001-2016

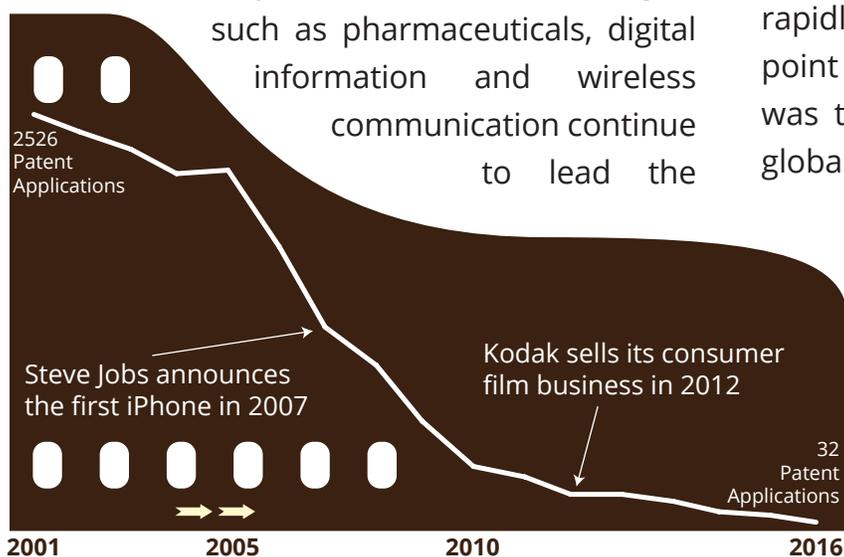
Source: USPATFULL on STN

by digital technology but also by new types of global partnerships, business relationships, and collaborations often referred to under the umbrella phrase “open innovation”. These relationships speed the movement of knowledge, technology, and ideas not only across geographic borders, but also between industries and the public and private sectors in new ways. One example of this the Structural Genomics Consortium, a public-private collaboration between major pharmaceutical companies, government research institutes,



and a host of leading global universities that endeavors to advance overall drug discovery efforts by elucidating the 3D structures for human proteins of biomedical importance. All output of this collaboration is being made openly accessible to the public to catalyze additional research efforts.

The pace of innovation also varies greatly by discipline. Traditional technologies such as pharmaceuticals, digital information and wireless communication continue to lead the



Global Chemical Photographic Film Patent Applications 2001-2016

Source: CAplusSM on STN

way in developed markets, while emerging economies often specialize. For example, Brazil's patent application volume in the areas of mining, aviation, and automotive technologies stands out, while China and Korea are responsible for 73% of global patent applications on use of graphene since 2000. It is likely unsurprising that in the past

few years, there has been an explosion in patent activity around technologies associated with unmanned vehicles, including drones. However, what might be surprising is that the rise in patent applications in that area actually began as early as 2005 (see graphic). Conversely, it is also interesting to look at technology areas where activity is shrinking rapidly, as new technologies reach the tipping point and push out previous leaders. This was the case with chemical film, which saw global patent activity fall by 83% between 2005 and 2010, as digital imaging rapidly ascended to dominate the landscape.

Keeping up to date with these types of global innovation trends is a critical aspect of market and competitive intelligence. Microtrends and leading indicators can be critical to guiding business strategy and mitigating risks of unexpected disruption from non-traditional competitors. However, measuring and tracking key areas of innovation and determining their relevance to your technology area, industry, and/or business is challenging and often requires global data sources and deep analysis. Properly invested resources can pay off handsomely providing a sustainable competitive advantage.