



**Clarivate Analytics**  
India Innovation Awards 2018

Powered by Derwent Innovation



# Clarivate Analytics India Innovation Awards 2018



**Arvind Pachhapur**

South Asia Head  
Clarivate Analytics

It is my privilege to present the winners of the Clarivate Analytics India Innovation Awards 2018.

Since 2007 we have recognized Indian innovator organizations that have made outstanding and pioneering contributions to innovation in India as demonstrated by their patent portfolio. Over these years, we have consistently measured innovativeness based on both quantum and quality of patent portfolio. This year, we have named 30 top innovator organizations across three broad categories – corporations, government research organizations, and academic institutions. Of these, 12 organizations are recognized as the winners of the Clarivate Analytics India Innovation Awards 2018

Clarivate Analytics has the privilege of humbly contributing to the innovation efforts of many such innovator organizations with our research and innovation solutions including Derwent Innovation, Web of Science, Cortellis, and InCites. We are truly grateful to get this opportunity to contribute to innovation excellence in India.

Clarivate Analytics congratulates the winners of India Innovation Awards 2018. These 12 organizations have truly created a niche in their chosen fields, and a legacy that will have an impact for years to come.

Please join me in congratulating all 30 top innovator organizations in India

Regards,

A handwritten signature in blue ink that reads "Arvind Pachhapur". The signature is fluid and cursive, written over a light blue circular stamp that is partially obscured.

**Arvind Pachhapur**  
South Asia Head  
Clarivate Analytics

# Methodology for Selection of Award Winners

The India Innovation Awards 2018 recognizes the most innovative organizations/ institutions in India, across varied sectors. Using patents as a proxy for innovation, we acknowledge and appreciate their pioneering spirit in creating technologies that touch all aspects of life, the efforts invested in taking their invention to the world, and positively influencing science and technology.

For this study we have considered India priority patents published by companies headquartered in India. published in the period 2015 to 2017. This enables us to track innovations that have originated from India, and created by local companies/ institutions.

As a next step, we shortlisted those assignees for the study that have at least 25 unique inventions, as identified by number of unique Derwent World Patent Index (DWPI) families. These assignees were classified into the three broad categories – corporations, government research organizations and academic institutions. The corporations have been further divided into 4 sectors using the Global Industry Classification Standards (GICS).

The categories and sub-categories used in this study are:

- **Corporations:** Pharmaceuticals, Biotechnology & Life Sciences; Software & Services; Capital Goods & Automobiles; Other Corporations
- **Government Research Organization:** Government department/ research labs
- **Academic Institution:** All academic institutes, including govt. and private sector institutions

Note: PSUs have been included in the Corporation segment

This sets the stage for an in-depth analysis of each assignee (nearly 150 companies/ institutions/ research labs), across the following parameters for the patents published in the period 2015-17.

- **Size of the patent portfolio:**  
The number of unique inventions as identified by the number of India priority DWPI patent families. This indicates the quantum of innovation.
- **Grant Success:**  
The percentage of patent families with at least one grant received. This reflects the quality of innovations.
- **Extent of Globalization:**  
The ratio of total number of patent records to the number of patent families in the patent portfolio. This indicates extent of globalization and the international commercialization intent of organizations and also underlines the quality of innovation.
- **Citations:**  
The average number of citations received by the patent families in the portfolio. This qualitative indicator indicates the impact that this invention had in its field of technology down the line

The individual organization score on each metric are then normalized to the highest score for that metric in a given organization sub-category (e.g. Pharmaceuticals). After normalizing, the total scores are calculated after applying weights to each of the metric. The top assignees in each Category are identified based on the total score. Thirty organizations have been recognized as the winners this year under various categories, of which we are facilitating the awards to 12 organizations at the awards event.

# CATEGORY : ACADEMIC INSTITUTIONS

WINNER : INDIAN INSTITUTE OF TECHNOLOGY BOMBAY



Since its establishment in 1958, and elevation to an 'Institute of National Importance' in 1961, IIT Bombay has grown from strength to strength to emerge as one of the top technical universities in the world. The institute is recognized worldwide as a leader in the field of engineering education and research.

Reputed for the outstanding caliber of students graduating from its undergraduate and postgraduate programmes, the institute attracts the best students from the country for its bachelor's, master's and doctoral programmes. Research and academic programmes at IIT Bombay are driven by an outstanding faculty, many of whom are reputed for their research contributions internationally.

IIT Bombay helps build links with peer universities and institutes, both at the national and the international levels, to enhance and enrich its research and educational programmes.

IIT Bombay emerges as the top Innovator in the Academic Institution category with the highest number of unique patent families published during 2015-17. In addition they have a healthy performance in the category on the grant success and globalization parameters.

IIT Bombay has filed patents in the areas of digital computing (Electronic data processors, interfaces and programme control), electrical materials such as conductors, resistors and capacitors, data transmission and networks, polymers in medicinal/ cosmetic applications, nanotechnology, circuit components and coatings amongst many others. An Influential patent from their portfolio pertains to innovation related to energy efficient sorption processes and systems that help make energy generating systems more efficient. This is indeed a need of the hour, as conventional energy sources dwindle, and the world looks at making current processes yield maximum energy output.

# CATEGORY : ACADEMIC INSTITUTIONS

WINNER : JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH



Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), a deemed University, is a multidisciplinary research institute situated in Jakkur, a locality north of Bangalore, India. It is relatively young yet well-known around the Globe.

The Institution's mandate is to pursue and promote world-class research and training at the frontiers of Science and Engineering covering broad areas ranging from Materials to Genetics. The vibrant academic ambience hosts nearly 300 researchers.

JNCASR has a broad spectrum of patents across different sciences, such as antibacterial, antiviral, antifungal agents, polymers used in medicinal applications, fermentation industry, materials and composites, and methods to detect DNA sequences to name a few. JNCASR has a strong foreign filing trend with nearly 75% of their patent families having at least one foreign filing. JNCASR's portfolio of patents has been well received by the scientific community, and found relevant to the continuing stream of innovation, as is evident by the number of citations received by them. Few such patents: a sensor device detects volatile organic compounds in the environment, which have harmful side effect on human and animal health, A carbon nanosphere for targeted drug delivery and Photovoltaic cells that help in developing the use of non conventional energy sources – indicate that research from JNCASR addresses some of the key challenges faced across the world.

## CATEGORY : GOVERNMENT RESEARCH ORGANIZATION

WINNER : COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH



The Council of Scientific & Industrial Research (CSIR), a contemporary R&D organization, is known for its cutting edge R&D knowledgebase in diverse science & technology areas. CSIR has a dynamic network of 38 national laboratories, 39 outreach centres, 3 Innovation Complexes and 5 units. CSIR's R&D expertise and experience is embodied in about 4600 active scientists supported by about 8000 scientific and technical personnel.

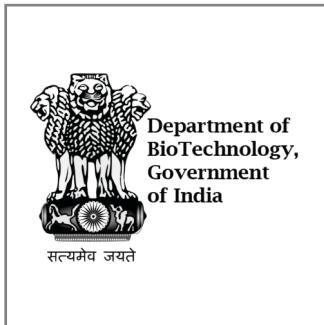
CSIR covers a wide spectrum of science and technology – from radio and space physics, oceanography, geophysics, chemicals, drugs, genomics, biotechnology and nanotechnology to mining, aeronautics, instrumentation, environmental engineering and information technology. It provides significant technological intervention in many areas with regard to societal efforts which include environment, health, drinking water, food, housing, energy, farm and non-farm sectors. Further, CSIR's role in scientific human resource development is noteworthy.

CSIR is a pioneer of India's intellectual property movement and a leader in terms of sheer volume of patents published during the analysis period. While CSIR's patent portfolio touches a wide spectrum of areas in science and technology, some of the top filing areas include: polymers and applications in medicine, materials, electrical industry, pharmaceutical research, fermentation, enzymes, catalysis and applications, chemical & biological treatment of water, etc.

With over 2800 citations received by their patents, CSIR scored well on patent citation impact in the government research organization category indicating the relevance and impact of CSIR's innovations. A look at one such cited patent, titled 'Magnetic nanoparticles decorated activated carbon nanocomposites for purification of water', indicates that it is very relevant to one of the pressing needs of the society at large in India.

# CATEGORY : GOVERNMENT RESEARCH ORGANIZATION

## WINNER : DEPARTMENT OF BIOTECHNOLOGY



The Department of Biotechnology (DBT) is an Indian government department under the Ministry of Science and Technology responsible for administrating development and commercialization in the field of modern biology and biotechnology in India. Since its creation in 1986, it has been responsible for development and commercialization of modern biology and biotechnology.

The department has made significant achievements in the growth and application of biotechnology in the broad areas of agriculture, health care, animal sciences, environment, and industry. The Department has nearly 10 Autonomous institutes and 3 public sector undertakings. In December 2015, the Department of Biotechnology launched the National Biotechnology Development Strategy 2015–2020 programme. The aim of the programme is to intensify research in the fields of vaccines, humane genome, infectious and chronic diseases, crop science, animal agriculture and aqua culture, food and nutrition, environmental management and technologies for clean energy.

Department of Biotechnology's initiative in patenting innovations, technology transfer and close engagement with industries has given a new dimension to biotechnology research in India. Their portfolio includes patents filed in areas such as; Fermentation, Production of vaccines and antibodies, Cell & tissue culture, Genetic engineering, Medical, Dental, Cosmetic applications of polymers, plant genetics, plant biotechnology etc.

DBT's portfolio of patents is well cited, indicating the influence of the technology developed.

Few such influential patents are: A way to produce fermentable sugars from biomass slurry, devices for intra-osseous access, innovations pertaining to bio/ chemical reactors with applicability in production and purification of various components. The inventions coming from DBT clearly have an industrial applicability and societal applicability (help improve processes for generating alternative sources of energy).



# CATEGORY : CORPORATION (PHARMACEUTICALS, BIOTECHNOLOGY & LIFESCIENCES)

WINNER : CADILA HEALTHCARE LIMITED



Cadila Healthcare instituted in 1995. is the flagship company of the Zydus Cadila Group. The Company is one of the largest pharmaceutical company in India. Cadila Healthcare's research emphasis is spread across five broad themes aiming to address unmet needs and drive sustainable growth: NCE, Biologics, Vaccines, APIs and Formulations Development. It is ranked amongst the top three players in the promoted covered market of gynecology, respiratory, pain management, cardiovascular, dermatology and gastrointestinal therapeutic areas. 17 of the Company's brands feature amongst the top 300 pharmaceutical brands in India.

The Company operates in different markets of Asia Pacific, Africa and Middle East with leadership position in several of these markets.

Cadila Healthcare has the distinction of being one of the highest filers of patents in the pharmaceutical industry in India. Their patents are widely spread across all the therapeutic areas that the company focuses on such as diabetes, cardiovascular diseases, pain, inflammation and cancer.

The portfolio of patents is includes patents secured in all the key markets that Cadila Healthcare operates in, such as US, Europe, Australia, Japan, Korea, Hong Kong and Singapore to name a few.

Some of the well cited patents include: a process for preparation of Ivabridine (to treat myocardial ischemia); pharmaceutical formulation for TNF-  $\alpha$  antibodies, novel compounds having hypolipedemic, hypocholesteremic activities etc. These patents cover key drugs that touch thousands of lives every day.

# CATEGORY : CORPORATION (PHARMACEUTICALS, BIOTECHNOLOGY & LIFESCIENCES)

WINNER : SUN PHARMACEUTICALS INDUSTRIES LIMITED



Sun Pharmaceuticals (also referred as Sun Pharma) is an Indian multinational pharmaceutical company headquartered in Mumbai. Sun Pharma manufactures and sells pharmaceutical formulations and active pharmaceutical ingredients (APIs). The company offers formulations in various therapeutic areas, such as cardiology, psychiatry, neurology, gastroenterology and diabetology. It also provides APIs such as Warfarin, Carbamazepine, Etodolac, and Clorazepate, as well as Anticancers, Steroids, Peptides, Sex Hormones, and Controlled substances.

Sun Pharma completed the acquisition of Ranbaxy Laboratories Limited, an integrated, research based, international pharmaceutical company, on 25th March 2015.

The patent portfolio of Ranbaxy has been considered with Sun Pharma for this study.

Sun Pharma's patent portfolio has a strong degree of globalization as highlighted by patents filed in the markets that it operates in, including US, Europe, Canada, Australia and Brazil, amongst 20 + other countries.

The patent portfolio is strong in anti inflammatory drugs, anti cancer drugs, cardiovascular disease treatment, and polymer applications in controlled release drugs to name a few therapeutic areas.

Some of the well cited patents of Sun Pharma include: an orally administered novel drug delivery system for antibiotic, anticancer, antifungal, antiparasitic or antiulcer drugs, a drug delivery method that helps control appetite, an inhalation device that helps administer medicine effectively. Such innovations touch the lives of mankind, providing a better quality of life to the afflicted population.

# CATEGORY : CORPORATION (SOFTWARE & SERVICES)

WINNER : INFOSYS LIMITED



Infosys is a global leader in technology services and consulting. Infosys enables clients in 45 countries to create and execute strategies for their digital transformation. From engineering to application development, knowledge management and business process management, they help clients find the right problems to solve, and to solve these effectively. A team of 200,000+ innovators, across the globe, is differentiated by the imagination, knowledge and experience, across industries and technologies that Infosys brings to every project.

Infosys' portfolio of patents revolves around its core businesses, covering area such as digital computing, software systems domain including data processing systems for administration and commerce, information retrieval systems, communication and control of information transfer over the internet, program control and system management software, applications control for electronic devices.

Infosys' portfolio of patents has the significance of having the highest citations received in the software and services industry. They have been cited over 2000 times by other stakeholders in the innovation community.

Few such patents that have been significantly cited are: System for providing application to requesting electronic device such as a mobile phone, Computer-implemented method for providing voice-over-IP conference communication, Computer-implemented method for querying database, involving natural language input and output. These patents are very relevant as in today's digital world, communication and data transfer are crucial areas.

# CATEGORY : CORPORATION (SOFTWARE & SERVICES)

WINNER : TATA CONSULTANCY SERVICES LIMITED



Tata Consultancy Services (TCS) is an IT services, consulting and business solutions organization. TCS offers a consulting-led, integrated portfolio of IT, BPO, infrastructure, engineering and assurance services. This is delivered through its unique Global Network Delivery Model™, recognised as the benchmark of excellence in software development.

A part of the Tata group, India's largest industrial conglomerate, TCS has over 371,000 of the world's best-trained consultants in 45 countries. The company generated consolidated revenues of US \$16.5 billion for the year ended March 31, 2016, and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

In April 2018, TCS became the first Indian IT company to breach \$100 billion market capitalization

TCS has the distinction of having the highest volumes of patents published in the period 2015-17, in the Software & Services sector. Their portfolio is not only strong in terms of overall numbers but also in terms of the number of unique inventions patented. The patents have been filed in key jurisdictions across the globe including US, Europe, Japan, Australia, China and Canada.

TCS' patent portfolio reflects a focus in the areas of digital computing and software products, data retrieval systems, information transfer over the internet and mobile telephony systems amongst other areas.

Some of the well-cited patents from TCS include: An enclosure for biometric sensors that helps reduce interference and power consumption; A computer implemented system and method for providing users secured access to application servers, a computer based method for transmitting sensor based data to infrastructure platform. With the world increasingly becoming digital, robust and secure communication methods are a vital necessity to ensure data protection, privacy and security.

# CATEGORY : CORPORATION (CAPITAL GOODS & AUTOMOBILES)

WINNER : BHARAT HEAVY ELECTRICALS LIMITED



Forging ahead on a sturdy foundation of over five decades of engineering excellence and embracing the glorious next phase of its growth, Bharat Heavy Electricals Limited (BHEL) is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing companies of its kind in India.

BHEL is engaged in the design, engineering, manufacture, construction, testing, commissioning and servicing of a wide range of products and services for core sectors of the economy, viz. Power, Transmission, Industry, Transportation (Railways), Renewable Energy, Oil & Gas, Water and Defence with over 180 products offerings to meet the needs of these sectors. BHEL has been the bedrock of India's Heavy Electrical Equipment industry since its incorporation in 1964.

BHEL's patent portfolio covers the domains of electric power generation, specifically around machinery that generates power, including steam turbines, soldering and welding techniques related to design of generators, non conventional energy systems such as Solar heat collection systems, applications of polymers in electrical engineering, combustion apparatus and processes.

BHEL's portfolio is of significant size and they are one of the top filers in the nation in the capital goods sector.

An influential patent of BHEL is related to Niobium addition in steam turbine casing ensuring greater mechanical strength and ductility at ambient and high temperatures. BHEL is the premier and pioneering organization in India with respect to Electric power engineering and their innovations literally light up our society.

# CATEGORY : CORPORATION (CAPITAL GOODS & AUTOMOBILES)

WINNER : TVS MOTOR COMPANY LIMITED



TVS Motor Company Limited (TVS Motor), a member of the TVS Group, is the largest company of the group in terms of size and turnover. It is the third largest two-wheeler manufacturer in India and has an annual production capacity of 32 lakhs 2 wheelers & 1.2 Lakh 3 wheelers.

The company has four manufacturing plants, three located in India (Hosur in Tamil Nadu, Mysore in Karnataka and Nalagarh in Himachal Pradesh) and one in Indonesia at Karawang.

TVS Motor's strength lies in design and development of new products. The customer and their everchanging need is TVS' continuous source of inspiration. The company has many firsts to its credit including the fact that they launched seven vehicles on the same day - a rare feat in automotive history. More than 33 million customers have bought a TVS product to date.

TVS Motor Company has the highest patent filing volume in the Automotive sector, a commendable achievement in a competitive market. Clearly aligned to their business, TVS Motors' patent portfolio pertains to primarily different aspects of two wheeler/ scooters/ moped technologies, parts, transmission systems, exhaust, engines and fuel supply.

The company's decision to file patents in other Asian countries such as Philippines, Vietnam, Indonesia, Taiwan, Malaysia and countries such as Brazil, Turkey etc clearly indicates their main export markets.

Some of the influential patents from TVS Motors include: Power transmission system for hybrid two wheelers, Gear shift actuator in internal combustion engine, internal breather valves for spring break actuators. TVS Motors, with its market relevant patents, is well positioned to ride this wave of hybrid vehicles and contribute to a cleaner, safer environment.

# CATEGORY : CORPORATION (OTHERS)

WINNER : POLY MEDICURE LIMITED



Poly Medicure was established in 1995 as a Healthcare company and strives to ensure that highest quality healthcare is made available to the mankind at affordable price. Their mission is to excel in designing & delivering of healthcare product and services with user and safety features using latest technology to earn trust and confidence of all stakeholders.

Poly Medicure manufactures over 100 different healthcare related products. Their research focus and product range covers a wide variety of areas such as Anaesthesia, Blood Management, Central Venous Access Catheters, Urology, Infusion Therapy, Dialysis, Diagnostics. Etc.

Poly Medicure's top patent filing areas include innovations related to medical/ surgical equipment such as catheters, needles, syringe components, flow regulators, medical containers/ storage tanks/ apparatus and their components. Their strategy to file abroad in key jurisdictions indicates their business is global.

Poly Medicure has the distinction of having one of the highest grant success in the corporate segment, as well as a very high count of citations received on an average by their patents. In addition, they have a high extent of globalization as well. Poly Medicure has clearly been a trend setter in the healthcare instruments/ devices industry and it is clear that their innovations have been influencing the industry.

Few influential patents from Poly Medicure include, a needle guard for use in medical devices such as a catheter, needle protector and cover assembly, catheter introducer and improved surgical scalpel. These devices help healthcare professionals deliver superior treatment and care.

## CATEGORY : CORPORATION (OTHERS)

WINNER : RELIANCE INDUSTRIES LIMITED



Reliance Industries Limited (RIL)'s motto, "Growth is Life," aptly captures the ever-evolving spirit of Reliance. RIL's activities span across hydrocarbon exploration and production, petroleum refining and marketing, petrochemicals, retail and telecommunications. In each of these areas, Reliance is committed to innovation-led, exponential growth.

Their business vision has pushed RIL to achieve global leadership in many of the businesses – including their position as the largest polyester yarn and fibre producer in the world. Reliance Industries Limited is a Fortune 500 company and the largest private sector corporation in India.

Reliance Industries has the distinction of having one of the highest number of patents published in the corporate sector.

Their patent portfolio pertains to their core business of hydrocarbon exploration and production – including areas such as catalysts, hydrocarbons, polymerization reactions and applications; manufacture of certain chemicals, refrigerants, metal oxides, petroleum by products etc.

At least 70% of their portfolio has one family member filed abroad; this shows their commercialization interests in India and other markets globally as well – majorly in regions such as Unites States, Europe, China, Brazil, Korea, Japan and Taiwan, alongside 20+ other countries.

Some of their influential patents include: Spheroidal particles for olefin polymerization catalyst, Preparation of high cis-1, 4-polybutadiene rubber, useful to prepare e.g. tires, Oxygen scavenging polyester useful in making packaging materials. These patents reflect a strong industrial applicability.



# CLARIVATE ANALYTICS INDIA TOP 30 INNOVATORS

## LISTED ALPHABETICALLY (for all categories)

### ACADEMIC INSTITUTIONS

Indian Institute of Science (IISc)  
Indian Institute of Technology, Bombay (IITB)  
Indian Institute of Technology, Madras (IITM)  
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)  
University of Calcutta

### GOVERNMENT RESEARCH ORGANIZATIONS

Council of Scientific & Industrial Research (CSIR)  
Defence Research and Development Organization (DRDO)  
Department of Biotechnology (DBT)  
Department of Atomic Energy (DAE)  
Indian Space Research Organisation (ISRO)

### CORPORATIONS - PHARMACEUTICALS, BIOTECHNOLOGY & LIFESCIENCES

Aurigene Discovery Technologies Limited  
Cadila Healthcare Limited  
Lupin Limited  
Sun Pharmaceutical Industries Limited  
Wockhardt Limited

### CORPORATIONS - SOFTWARE & SERVICES

HCL Technologies Limited  
Infosys Limited  
KPIT Technologies Limited  
Tata Consultancy Services Limited  
Wipro Limited

### CORPORATIONS - CAPITAL GOODS & AUTOMOBILES

Bharat Heavy Electricals Limited (BHEL)  
Kirloskar Oil Engines Limited  
Larsen & Toubro Limited (L&T)  
Tata Motors Limited  
TVS Motor Company Limited

### CORPORATIONS - OTHERS

Indian Oil Corporation Limited  
ITC Limited  
Poly Medicure Limited  
Reliance Industries Limited  
Tata Steel Limited

06.2018  
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