Industrial Enzymes Market growing at 7% touches Rs 2360 crore

“India’s life science and healthcare industries are some of the fastest growing sectors” - 46
- Dr Rajnish Bharti, General Manager, Promega Biotech India

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INDUSTRIAL ENZYMES MARKET GROWING AT 7% TOUCHES RS 2360 CRORE

Indian industrial enzymes market is growing at 7 per cent over last year and has touched Rs 2360 crore for the year 2018-19. There are about 25 major players in this market. Most of these companies are either into marketing or into formulations. But India has few companies both multinational and local that manufacture enzymes used in different industries such as pharmaceutical, food processing, leather, detergents, paper and pulp and textile. These companies produce various enzymes and several other eco-friendly biological products. The product range and services are growing rapidly as the use of enzymes is gaining widespread acceptance.
20
NDHB - AMBITIOUS BUT CHALLENGING

SPEAKING WITH

46
“India’s life science and healthcare industries are some of the fastest growing sectors”
Dr Rajnish Bharti,
General Manager, Promega Biotech India

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TOP VIDEO

Dr Krishna Ella,
CMD, Bharat Biotech talks about the situation of cholera in India.

Dr Rajiv Desai,
Executive VP, Corporate QA, Lupin shares his views on the issues related to quality in the Indian pharmaceutical industry.

Prasad Vanga,
Founder & CEO, Anthill Ventures points out the challenges facing the Indian biotech startups on the investment front.
Pharmaceutical products is among some others which India is pushing for larger exports to China and trying to sort out issues related to its market access. At the recently held Regional Comprehensive Economic Partnership (RCEP) Indian Commerce Secretary held a meeting with the Chinese vice minister on these issues.

Prior to that, just two months back drug regulators and Commerce Ministry officials of India and China met at Shanghai for the first time to remove hurdles in the bilateral pharmaceutical trade. According to the reports, India is looking at the higher pharmaceutical exports to China in order to reduce the reported high trade deficit of $57 billion.

China is the world’s second largest drug market after the US. China-US trade war has opened up more opportunities for the Indian companies to fill the gap created by that war. Two recent analysis reports have narrated such a scenario. Global Data, a data analyst company, has estimated that India will fill the gap in pharmaceutical sector created by China-US trade war. But, the Indian companies will be turning more towards China due to the stiff competition in the US, estimated another report by Bank of America Merrill Lynch.

In May 2018, China removed import duties on 28 medicines, opening up opportunities for Indian pharma companies. Though the decision was not India specific, it was important from the Indian perspective since it had potential to increase Indian’s export of medicines to China. Currently India’s medicine exports to China stands at only $200 million, as against $5 billion to the US. However, the further steps required after the May 2018 decision seemed to have not taken by the Chinese authorities with the required pace. From the Pharmexcil’s statement it appeared that Chinese authorities are quoting the changes that have been made in their FDA’s nomenclature and approval and registration system as a cause for the delay.

China’s FDA was renamed last year as National Medical Products Administration (NMPA) and changes were introduced in the registration and approval system. China’s 15 per cent drug import is from the US, which is the second largest drug supplier to China. India supplies merely 0.1 per cent of its total drug import. This is where Indian companies have a chance to grow. China is also dependent on the US for drug formulations import. Experts feel that this is another area where opportunity lies for the Indian companies in the drug formulations space.

As a result, several Indian companies have already started moving in that direction and some have gone much ahead in looking for local partners and forming partnerships, going for joint ventures and setting up manufacturing facilities. The analysis report has said that Indian companies are seeking partners that can make tangible business contributions, safeguard IP, ensure operational control and manage talent. It has listed such efforts by Indian companies, for example Dr Reddy’s has selected 70 products from its US list to shift them to China. Similarly, Strides Pharma Science Limited’s subsidiary Strides Pharma Global Pte Ltd, Singapore has already entered into a joint venture with Sun Moral International (HK) Limited, a wholly-owned subsidiary of Sihuan Pharmaceutical Holdings Group Ltd (Sihuan) of China.

Although the import duties on some medicines have been scrapped by the Chinese government, duty was actually not a big issue for the Indian industry. The real challenge the Indian companies have been facing is the product registration which takes long time of up to five years. The new opportunity created by the trade war and the reforms China has introduced in its registration and approval system, with possibility of removal of obstacles like delay in registration have generated renewed interest in the Indian companies to enter the Chinese market in a big way.

Milind Kokje
Chief Editor
milind.kokje@mmactiv.com
"Rehydration fluid for GPT" is recommended as a diluting fluid for performing Growth Promotion Test with enhanced stability.

**FREEDOM FROM TEDIOUS**
- Growth Promotion Tests (GPT), described in various pharmacopoeias (USP, BP, EP, JP, IP) is carried out to determine suitability of test medium for growth of specified microorganisms.
- Dilution methods for GPT are tedious while commercial cfu preparations are expensive.
- Culture preparations in this fluid can be stored up to 20 days.
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- Overcomes tedious dilutions preparations.
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**The basic requirements for the GPT are as follows:**
1. The new batch of medium must be inoculated with a small number of micro-organisms i.e. 10-100 cfu/0.1ml.
2. The laboratory should test the medium with the microorganisms required by the pharmacopoeias.
3. The microorganisms must not be more than five passages removed from reference culture.

* For E.coli ATCC 8739, stability has been observed for up to 20 days.

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**REHYDRATION FLUID FOR GPT**

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Acknowledgements

Thank you so much for the coverage on C-CAMP in the Bio-Incubators special edition. Looking forward to the next coverage in the September issue.

- Debarshini C, Bengaluru

The news update on Syngene’s newly appointed COO- Mahesh Bhalgat looks good. Thank you so much.

- Sneha Ashok, Bengaluru

Appreciate the latest coverage on Fortis Healthcare in BioSpectrum.

- Ria Jha, Bengaluru

The coverage on Atal Incubation Centre - Centre for Cellular and Molecular Biology has come out well. Thank you.

- Ritika M, Hyderabad
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Government inks new deal for TB eradication

Ministry of AYUSH and Ministry of Health & Family Welfare have signed a Memorandum of Understanding (MoU) to forge inter-sectoral convergence at the level of policy, planning and programme implementation for accelerated response towards “Tuberculosis Free India” initiative. The intended collaboration between the two Ministries aims at development of linkages and integration of TB care services within the infrastructure and institutional network of AYUSH. Focused activities envisaged under the MoU will cover joint planning to work with AYUSH organisations & professional bodies and promote adjuvant use of evidence-based AYUSH interventions for, TB control and management. It is also intended to facilitate research collaboration and best practices of AYUSH healthcare and build up capacities for TB-free work places and communities. Both Ministries will appoint Nodal Officers for development of implementation plan, modalities of operationalization and steering the collaboration activities outlined in the MoU.

India Hypertension Control Initiative gets expansion

Indian Council of Medical Research (ICMR), in collaboration with World Health Organization and Ministry of Health and Family Welfare, has announced nationwide expansion of their programme India Hypertension Control Initiative (IHCI). Launched in November 2017 IHCI has enrolled more than three lakh patients with high blood pressure in the government health facilities in 25 selected districts of the country in the states of Punjab, Madhya Pradesh, Kerala, Telangana, and Maharashtra. Now IHCI will expand to 100 districts across India covering all the states. The project will accelerate the implementation of quality hypertension treatment for over 15 crore population over the next four years and prevent deaths from heart attack, stroke and kidney failure.

Cabinet approves merger of NIMH with ICMR

The Union Cabinet, chaired by the Prime Minister Narendra Modi has approved to dissolve National Institute of Miners’ Health (NIMH), an autonomous Institute under Ministry of Mines (MoM) and merge with ICMR-National Institute of Occupational Health (NIOH), Ahmedabad with all assets and liabilities; and absorb all the employees of NIMH in NIOH in the similar post/pay scale as the case may be and their pay be protected. The registered office of NIMH is located at Kolar Gold Fields, Karnataka and the Central Laboratory in Nagpur. The Institute conducts applied research in occupational health and hygiene and specializes in providing technical support services to mining and mineral based industry with special reference to metalliferous sector and endeavors for safe mines and healthy miners through research & development.
Announces call under NATIONAL BIOPHARMA MISSION
(Funded jointly by Department of Biotechnology and World Bank)

This Request for Proposals (RFP) is to seek Letter of Intent for establishing Clinical Trial Networks (CTNs) and strengthening Clinical Trial Capacity

FOCUS OF THE CALL

RFP 1: To establish Clinical Trial Networks for hospital-based trials of Diabetology, Ophthalmology, Rheumatology and Oncology

RFP 2: To study epidemiology of Dengue & Chikungunya in an existing Demographic Surveillance System (DSS) site and prepare for conduct of GCP compliant clinical trials

RFP 3: Establish new DSS sites for geographical representation and to study epidemiology of Dengue and Chikungunya

RFP 4: Data Collection and Management: An IT Platform for community-based data collection, analysis and reporting

How to Apply: Letter of Intent to be submitted online only. Please log on to BIRAC website www.birac.nic.in

Call Opens: 15th August, 2019
Last date for Submission: 10th October, 2019 (2:00 PM)

For queries please contact: Mission Director, PMU-NBM: technical.birac@gov.in
Micronclean Targets Sales Growth for Cleanroom Consumables in India with Biospan Contamination Control Services

In 2017 Micronclean partnered with Biospan to sell its Cleanroom Consumables into the rapidly expanding Indian Pharmaceutical Cleanroom Market. Together they formed a joint venture company Biospan Contamination Control Services so that customers in India could benefit from a product range that has been sold into over 30 countries in the last 5 years.

Which customers does Biospan already deal with in India?
As a company Biospan already supplies some of leading Indian Bio-pharmaceutical and Pharmaceutical companies including Baxter Healthcare, Biocon, Dr Reddy’s, Intas, IPCA, Pfizer and Syngene.

As a customer what should I be looking for in an Indian Cleanroom Consumables Supplier?
As a customer I think you should ask any potential consumable supplier the following key questions and then make your assessment about who you deal with based on their replies:
1. Do you have knowledge of the local market?
2. Is the Sales team knowledgeable, experienced and have they been directly trained in the products they are selling?
3. Do they offer in region stocking and transport facilities?
4. Do they sell market leading products or are they me to?
5. Do they have access to the technical experts who developed the product?

Note your preference will always be based on how you rate the risk associated with any of these answers.
OK so does Biospan have knowledge of the local market?
One of the things that attracted Micronclean to Biospan in the first place was their long association with the Indian Pharmaceutical market in addition to their willingness to work with us to sell our products into the Indian marketplace. As a result, we formed the joint venture company Biospan Contamination Control Solutions (Biospan CCS).

So does Biospan CCS have experienced sales teams and are they trained in the product they are selling?
In a word yes! Each member of the Sales Team has a specific geography and has been specially selected so that they bring together market and product knowledge. In order to keep the Sales teams product knowledge up to date they all attend product knowledge training sessions where key speakers from India and the UK take the Sales teams through new product developments alongside refresher training on existing product lines.

In addition, we also gather feedback from these days to inform us about what we have to develop next and where we can help people by creating specific ‘how to guides’ that show how our products should be used to deliver maximum quality and efficiency to the user.

So does Biospan CCS have in-region stocking and a developed transport infrastructure?
As part of the joint venture agreement Biospan CCS hold specific stocks in their facility at Bhivandi near Mumbai which means that most orders can be fulfilled directly rather than waiting for supplies to arrive in the country. This can reduce the delivery lead time by a large number of weeks.

Biospan CCS also has access to an existing and proven nationwide distribution network so that the whole of India especially the pharmaceutical hubs of Baddi, Poanta, Sahib, Dehradun Sahib, Dehradun, Pune, Bangalore, Goa, Hyderabad and Vishakhapatnum are fully catered for.

So does Biospan CCS have access to the technical experts who developed the product?
As part of the joint venture agreement with Micronclean any Biospan CCS customer will have access to the full range of product knowledge and technical support provided by Micronclean. This level of knowledge and support can range from what is shown in the brochure and product specifications, through the how to guides to process overviews, safety data sheets to direct access to the Micronclean R&D team based in the UK who developed the products originally. In this way you as a customer are not passed around between various companies who only have a transactional relationship.

What market leading products does Biospan CCS promote in the Indian market?
All of our products promote quality and efficiency in our customers but if we had to pick three we would suggest, our PureGuard bucketless mopping systems, our CleanGuard IPA trigger sprays and our SureGuard Disposable garment range.

The PureGuard bucketless mopping system is a fully developed mopping system which at its heart uses pre-saturated mops that remove the need for in cleanroom mixing of disinfectants and detergents and also the disposal of rinse water after cleaning. The system is fully aligned to the proposed changes in GMP Annex 1 which promotes the needs for cleaning prior to rotational disinfection as our system incorporates Alpha, Beta and Delta as its three elements.

Alongside this for hard surface cleaning we would suggest our CleanGuard IPA trigger spray which is supplied in our unique transparent bottle. This bottle removes ‘bag in bottle’ concepts and delivers an ergonomic solution that always allows you to see the liquid volume whilst delivering a 12-week sterile life through an integrated filter in the trigger head.

Finally, our SureGuard range of disposable garments are all CE approved to PPE Category III Type 5 & 6. The range covers lab coats, overshoe, coverall with integral hood and coveralls with integral hoods and feet and are constructed from a Polypropylene with polyethylene laminate fabric. For additional user comfort the coveralls are supplied with latex free elastic at hood, wrists and ankles.
DBT invites proposals for vaccine research

Vaccine research and development is a priority area in the Department of Biotechnology (DBT) supported through an important mission called the National Biopharma Mission (NBM). Considering vaccine adjuvant research as an important area for vaccine development, DBT in collaboration with National Institute of Allergy and Infectious Diseases (NIAID)- National Institutes of Health (NIH) invites proposals for the discovery, development, and/or preclinical testing of vaccine adjuvants under the aegis of Indo US Vaccine Action Programme (VAP). VAP is one of the oldest bilateral programmes that supports a wide range of collaborative activities related to immunology, infectious disease biology and vaccine research. The aim of this call is to strengthen vaccine adjuvant research in India. This joint DBT & NBM-BIRAC call will leverage the funding expertise of both the organizations.

ICMR launches National Data Quality Forum

The Indian Council of Medical Research (ICMR)'s National Institute for Medical Statistics (ICMR - NIMS), in partnership with Population Council, has launched the National Data Quality Forum (NDQF). NDQF will integrate learnings from scientific and evidence-based initiatives and guide actions through periodic workshops and conferences. Its activities will gear towards establishing protocols and good practices when dealing with data collection, storage, use and dissemination that can be applied to health and demographic data, as well as replicated across industries and sectors. This platform will be guided by the direction provided by a high level steering committee and operationalized with the help of a technical advisory group composed of subject matter experts. With a mandate to create a dialogue for data quality, and build a like-minded community of practice.

Health Ministry draws attention towards Rotavirus Vaccine

The Health Ministry has drawn an ambitious plan under the 100-days agenda of the newly elected government, wherein it has been decided to provide Rotavirus vaccine to every child across all 36 states and Union Territories by September, 2019. According to Dr Harsh Vardhan, Union Minister of Health and Family Welfare, the Government is committed to ending morbidity and mortality in children due to diarrhoea by 2022. Strengthening routine immunization is an essential investment in India's children and will ensure a healthy future of the country. Rotavirus vaccine was introduced in 2016 in a phased manner, beginning with 4 states initially and later expanded to 7 more states making it a total of 11 states by end of 2018, where Rotavirus vaccine was available in the country. At present the vaccine has been further expanded to 17 more states till now. Rotavirus vaccine is now available in 28 States/UTs.
Biological E, GVK BIO enter strategic R&D partnership

GVK BIO, a leading global Contract Research and Development Organisation (CRDO), and BE Pharmaceuticals Inc (BE Inc), a rapidly growing pharmaceutical company that develops, manufactures and markets complex and critical injectable products, have announced a strategic collaboration in drug product development. BE Pharmaceuticals Inc is a subsidiary of Biological E. Limited and focuses on Speciality Generic Injectables. As part of the partnership, GVK BIO will develop certain set of injectable products for BE Inc. Development work will include Pre-Formulation studies, Formulation Development, Analytical Method Development and Technology Transfer to a BE facility. The goal of the collaboration will be the successful regulatory submissions and marketing authorizations for the products in the US, Europe and RoW markets.

Sun Pharma announces licensing agreement with IICT

Sun Pharmaceutical Industries has entered into a global licensing agreement with the CSIR Indian Institute of Chemical Technology, Hyderabad (CSIR-IICT), for patents related to certain compounds with potential therapeutic activity across multiple indications in Sun Pharma’s specialty focus areas. Under the terms of the license agreement, Sun Pharma gets exclusive global license for the said patents and any other future patents covered in the agreement. Sun Pharma will pay CSIR-IICT upfront and potential development, regulatory and sales milestone payments totaling up to Rs 240 crore, plus royalties on net sales from commercialization of the products developed using these patents. Sun Pharma will be responsible for development, regulatory filings, manufacturing and commercialization of these potential products. This agreement will facilitate addition of pre-clinical candidates to Sun Pharma’s global specialty pipeline. A successful clinical development of these potential compounds may enable Sun Pharma to commercialize pharmaceutical products for various therapeutic indications over the long term.

Zydus completes phase III trial of diabetes drug in India

Ahmedabad based Zydus Cadila has announced that it has completed Phase 3 Clinical Trial in India of Saroglitazar Mg for treating Type 2 Diabetes. The Phase 3 trial has demonstrated efficacy and achieved statistical significance for its primary endpoint which was the change in mean HbA1c as compared to the baseline. No severe hypoglycaemia events were reported. There was no weight gain or edema observed with Saroglitazar Mg. Saroglitazar Magnesium was launched in India during September 2013 under the brand name ‘Lipaglyn’, for the treatment of hypertriglyceridemia and diabetic dyslipidemia in patients with Type-2 diabetes not controlled by statins.
HealthQik secures Rs 1.7 Cr in seed round

Electronic health records startup HealthQik, founded in 2016 in Bhopal, has raised seed funding of Rs 1.7 crore from two angel investors, Virendra Prakash Sharma (from Indonesia) and Gagan Lamba (from the US). Incubated at B-Nest Incubation Centre in Bhopal, HealthQik is a website and mobile platform connecting patients with healthcare providers. The cloud-based comprehensive EHR platform helps keep health records online, schedule doctor appointments, and analyse medical data. The startup intends to utilise the funds to maximise ongoing momentum, expand offerings to additional healthcare segments, and continue the development of product to reach a wider audience in India.

Neuberg joins hands with C-CAMP

Hyderabad based healthcare startup Neuberg Diagnostics has announced a strategic alliance with the Centre for Cellular And Molecular Platforms (C-CAMP), an initiative of the Department of Biotechnology, Ministry of Science and Technology and Earth Sciences, Government of India. As part of the arrangement, Neuberg Anand Academy for Laboratory Medicine (NAALM) will partner with C-CAMP for technical training courses covering Flow Cytometry, Genomics, Mass Spectrometry and other advanced technology platforms. Also Neuberg Anand Reference Laboratory and Anand Diagnostic Laboratory – A Neuberg Associate will have access to high end technology like electron microscopy at C-CAMP for analytical testing and for research into method development.

Doxper raises Rs 28.4 Cr in Series A round

Health tech startup Doxper based in Mumbai, has raised Rs 28.4 crore in its Series A round of funding led by healthcare and wellness focused investor Alkemi Venture Partners. Existing investor GrowX Ventures and some angel investors also participated in the round. Other investors that contributed to the round include Rainforest Venture Network and a group of individual investors. The startup, which is operated by InformDS Technologies Pvt Ltd, will use the funds for market expansion in the country apart from investing in technology, research and development. Doxper is a machine learning (ML) and artificial intelligence (AI) powered data capture solution. It has developed an encoded pen-and-paper system, through which doctors can write prescriptions and patient information, and the data automatically gets transferred to the cloud.
**Exelixis strikes $17.5M pact with Dr Reddy’s arm**

US-based Exelixis Inc has entered into an exclusive collaboration with Bengaluru based Aurigene Discovery Technologies, an arm of Dr Reddy’s Laboratories. The agreement gives Exelixis, an oncology-focused biotechnology firm, the opportunity to in-license as many as six programmes from Aurigene. Under the agreement terms, Exelixis will make an upfront payment of $10 million for exclusive options to license three pre-existing programmes from Aurigene. In addition, Exelixis and Aurigene will initiate three Aurigene-led drug discovery programmes on mutually agreed upon targets, in exchange for additional option payments of $2.5 million per programme. Exelixis will also contribute research funding to Aurigene to facilitate discovery and preclinical development work on all six programmes. As the programmes mature, Exelixis will have the opportunity to exercise an exclusive option for each programme up until the time of investigational new drug (IND) acceptance.

**IOL invests Rs 47 Cr in Raikot facility**

IOL Chemicals and Pharmaceuticals, through its ancillary unit Vivachem Intermediates, is investing Rs 47 crore for establishing a new manufacturing facility at the Industrial Focal Point, Raikot, Punjab. Vijay Inder Singla, PWD and Education Minister, Government of Punjab, laid the foundation stone of the unit at Raikot. The unit is coming up with the support of Invest Punjab. IOL Chemicals and Pharmaceuticals, incorporated in 1986 having to-date cumulative investment of Rs 700 crore and projected annual turnover for FY 2019 is Rs 1,700 crore. IOLCP is one of India’s leading manufacturers and exporters of APIs. IOLCP has a well-diversified product portfolio and Ibuprofen is the flagship product of the company in the pharmaceutical segment and Ethyl Acetate in the chemical segment.

**Siemens Healthineers announces acquisition of CV Robotics for $1.1B**

Corindus Vascular Robotics, a leading developer of precision vascular robotics, has announced that it has entered into a definitive merger agreement to be acquired by Siemens Healthineers AG. Under the terms of the merger agreement, Siemens Medical Solutions, a wholly-owned subsidiary of Siemens Healthineers AG, a German stock listed company, will acquire all issued and outstanding shares of common stock of Corindus for $4.28 per share in cash, representing an aggregate purchase price of approximately $1.1 billion. The acquisition of Corindus, combined with Siemens’ strong advanced therapies portfolio will help further advance the growth of vascular robotics.
In line with his vision of universal health coverage, Prime Minister Imran Khan has launched Sehat Sahulat Programme for persons with disabilities and their families in Pakistan as his government’s vision is based on the principles of lifting the conditions of the downtrodden and weaker segments of society. It is the first-ever initiative aimed at the empowerment, mainstreaming and well-being of the persons with disabilities by the government. Through health cards, disabled individuals and their registered families will also be provided with similar benefits, which are being provided to other families. This joint collaboration between the Ministry of National Health Services and Ehsaas Programme appears to be an example for all other public sector initiatives to work together and synergize their efforts to benefit the people.

Sri Lankan hospital chain steps in Seychelles

Hemas Hospitals, the first and only hospital chain in Sri Lanka to have been accredited by the Australian Council on Healthcare Standards International (ACHSI), has recently established its first overseas laboratory facility in Mahe, Seychelles. Offering a comprehensive portfolio of over 3000 medical tests, the facility is the first fully-fledged laboratory to be established outside the country by a Sri Lankan hospital chain. Well equipped with the latest technology to cater to the needs of the island nation, the facility strictly adheres to international standards and has implemented stringent internal and external quality assurance procedures to ensure the highest levels of accuracy and precision of test results. The lab also maintains standards set by the Seychelles Government Authorities. Established in 2008 with the launch of its pioneering facility in Wattala, followed by a second hospital in Thalawathugoda, Hemas Hospitals has today grown into one of the most advanced hospital chains in Sri Lanka.

Ncell ventures into telemedicine in Nepal

Ncell, a privately owned mobile network operator in Nepal, under its Corporate Social Responsibility (CSR) and Dhulikhel Hospital-Kathmandu University Hospital (DH-KUH) have signed an agreement to support Dhulikhel Hospital for Telemedicine and Health Informatics Programme. The purpose of the programme is to serve remote and underserved communities through quality health care services, using technology and data-driven health care methods. Ncell will provide telemedicine equipment, establish connectivity infrastructure at the local community health centers to DH-KUH. Ncell will also provide financial support to DH-KUH for procurement of local suppliers and services needed for the execution of the project for the next two years. In return, DH-KUH will provide support in allocating space & utilities, qualified Medical Doctors & Consultants and carrying out periodic training sessions, monitoring the project to run in optimum quality.

Pakistan launches health plan for disabled

In line with his vision of universal health coverage, Prime Minister Imran Khan has launched Sehat Sahulat Programme for persons with disabilities and their families in Pakistan as his government’s vision is based on the principles of lifting the conditions of the downtrodden and weaker segments of society. It is the first-ever initiative aimed at the empowerment, mainstreaming and well-being of the persons with disabilities by the government. Through health cards, disabled individuals and their registered families will also be provided with similar benefits, which are being provided to other families. This joint collaboration between the Ministry of National Health Services and Ehsaas Programme appears to be an example for all other public sector initiatives to work together and synergize their efforts to benefit the people.
Mylan, Pfizer start new venture

Mylan and Pfizer Inc. have announced a definitive agreement to combine Mylan with Upjohn, Pfizer’s off-patent branded and generic established medicines business, creating a new global pharmaceutical company. Under the terms of the agreement, which is structured as an all-stock, Reverse Morris Trust transaction, each Mylan share would be converted into one share of the new company. Pfizer shareholders would own 57 per cent of the combined new company, and Mylan shareholders would own 43 per cent. The Boards of Directors of both Mylan and Pfizer have unanimously approved the transaction. The new company will transform and accelerate each businesses’ ability to serve patients’ needs and expand their capabilities across more than 165 markets by bringing together two highly complementary businesses. Mylan brings a diverse portfolio across many geographies and key therapeutic areas, such as central nervous system and anesthesia, infectious disease and cardiovascular, as well as a robust pipeline, high-quality manufacturing and supply chain excellence. Upjohn brings trusted, iconic brands, such as Lipitor (atorvastatin calcium), Celebrex (celecoxib) and Viagra (sildenafil), and proven commercialization capabilities, including leadership positions in China and other emerging markets.

NHS England to set up £250M national AI lab

NHS England is setting up a national artificial intelligence (AI) laboratory with a cash injection of £250 million. The lab aims to bring together the industry’s best academics, specialists and technology companies to work on big developments in AI such as earlier cancer detection, new dementia treatments and more personalised care. The NHS is also investing in AI-powered apps and implementing technology which will allow NHS 111 non-emergency enquiries to be managed by robots. AI has been used to detect early signs of melanoma, demystify the contraceptive pill and decode mental health. While the technology is not available across all UK hospitals, some are now using it to predict cancer survival and cut the number of missed appointments. An AI developed by University College London is able to identify patients who are likely not to turn up to ensure they are given a reminder phone call.

Bayer buys BlueRock in $600M deal

Bayer AG and BlueRock Therapeutics have announced an agreement under which Bayer will fully acquire BlueRock Therapeutics, a privately held US-headquartered biotechnology company focused on developing engineered cell therapies in the fields of neurology, cardiology and immunology, using a proprietary induced pluripotent stem cell (iPSC) platform. Following a 2016 joint venture with Versant Ventures to establish BlueRock Therapeutics, Bayer will acquire the remaining stake for approximately $240 million in cash to be paid upfront at closing and an additional $360 million payable upon achievement of pre-defined development milestones. With Bayer currently holding 40.8 per cent stake, the investment corresponds to a total company value of BlueRock Therapeutics of approximately $1 billion. The closing of the transaction is expected during the third quarter of 2019.
NDHB- AMBITIOUS BUT CHALLENGING

The vision of National Digital Health Blueprint (NDHB) is to create a National Digital Health Eco-system that supports Universal Health Coverage in an efficient, accessible, inclusive, affordable, timely and safe manner, through provision of a wide-range of data, information and infrastructure services, duly leveraging open, interoperable, standards-based digital systems, and ensuring the security, confidentiality and privacy of health-related personal information. Although it appears to be a very ambitious project, a large number of obstacles need to be tackled for its successful implementation.

The Government of India approved the National Health Policy 2017 (NHP 2017) with the vision of providing Universal Health Care. As a sequel to the NHP 2017, the Union Budget for the fiscal year 2018–19 announced the Ayushman Bharat Yojana. Later in 2018, NITI Aayog had proposed a conceptual framework for creation of a National Health Stack (NHS) - a set of core building blocks to be built as a common public good that helps avoid duplication of efforts and achieve convergence among the IT systems of the diverse stake holders such as the Governments, the Payers, the Providers and the Citizens. However, the components of NHS went for further examination and as a result a committee was constituted under the chairmanship of J Satyanarayana, former Secretary, Ministry of Electronics and Information Technology (MeitY) and Chairman of Unique Identification Authority of India (UIDAI) to create a framework and implementation plan for NHS. After a series of meetings and brainstorming sessions, the committee prepared the report and named it 'National Digital Health Blueprint (NDHB)'. The report was officially released by Dr Harsh Vardhan, Union Minister of Health and Family Welfare, on 15 July 2019, to receive inputs from various stakeholders.

A new entity, National Digital Health Mission (NDHM), will be charged with the responsibility of implementing NDHB. The vision of NDHB is to create a National Digital Health Eco-system that supports Universal Health Coverage in an efficient, accessible, inclusive, affordable, timely and safe manner, through provision of a wide-range of data, information and infrastructure services, duly leveraging open, interoperable, standards-based digital systems, and ensuring the security, confidentiality and privacy of health-related personal information.

The National Digital Health Mission (NDHM) has chalked out an extensive plan in three batches. Starting July 2019 till December 2019, the objective is to design and develop a number of deliverables such as H-Cloud, Personal Health Identifier, Electronic Health Record (HER), Core APIs and Consent Manager. Following this, the next set of deliverables to be achieved by July 2020 includes establishment of telemedicine infrastructure, National Health Portal, Health Locker, NCD Registries, to name a few. Towards the end of 2020, the rest of the targets are to be achieved in the form of establishing health call centres, developing capacity building plan, clinical
Keeping in view the action plan carved out by NDHM which is to be executed within the next 18 months, BioSpectrum reached out to the industry experts to seek their views, feedback and comments on how NDHB can help achieve ‘Health for all’.

Supporting the whole initiative, **Dr Chirag Trivedi, President, Indian Society for Clinical Research** says, “One of the key objective from the NDHB is ‘promoting better management of the health sector by leveraging health data analytics and medical research’. The NDHB envisages both researchers and drug device manufacturers (including CROs) to be key actors in establishing the NDHB. The NDHB plans to set up disease registries for mainly NCDs which will also allow researchers with better information on disease epidemiology. Currently India has poor publicly available data on natural history disease cohorts for many of the diseases which are more endemic to India. This data is key to understanding the disease and the diseased, and to developing effective interventions (drugs/devices/lab tests etc.). ISCR welcomes the opportunity to be part of the setting up of NDHB and will play a key role from a researcher/industry stakeholder perspective in the setting up and roll out of the NDHB”.

Having a similar opinion, **Dr Taslimarif Saiyed, CEO, C-CAMP** says, “Digital technologies evolve fast, and hence innovation would be a key aspect while envisaging NDHB. C-CAMP can contribute to the national Digital Health community by providing strategic inputs in this aspect and also representing start-up/innovator community and their views and perspectives at the national level. Data analytics and affordable digital devices that can generate data are two important complementary aspects of Digital Health. NDHB should have a clear strategy on developing indigenous, affordable, and innovative digital health devices that can measure data in digital format and hence enable health data analytics.”

Putting her views in sync with healthcare affordability and accessibility as the major objective of NDHB, **Dr Geetha M, CEO & CTO, Niramai** notes, “The report talks about preventive interventions, early detection and stresses the need for screening programs, which is key to reduce healthcare cost and yet provide high-quality healthcare. The second aspect that is interesting in National Digital Health Blueprint (NDHB) is that it makes digital technology and integrated Enterprise architecture as a core solution to implement Ayushman Bharat Yojana, announced last year. The report talks about making the National Cancer Registry interoperable. The National Health Stack proposed by this report helps avoid duplication of efforts and tries to bring in convergence among the different IT systems of the stakeholders. We look forward to working with the government representatives to integrate Niramai solution with the Health Stack and enable Health and Well-being for all.”

Highlighting the inclusion of Clinical Decision Support systems as part of the NDHB, **Shireesh Sahai, CEO India/South Asia, Wolters Kluwer** observes, “It is great to note that the NDHB has
recognized the potential of Clinical Decision Support systems (CDS) to improve healthcare outcomes. The benefits of CDS are backed by several studies that show a reduction in diagnostic and medication errors and decrease in the overall variability of care. By eliminating variability through standard treatment guidelines and protocols, healthcare providers can save on operational costs, deliver accurate and timely treatment and ultimately save more lives. The NDHB is a very clear framework and implementation guidance for the National Health Stack. Its “citizen-centric” approach aligns with international best practices. Implementation of the NDHB is truly the need of the hour because in India currently we are significantly behind in adopting healthcare technologies and infrastructure that enable better healthcare outcomes at a national level. Once the NDHB is implemented through the National Digital Health Mission, it will significantly improve the quality of healthcare delivery and increase access to health services in a timely, robust and cost-efficient manner).

Stressing upon the benefits this initiative can bring upon the supply end, Georg Sparschuh, Managing Director, SCHOTT Glass India is of the opinion that “We welcome the initiative taken by the Health Ministry in producing a National Digital Health Blueprint and we believe it is a step towards a bright future. To bring about a digital revolution at this scale, and provide progressive and inclusive digital health services to 1.3 billion people on par with global standards, is the need of the hour. We see a great opportunity in the Ministry’s initiative, through investments on product innovation and supply chains, as a lot more can be done apart from creating the digital and IT based apparatuses. Financial and logistical shortcomings hinder services. Hence, organisations like ours, which rely heavily on the manufacturing value chain, will surely benefit from such an initiative, as it will allow interoperability and digital literacy.”

In addition, pointing out some other benefits of NDHB, Zoya Brar, Founder and Managing Director, CORE Diagnostics says, “The launch of the National Digital Health Blueprint (NDHB) will certainly increase the scope for adoption of digital tools in the healthcare sector. I believe it will also ensure that hospitals, health insurance firms, private as well as public organisations and even medical equipment and pharmaceutical manufacturers follow a set of procedures for this adoption. The initiative is a step in the direction of improving security, confidentiality and privacy of health-related information through a wide range of data, information and infrastructure services. NDHB will prove instrumental in establishing and managing the digital health data and its seamless exchange in addition to leveraging the Information Systems already existing in the health sector.”

**Industry raises impediments**

Although the National Digital Health Blueprint appears to be a very ambitious project, a large number of obstacles such as stringency, data security, legal perspectives, technical workforce, accessibility, regulation, etc. need to be tackled for its successful implementation.

Raising his concerns on the management aspect, Dr B S Ajaikumar, Chairman & CEO, HealthCare Global Enterprises Limited (HCG) points out, “The government’s architectural National Digital Health Blueprint (NDHB) document talks about leveraging the potential of digital health to synchronize primary, secondary and tertiary care. The blueprint comprises both health and pure-play technology. Thus, it is essential to integrate the key components of IT BT act as well as Drugs and Cosmetic act. This will be a pivotal step to maintain the anonymity of the data, legal balance to ensure stringent controls in data transfer. Further, there is a need to address the top barriers to mHealth implementation such as assessing the impact and cost-effectiveness of mHealth applications, to ensure that it gets its proper due amongst the competing health system priorities. The government should take the first move to bring in blockchain to leapfrog the traditional issues of legacy systems, health data inconsistencies and too many intermediaries. They should have a pool of informative videos to sensitize the patient needs. The National Digital Health team should weave a network of facilities for the secondary prevention of diseases like cancer.”
Citing the technicalities associated with this big project, Vivek Kanade, Executive Director, Siemens Healthineers, India, is of the opinion that “Healthcare is one of the most data-intensive industries around, and the challenge here is not just in collecting, storage and access, but in making this data usable at the right time during the care continuum. This wish, however, is aggravated by heterogenous IT systems in different medical institutions. The mandate of a good eHealth Solution is to provide secure health-data portability or exchange during the entire care cycle of a patient, irrespective of where this data gets created; enabling patient care by optimizing resources and time required for the treatment. In the long run, insights garnered from the ecosystem that will be created, will improve the quality and accessibility of care, help foster a spirit of cooperation and research in the healthcare system, and improve patient experience. Needless to say, the financial benefits that would accrue with digitalization of healthcare shall be immense.”

However healthcare data management brings along the biggest risk of cyber security. If we judge by the recent healthcare attacks i.e. ransomware downing the systems in two Ohio hospitals and the enormous SingHealth data breach, no healthcare organization can hope to be overlooked in the long run. And this project is no exception. “The effort put into integrating the IT systems in order to monitor and provide healthcare to create a national digital health ecosystem is a great step in recognizing the potential of technology for the benefit of health. However, the implementation of the same would be a mammoth task. There has to be an extremely robust system to ensure ‘anonymisation’, with an impossibility of leak of personal information. This model should also be initially made keeping in mind the available resources and the country’s priorities. There should be inclusion of the private sector during the implementation, as a strong Public Private Partnership (PPP) would likely lead to effective implementation of the National Digital Health Mission. In my opinion, the accountability and reliability of information would be the biggest challenge. Running a pilot project, maybe in a state, and then scaling up to a national level, may help to understand acceptability and do-ability of this great ambitious project. This project will definitely help to get real time data and analytics, which would help connect healthcare records with mobile phone applications etc., in order to improve clinical outcomes and services”, mentions Dr Sanjith Saseedharan, Head, Intensive Care Unit, S L Raheja Hospital- a Fortis associate.

Besides addressing technological challenges, the government would also have to manage the critical issue of accessibility. Sharing her thoughts on this, Dr Dilpreet Brar, Founder and MD, medECUBE Healthcare India says, “As the world moves towards Artificial Intelligence (AI), the timing of Indian Nation Digital Health Blueprint is very appropriate. I wish to highlight a few insights that I believe are critical. First, the success of a nationwide system will depend heavily on a unique person identification. The challenge faced in the US because of the lack of such ID provides great learnings. We will have to set aside superficial concerns of privacy in order to overcome this challenge. Besides, blockchain technologies can be leveraged to address the issues of privacy and security. Second, our digital infrastructure must emphasize the value of diagnostics. With only 3 per cent of the total healthcare expense, and impact on nearly 75 per cent of the healthcare cost, streamlining diagnostics with digital means will have a transformational impact. AI will play an important role here, not by outdoing experts, but rather, but bringing the knowledge of the experts to the non-experts. This will be critical for rural India. Finally, the digital footprint, for it to have a far-reaching impact, must address the issue of access. A large proportion of patient encounters do not need physical contact; that’s where digital means can play a role. A national command center will go a long way in tremendously increasing the reach of our current resources.”

Healthcare accessibility is also dependent on the regulations that form a key component of an effective healthcare system. Expressing a major doubt here is the Healthcare Federation in India (NATHEALTH) that plays a pivotal role in empowering Indian healthcare and address quality
healthcare. “The data governance structure of the registries and master databases of NDHB, including the access rights of these registries, need more clarity. The usage of Government Community Cloud (GCC) as recommended in the NDHB, specifically regarding the implementation of layer 2 and layer 3 would benefit from shared experiences of use cases. E-prescriptions, specifically those that confirm to the clinically accepted norms of identifiable doctor, patient, disease and drug demographics should be considered as legal (e-prescriptions are still considered as illegal). These 4 demographic standards are in line with the 8 standards set for electronic health records in the NDHB. It would be important to co-opt national and state medical councils into the NDHM as they provide regulatory supervision to doctors. The governance structure of the NDHM will be enriched if relevant bodies with specific dual core expertise in health and technology are duly represented in it. We hope to work closely with the NDHM in order to ensure that principles of the National Health Policy are truly met, providing good quality healthcare to all”, says **Dr Sudarshan Ballal, President, NATHEALTH.**

Keeping in view the way digital healthcare is making waves, **Abhishek Shah, Co-Founder & CEO, Wellthy Therapeutics** talks about the role digital therapeutic (DTx) interventions can play in this project. “For patient centricity to be at the centre of every intervention for NCDs, the NDHB needs to enable digital health to solve for the 8759 hours that the patient does not interact with healthcare today. Addressing the sustainable development goals for non-communicable disease requires evidence based digital therapeutic (DTx) interventions to be curated by the NDHB, and to be regulated by the relevant bodies. Those that have proven to improve outcomes and reduce healthcare cost, should be assigned codes and be reimbursable just like hospital surgery is”, he stresses.

Sharing similar views on the role of digitization in healthcare, **Anil Jotwani, Senior Advisor, Transasia Bio-Medicals** says, “The NDHB is a call for attention on the optimum use of data and analytics for a healthier India. In my opinion, this is a move in the right direction, to make healthcare safe for patients. Electronic Medical Records will make it easier to get all the past treatment history of a patient, thus making healthcare more accessible and safe. Data if collected properly can also provide a plethora of information for the epidemiological studies, to better understand the disease trends and geographical distribution. On the diagnostic front, digitalization can make diagnosis more accessible. Tele-pathology and telemedicine can be used to connect even a small Primary Health Centre (PHC) in rural areas, giving patients access to high end treatment options. A lot of homework, however, needs to be done to ensure seamless transition of data from let’s say a private to a public entity with a stringent law in place.”

With so many targets and associated challenges to be addressed in the coming few months, the most important requirement is to be able to integrate all healthcare components efficiently, probably picking notes from the already established healthcare models of other countries. “As health is a state subject, integrating all the 31 states and union territories of India into this project is no easy task. Patient confidentiality would remain a major issue. Given that even the best computer systems can be hacked into, enough protection must be provided to protect the confidentiality of patient data. It would be a challenge to get different private clinics and hospitals, most of whom do not even have electronic records to develop these records and that too, in a manner which can be easily ‘synced’ into the national data base. The National Cancer Registry maintained by ICMR is mentioned on Page 23. There are other examples such as the ICMR-Young Diabetes Registry (YDR) which combines data from both government
and private institutions in 6 cities of India. While developing the electronic records, mention is made of the South Korean model and the UK model, there could be other countries like Sweden, Denmark, Finland and Norway i.e. Scandinavian countries who have managed to get data on the entire population of those countries. On Page 21, under Government Managed Health Applications, it is mentioned that telemedicine should be given a high priority given the low Doctor-Population ratio, especially in the rural area. I completely agree with this. However, there have been conflicting reports from the Government saying that telephone consultations, email consultations etc. by doctors are illegal. I think the Government should rethink this as they are also tools which help to connect patients with doctors especially in remote areas. As long as confidentiality is maintained, modern technology should be utilised for the betterment of the health of people”, elaborates **Dr V Mohan, Director & President, Madras Diabetes Research Foundation.**

As the industry puts out the impediments that need to be addressed in order to create a National Digital Health Eco-system in India, the government should take a note of these multiple issues and go about their action plan more carefully and accurately for a healthy nation.  

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**Dr Manbeena Chawla**  
manbeena.chawla@mmaactiv.com

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<tr>
<th>Timelines</th>
<th>Physical Deliverables</th>
<th>Digital Deliverables</th>
<th>Artefact Deliverables</th>
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<tbody>
<tr>
<td><strong>Immediate</strong></td>
<td></td>
<td>1. Design and establish Personal Health Identifier (PHI)</td>
<td>1. Develop Federated Enterprise Architecture, adopting Agile IndEA Framework</td>
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<td>(0-6 months)</td>
<td>2. Establish Secure Health Network for accessing Core and Critical Health Data</td>
<td>2. Design and develop Electronic Health Record (EHR) system</td>
<td>2. Develop approach to working with States/UTs</td>
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<td></td>
<td>3. Establish Health Information Exchange (HIE) for interoperability and integration.</td>
<td>3. Design and Develop Core APIs</td>
<td>3. Develop approach to working with private sector (health &amp; IT service providers)</td>
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<td>4. Design, develop and establish Consent Manager</td>
<td>4. Assessment of Legacy Systems for conformance to NDHB</td>
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<td>5. Establish MyHealth App</td>
<td>5. Design Organization Structure for NDHM</td>
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<td>6. Design, develop and populate Health Directories (Master data of professionals, institutions)</td>
<td>6. Design and implement a Plan for Adoption of Health Informatics Standards, including a system of incentives for adoption.</td>
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<tr>
<td>(6-12 Months)</td>
<td>5. Establish special connectivity and IT Infrastructure for identified Remote Areas.</td>
<td>8. Design and establish Health Locker</td>
<td>8. Design and notify NDHM Privacy Policy</td>
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<td><strong>Medium term</strong></td>
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<td>10. Design and Develop Anonymizer</td>
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<td>(12-18 Months)</td>
<td>7. Establish GIS/Visualization Platform(s)</td>
<td>11. Integrate PMJAY with NDHM</td>
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<td></td>
<td>8. Establish Health Call Centre(s)</td>
<td>12. Establish NCD Registries</td>
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<td>13. Design, develop and launch Common Applications including:</td>
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<td>• Hospital Info Sys</td>
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<td>• Emergency Mgt Sys</td>
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<td>• E-Pharma</td>
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<td>• Wellness Centres Mgt</td>
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<td>• Screening</td>
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<td>• MEDucation</td>
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<td>• CDS(Clinical Decision Support System)</td>
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<td>14. Localization Tools</td>
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<td>15. Design and Develop Health Schemes mgmt system(s)</td>
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<td>10. Design and implement Capacity Building Plan</td>
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<td>11. Design and implement Plan for Clinical Audit.</td>
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<td>12. Architecture for Integration with CRS of Registration of Births &amp; Deaths</td>
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The market for enzymes in India was relatively small compared to other sectors but it is picking up as compared to other markets in the world. Enzyme use is still in its infancy with growing awareness of enzyme potential and benefits providing attractive growth perspectives.

Indian enzyme market is growing at 7 per cent over last year and has touched Rs 2360 crore for the year 2018-19. However, the rapid development of India’s food and beverage, pharmaceutical and chemical industry is starting to change this, and specialty enzyme demand will outpace industrial enzyme demand going forward.

There are about 25 major players in this market. Most of these companies are either into marketing or into formulations. But India has few companies both multinational and local that manufacture enzymes used in different industries such as pharmaceutical, food processing, leather, detergents, paper and pulp and textile. These companies produce various enzymes and several other eco-friendly biological products. The product range and services are growing rapidly as the use of enzymes is gaining widespread acceptance. However according to esuppliersindia.com there are over 1626 suppliers for enzymes in India offering 607 different range of products.

The Indian manufacturers are not only supplying to local market but are also exporting to a number of countries. According to Directorate General of Commercial Intelligence and Statistics (DGCI&S) India exported enzymes worth Rs 287 crore in 2018-19 and in the first quarter of 2019-20 India exported enzymes worth Rs 78.57 crore. The USA, Germany, Japan, China, Malaysia and Denmark are the leading importers of Indian enzymes during 2018-19. These nations have imported worth Rs 71.17 crore, Rs 14.24 crore, Rs 14.23 crore, Rs 12.93 crore, Rs 12.26 crore and Rs 10.50 crore respectively during last year.

As the economy is picking up it will help in increased foreign direct investment which will support the growth of enzyme usage as well. Growth will be seen in research and biotechnology as the government seeks to promote development of the biotechnology sector to showcase the country’s technological capabilities, and Indian pharmaceutical and biotechnology companies increasingly seek to make inroads into the developed markets of the United States. This same trend will benefit the biocatalysis market.

Besides pharmaceutical and biotechnology, industrial enzymes find application across various industries such as food and beverage, household care, animal feed, leather manufacturing, textile processing, etc. The food and beverage enzymes market is in the growing stage of its product lifecycle. Improved R&D, end-user awareness about the role of enzymes in enhancing taste, quality, convenience, and finally, the
natural way of synthesizing enzymes are some of the key factors leading to the increasing market for food and beverages enzymes.

Industrial enzymes are categorized into carbohydrates, proteases, lipases and others. Among these, the demand for carbohydrates is growing at the fastest pace in India as they are widely used in various industries such as baking, brewing, dairy, etc. Increasing demand for packaged food, dairy products, detergents and pharmaceuticals that aid in digestion is driving the country’s industrial enzymes market. Moreover, an increasing number of detergent manufacturers are shifting their focus towards adopting enzymes for detergent formulations due to environmental concerns associated with the usage of phosphorus in detergents.

The market is dominated by multinational companies such as Novozymes South Asia Pvt. Ltd., Danisco (India) Pvt Ltd, DSM Nutritional Products India Pvt. Ltd, Chr. Hansen (India) Pvt Ltd, E.I. DuPont India Pvt. Ltd and so on with their competitive quality products. These companies are very active and controlling the food and beverage, pharmaceutical and biotechnology space by offering high quality products.

While Indian companies are entering this space by offering quality food grade enzyme products in the last few years and in the coming years they will take on competition with global players. There are few local players in this space who are offering formulated products at an affordable price to meet the demands of the local market. High R&D capital, unclear regulations, and an import-dominated market are some of the reasons leading to fewer domestic participants in the food and beverages sector.

Domestic companies accounted for a minor chunk of the total market. However, the share has been increasing over the last three to four years as these companies realize the huge potential of food enzymes. These market participants are currently enhancing their R&D facilities, staff, sophisticated manufacturing plants, and a comprehensive distribution network.

Due to increasing environmental concerns, there is an increase in the number of detergent manufacturers who are shifting towards use of enzyme based technologies instead of using harmful phosphorus chemicals in detergents, which is expected to contribute to the growth of industrial enzymes in India in the coming years.

According to Pharmaion, a research based global management consulting firm, enzyme use is still in its infancy with growing awareness of enzyme potential and benefits providing attractive growth perspectives. India imports about 70 per cent of the total enzyme consumption. Pharmaceutical enzymes represent most of the industrial enzyme demands in India and cover almost 50 per cent of the total enzyme demand, followed by detergent enzymes (20 per cent) and textile enzymes (20 per cent).

According to DCCI&S, in 2018-19 India imported enzymes worth Rs 863 crore from China (Rs 245.60 crore), Denmark (Rs 159.09 crore), U S A (Rs 94.14 crore), Germany (Rs 65.62 crore), Finland (Rs 64.52 crore), Netherlands (Rs 43.74 crore), Singapore (Rs 43.70 crore), Austria (Rs 30.23 crore), Spain (Rs 19.93 crore), Italy (Rs 19.47 crore), Japan (Rs 16.73 core), Belgium (Rs 12.90 crore) and Ireland (Rs 10.05. crore).

According to GM Insights shifting consumer preferences towards packaged and processed foods due to the rising awareness pertaining to food safety and security will be a key impetus for the enzymes market growth. Incorporation of enzymes in several food products promotes prolonged nutritional content and longer shelf life, thereby augmenting the product portfolio. Additionally, rapid penetration of organized retail in the untapped rural and urban areas will provide strong business outlook through the forecast period.

Continuous government support in the taxes and subsidies on numerous food items accompanied by the upgradation of trade practices between several economies across the globe will propel the industry landscape. Mass urbanization, changing consumer lifestyle and growing health awareness will provide lucrative opportunities for the enzymes market in the coming months.

Food and beverage industry expansion for the growing population requirements along with need to improve food flavour, quality and texture will drive enzymes market growth. Major product benefits in baking products that
include standardized bread quality, uniform bread browning, and lower flour protein levels in crackers and biscuits will support industry growth.

Growing demand for processed food coupled with the rising awareness regarding its health benefits will support the growth of the market. Significant consumer paradigm shift towards processed food products due to changing urban lifestyle will boost the product demand. Food enzymes market segment is expected to witness strong growth as they are vital in breaking down several complex molecules in the food into simpler forms that can be easily digested.

Potential applications in the detergent industry will also provide positive outlook to the industry growth as they are widely used for the stains removal from clothes. Addition of specific enzymes in the product composition will enhance the effectiveness of detergents and helps in the removal of protein-based stains. Growing adoption of auxiliary chemicals for enhancing bleaching and deinking and fiber modification will support the enzymes market penetration in the pulp and paper industry. Improved paper quality and reduced energy consumption are the major benefits that will support product penetration in the coming years.

Carbohydrase is among the major soft drink ingredients. Increasing demand for sports drinks in the country will have a positive influence over the carbohydrase demand which will boost enzymes market share. Growing applications in animal feed and pharmaceutical industries will provide strong demand growth.

Increasing demand for biofuel applications, specifically for amylases, due to increasing petroleum costs will drive the industry growth. Additionally, the growing demand for renewable energy sources and improved R&D initiatives are supplementing the overall industry growth. Contemporary technologies and patent expirations over the coming years will propel the demand for amylases biofuels, propelling the market size.

Many companies in India are entering specialised area ie probiotics and exporting to Indonesia, Thailand, the Far East and the Middle East. Now small Indian players are looking for investors to expand their operations in terms of product portfolio and volume as well. Besides European companies, Chinese companies too are looking at entering the Indian enzymes market.

As India lacks having standardized regulatory guidelines and harmonization, it will continue to hamper the enzymes market growth. High product prices as compared to traditional ingredients, particularly in the food & beverage and pharmaceutical & biotechnology industry, are among the key factors restraining industry growth. But high prevalence of chronic diseases, increase in prevalence of digestive disorders, and surge in demand for biofuels, will give a push to the growth of the enzymes businesses mainly in food and beverage, pharmaceutical, nutraceutical, bioenergy areas.

**BIOSPECTRUM INDUSTRIAL ENZYMES SURVEY AND METHODOLOGY**

BioSpectrum India, a leading B2B media platform in Lifesciences space since 2003 has re-launched its ranking special edition in June 2019 after a gap of 2 years. In the previous issues we have covered the ranking of BioPharma and Bio Suppliers industry. In this survey we looked at only Industrial Enzymes Industry with companies specializing in food & beverage, textile, pharmaceutical, food processing, leather, detergents, paper and pulp and bioenergy. We highlighted the companies (both MNCs and domestic players) based on their achievements in the past financial years.

A detailed questionnaire (survey form) was sent to about 25 companies in this space to capture the needed information for the analysis. This was done during August 2019. Companies shared information with us to the extent it was possible by them. We have collected information about listed companies from stock exchange and financial agencies as well.

The revenues considered for the analysis are of Industrial Enzymes products sales. In several cases, where revenue figures were not available, estimates were arrived in discussion with industry experts.

For all the ranking purposes, we have taken the Industrial Enzymes business only into consideration. Wherever ‘Revenue is mentioned, it means, sales turnover from Industrial Enzymes products division. Therefore, revenue wherever mentioned is not necessarily the total sales turnover of the company.
BioSpectrum Top Industrial Enzymes Companies 2019*

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Company</th>
<th>Revenue in 2018-19 (in Rs crore)</th>
<th>Category</th>
<th>Location</th>
<th>Region</th>
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<tbody>
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<td>1</td>
<td>Rossari Biotech Ltd</td>
<td>600.00</td>
<td>India</td>
<td>Mumbai</td>
<td>West</td>
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<td>2</td>
<td>Novozymes South Asia Private Limited</td>
<td>530.00</td>
<td>MNC</td>
<td>Bangalore</td>
<td>South</td>
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<td>3</td>
<td>Advanced Enzyme Technologies Limited</td>
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<td>India</td>
<td>Thane</td>
<td>West</td>
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<tr>
<td>4</td>
<td>Lumis Biotech Private Limited</td>
<td>100.00</td>
<td>India</td>
<td>Mumbai</td>
<td>West</td>
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*We have not covered some of the leading MNC and local companies as they are unable to participate in the BioSpectrum Industrial Biotechnology (Enzyme) Survey 2019.

Mumbai based Rossari Biotech Ltd is leading the Industrial Enzymes Industry with sales revenue of Rs 600 crore for the year 2018-19 followed by Bangalore based Novozymes South Asia Private Limited with sales revenue of Rs 530 crore and Thane based Advanced Enzyme Technologies Limited with sales revenue of Rs 411 crore.

Top 3 Industrial Enzymes companies contribute 65% of the total Industrial Enzymes market

Top 10 Industrial Enzymes companies contribute 85% of the total Industrial Enzymes market
ROSSARI BIOTECH LIMITED

Mumbai based manufacturing company Rossari Biotech generated a revenue of Rs 600 crore in the enzymes space during the FY 2018-19. Rossari is one of India’s leading manufacturers and exporters of textile chemical auxiliaries, enzymes, polymers and animal health care products.

The enzymes portfolio at Rossari is spread across a wide range of functions such as Desizing Agent, Bioscouring Agent, Peroxide Killer, Biopolishing, Fading and Washing Off catering to the textile chemicals section. Apart from this, the company also has a large number of enzyme products such as Mannobac, Phytobac, Protoxy Forte, Rosslipase, Rossphyte 5000/10000 and Xylot Ex in the individual form; and Enzyfort, Maxi ex, Maxizyme Ex and Rosszyme Plus in the cocktail form, within the Poultry Supplements & Additives sector.

The year 2018 saw the company receiving recognition as the Star Performer in Innovation, given out by Arvind Industries. Last year, the company also announced getting into an exclusive business partnership with Unilever to deliver best cleaning solutions.

Founded in 1997, Rossari Biotech was the brainchild of the two founding partners, Edward Menezes and Sunil Chari. Interestingly, most of the initial capital for the company was borrowed from friends and family who reposed their faith in the founders’ vision and their commitment to their goal. As the firm has grown in manpower and market value, its offices have moved a good few times finally settling at the current premises in Kanjurmarg in Mumbai which is now the location of the 80-person strong head office.

The company has state-of-the-art research facilities both at its head office in Mumbai as well as at the manufacturing plant in Silvassa in Gujarat. Rossari is one of the few companies in the sector credentialed with a Department of Scientific and Industrial Research (DSIR) certification.

The research facilities at Rossari encompass all the divisions of the company with Application Laboratories for textile and polymer applications to Microbiology Laboratories for enzyme research and Reaction Laboratories equipped with the appropriate facilities for carrying out polymer reaction and emulsion research and product development.

In the coming years, the company plans to stay on a rigorous innovative mode in order to expand operations and expertise.
Bangalore based Novozymes South Asia Private Limited, a subsidiary of Denmark headquartered biotechnology company Novozymes A/S saw a revenue generation of Rs 530 crore in the last financial year 2018-19 in the enzymes space. The company has operations in a number of countries around the world, including China, India, Brazil, Argentina, United Kingdom, the United States, and Canada.

Novozymes started operations in India in 1983 and is the largest supplier of industrial enzymes and microorganisms in the region today. The region's operations cover India, Sri Lanka, Bangladesh, Nepal and Bhutan. With over 500 employees, Novozymes India has grown into an organization spread across three sites in Bengaluru covering research, manufacturing, business functions and a shared service centre. Some of the key business areas for India are household care, textiles, food & beverages, oils & fats, baking and beverage alcohol. Novozymes makes pectinase enzymes in India. Pectinases are used in the wine and juice industries to squeeze more juice from the fruit and improve production processes. The company also formulates other enzyme types in India to cater to local market needs.

Novozymes has a Detergent Design Centre in Bengaluru that serves as a platform for engaging customers on how its biological solutions can meet the customer’s needs in laundry detergents and soap bars. Bengaluru is also home to the company’s textile application centre to support the growing textile industry in the region.

To accommodate business growth and a consequent increase in production and supply chain needs, Novozymes has obtained a land on a long-term lease in the Patalganga industrial area near Mumbai. With an initial investment of Rs 300 crore, the company is establishing a new enzyme production and supply chain facility that will be ready for operations this year and plans to employ around 150 people in the first phase. The new plant will be producing enzymes using solid state fermentation and also formulating enzymes imported from Novozymes’ production sites outside India. Subsequently, the formulation facility will now move from Bengaluru to Mumbai, which will bring it closer to customers for faster supplies.

Besides its business, education is also at high priority for Novozymes as it aims to educate 1 million people about the potential of biology by 2020. In 2018, the company conducted several educational activities aimed at external audiences. One example is the Mobile Science Lab, which was set up by Novozymes as a step toward making quality education accessible to remote schools and communities in the vicinity of Bengaluru.
THANE BASED RESEARCH DRIVEN COMPANY ADVANCED ENZYMES TECHNOLOGY LIMITED CLOCKED IN A REVENUE OF ₹ 411 CRORE DURING THE FINANCIAL YEAR 2018-19 EXHIBITING A GROWTH OF 4 PER CENT AS COMPARED TO ₹ 396 CRORE GENERATED IN THE PREVIOUS YEAR. THE COMPANY GENERATED A REVENUE OF ₹ 217 CRORE THROUGH ITS EXPORTS BUSINESS WHEREAS ₹ 178 CRORE CAME IN THROUGH THE DOMESTIC FRONT DURING THE FY18-19. THE COMPANY PROVIDES PROPRIETARY ENZYME PRODUCTS AND CUSTOMIZED ENZYME SOLUTIONS TO VARIOUS PHARMACEUTICAL AND NUTRACEUTICAL COMPANIES IN NORTH AMERICA, ASIA, EUROPE AND OTHER COUNTRIES GLOBALLY.

WITH A WORKFORCE OF MORE THAN 550 EMPLOYEES, AROUND 68 ENZYMES AND PROBIOTICS IN ITS PORTFOLIO, 5 R&D LOCATIONS IN INDIA AND GERMANY, AND 22 PATENTS GRANTED TO ITS CREDIT, THE COMPANY CATERS TO DIVERSIFIED INDUSTRIES AND VERTICALS LIKE HUMAN NUTRITION, ANIMAL NUTRITION AND BIO-PROCESSING. IN THE FY18-19, HUMAN NUTRITION VERTICAL COMPRISING OF ACTIVE INGREDIENT FOR NUTRACEUTICALS AND PHARMACEUTICALS CONTRIBUTED 76 PER CENT OF THE REVENUES FOLLOWED BY ANIMAL NUTRITION AND BIO-PROCESSING CONTRIBUTING 12 PER CENT AND 12 PER CENT RESPECTIVELY. LAST YEAR ALSO SAW 4 FOOD ENZYMES GETTING APPROVED AS A PROCESSING AID WITH FOOD SAFETY STANDARD AUTHORITY OF INDIA (FSSAI) AND 4 ENZYMES GETTING REGISTERED WITH REACH -ECHA (EUROPEAN CHEMICAL AGENCY).


AT PRESENT, ADVANCED ENZYMES WITH THREE WHOLLY OWNED SUBSIDIARIES, THREE JOINT VENTURES AND FIVE STEP-DOWN SUBSIDIARIES IS ABLE TO SERVICE 700 CUSTOMERS ACROSS 45 COUNTRIES WORLDWIDE AND EXPORTS ACROSS 6 CONTINENTS. IN THE COMING YEARS, THE COMPANY INTENDS TO EXPLORE THE INORGANIC AND ORGANIC GROWTH OPPORTUNITIES WITH AN EXPECTED RATE OF 10 PER CENT.
LUMIS BIOTECH PRIVATE LIMITED

Mumbai based enzyme manufacturing company Lumis Biotech Private Limited recorded a revenue of Rs 100 crore during the FY 18-19. With majority revenue being generated through exports, the company has designed and launched certain innovative products for the food, feed and the textile industry through state-of-the-art manufacturing facilities, high tech laboratory equipment, leading edge quality assurance system and industry specific knowledge. Lumis belongs to the K-Genix Health Care Group established in 1945. The core focus of K-Genix is manufacturing and marketing of pharmaceutical, biotech products and bulk drug chemicals.

In the textiles sector, Lumis has a number of desizing, bioscouring, biowashing, indigo bleaching, enzymatic peroxide killer, biopolishing enzymes in its portfolio. In addition, the company has developed few unique enzyme products namely Lumitint, Lumisilk, Lumiwool.

The company has also developed a range of products in the food sector catering to the areas of baking, brewing, wine, juices, distillation. Lumis has been supplying feed enzymes since many years to corporates in the capacity of a contract manufacturer but it is only in the recent past that the company has started emphasizing on directly promoting its enzymes for the animal feed industry through the exclusive global distributors either in their brand name or Lumis'.

Lumis, with its own culture bank of industrially potent strains (fungal and bacterial), focuses on producing robust enzymes coupled with unique side activities that are stable at wide pH and temperature conditions. These characteristics are quintessential for optimum efficiency of enzymes on the various types of feed ingredients and application conditions.

Established in 2000, Lumis is at the fore front in enzyme technology due to its unique combination of expertise, technology, research and its own large scale commercial fermentation unit. The company develops and produces a wide range of biocatalysts by both submerged and solid state fermentation. The fermentation unit has state of the art manufacturing facilities with proven production technology and advanced control systems that comply with international quality guidelines.

The company intends to become a prominent enzyme player across the globe in the coming years with core focus on animal feed, food and industrial enzymes sectors.
Engaluru based Contract Research Organization Anthem Biosciences recorded a revenue of Rs 50 crore in the enzyme space during the FY 2018-19 which is about 8 per cent of the total company’s revenue. The company has shown a growth of 30 per cent over the previous year. Anthem supplies enzymes to a host of industries such as paper manufacturing, beverages, grain processing, textiles, baking, animal feed and pharma.

Within the pharmaceutical sector, the company strongly focuses on the GastroIntestinal tract management and offers digestive enzymes range with multiple strengths. Research and development has added edge to Anthem to innovate new molecules for the Pharmaceutical segment.

Anthem also offers a wide range of products in the Nutraceutical segment of business ranging from enzymes, Prebiotics, Probiotics and their blends. High quality enzymes are also offered for better feed conversion rate for poultry, swine, ruminants and aqua species.

In the food & beverage space, the company offers specialized enzymes and functional ingredients for Bakery, Dairy and Confectionaries. On the industrial front, Anthem has a full line of cellulase enzymes for use in the textile industry, enzymes for pulp refining, eco-friendly deinking, Thermostable Xylanases for pre-bleaching of pulp, drainage control, and enzymes as mud breaker in open hole reservoir to do efficient well cleanup.

The revenue count for Tamil Nadu based Tex Biosciences (P) Limited (TBPL) was Rs 39 crore in the enzymes space during the FY18-19 exhibiting a growth of 11 per cent in comparison to Rs 35.2 crore generated in the previous year. The company generated most of its revenue from its domestic business and rest from the exports side. The bulk revenue came in through the leather, pulp & paper, biocatalysis, and animal feed & healthcare sectors of the company.

Operating since 1982, TBPL is involved in the manufacturing and marketing of Enzymes, Probiotics & Specialty Chemicals for a number of industrial applications namely Leather, Animal Feed, Textiles, Pulp & Paper, Detergents and Waste Water Treatment. The company is an ISO 9001, ISO 22000 and FAMI QS Certified organization and has a workforce of around 200 people. It has an export presence in 22 countries across the globe.

TBPL operates two state of the art facilities to undertake continuous research and process optimization. The Molecular Biology centre is a fully equipped genetic engineering facility that undertakes culture and process improvement work to support Enzyme and Probiotics production, and the Quality Control centre works on formulation and stability optimization.

For the coming years, the company is working towards expanding in to new geographical areas and planning an expansion into the waste water treatment market.
NOOR ENZYMES PRIVATE LIMITED

For Kolkata based industrial biotechnology company Noor Enzymes, the revenue generation was Rs 36 crore during the FY18-19. Noor Enzymes leverages on the infrastructure of large scale contractual fermentation facilities for manufacture of its enzyme concentrates. The company presently utilises fermentation units located at different parts of the Indian subcontinent to streamline manufacture of the wide range of products in its portfolio.

The company currently caters to the textile processing industry with a range of Amylase, Cellulase, Pectinase Enzymes; to the Detergents industry with a range of enzymes such as Alkaline Protease, Alkaline Amylase and Alkaline Lipase for detergent formulations; and the Leather processing industry with Acid Protease, Alkaline Protease, Acid Lipase and Alkaline Lipase Enzymes for tanning processes. Noor enzymes also has enzymes products for the paper processing industry, biofuel industry, starch processing industry, and the animal feed industry in its portfolio.

The company also manufactures of a wide range of Food Enzymes such as Baking Enzymes, Fruit & Vegetable Processing Enzymes, Tea Enzymes, Herbal extraction & Processing Enzymes, Protein Processing Enzymes and Dairy processing Enzymes. There is also presence of a variety of dietary supplement enzymes manufactured at Noor Enzymes such as fungal amylase, fungal xylanase, fungal lipase, fungal protease and fungal cellulase.

FRUZYME BIOTECH INDIA PRIVATE LIMITED

Tamil Nadu based Fruzyme Biotech India Private Limited roped in a revenue of Rs 21 crore during the FY18-19. Incorporated in 2012, the company caters to a wide range of industry applications such as flavor production, brewing, functional protein production, effluent treatment, meat tenderization, to name a few.

The company has developed an ultra-refined papain powder which is a highly concentrated Proteolytic enzyme prepared from the latex of Carica papaya fruit. It is characterized by its ability to hydrolyse large proteins into peptides and amino acids. The company has also developed a liquid papain which is a solution of proteolytic enzyme prepared from the latex of Carica Papaya fruit.

Fruzyme has acquired FSSC 22000 (Version 4.1), 22000:2005, FSSAI, Halal and Kosher certification for its activities and operations. The R&D laboratory at Fruzyme is fully equipped to test the Biochemistry and Microbiological parameters of the products with well-trained technical staffs. The bulk procurement of raw materials such as pooled latex, intermediate products are tested on based on Certificate Of Analysis (COA) from the production on batch to batch basis.
Incepted under the auspices of Duphar Interfran Ltd (DIL), Thane based Fermenta Biotech Limited (FBL) clocked in a revenue of Rs 13.8 crore during the FY18-19 in the biotechnology space. DIL holds a 91.2 per cent equity in FBL, incorporated in 1986. In 2019, the FBL has executed a 99 year lease agreement for the acquisition of land aggregating about 40,000 sq meter from the Gujarat Industrial Development Corporation (GIDC) authority in Ankleshwar, Sayakha, for expansion. FBL has been included in the Forbes India Hidden Gems 2019 list as one of just nine Indian companies that are on the verge of hitting it big.

FBL operates four major business divisions- biotechnology, pharmaceuticals, vitamin D3 and environmental solutions. In the biotechnology space that consists of 3.4 per cent of total revenue of Rs 401.3 crore, Fermenta has developed its flagship enzyme products ranging from the classical "white enzyme", Penicillin G amidase-(PA 850) to the more advanced enzyme variants like Novel Penicillin G Amidase (PS 250) and CALB Lipase (CALB10000). The company also offers enzyme immobilisation optimisation and supply services that cover multi-tonne quantities.

During the FY18-19, FBL improved the fermentation process of PA 850, improved mobilization and reduction in enzyme loading, ensuring better productivity, optimized maintenance process of stock for production and redesigned media to achieve improved and cleaner fermentation processes. The company is also exploring fermentation potential in developing new product lines to cater to more customers.

Fermenta Biotech Limited

9

REVENUE
¥ 13.8 crore

PRASHANT NAGRE
Chief Executive Officer (CEO)

Tamil Nadu based biotechnology company, Caprienzymes Technology Private Limited generated a revenue of Rs 6 crore in the last financial year 2018-19 and growing at 6 per cent over previous year. The company experienced a tough time due to policies and economic crisis thereby affecting the business.

Established in 2010, the company has its offices in Chennai and Bengaluru. The factory is strategically located in the State Industries Promotion Corporation of Tamil Nadu (SIPCOT) supported industrial area in Vellore, situated near the Bengaluru-Chennai national highway.

Over the years, the company has built long term technology cooperation with Spanish and Japanese companies to promote specialized enzymes for the tanning industries. CapriEnzymes has established a catalogue portfolio of more than 30 enzyme ingredients, introduced novel enzymes and innovations for the effluent treatments related to leather, textile, food and aqua industries. The last year saw CapriEnzymes taking part in a number of exhibitions and conferences all over India and across the globe such as the poultry exhibition in Canada, poultry and Aqua industries fair in Bagnkok, to name a few.

In 2019, the company has signed a Memorandum of Understanding (MoU) with a government supported university in Tamil Nadu, Dr J Jayalalitha Fisheries University, which has a strong network of fish and shrimp farms.

Caprienzymes Technology Private Limited

10

REVENUE
¥ 6 crore

V S RAVINDRAN
Chief Executive Officer (CEO)
S K BIOBIZ PRIVATE LIMITED

For Nashik based S K Biobiz Private Limited (SKBPL), the FY18-19 brought in a revenue of Rs 3 crore giving the startup the much needed push for carving a niche for itself in the enzyme space. SKBPL has its well-equipped R&D and production facility in Nashik, which is ISO 9001:2015, ISO 22000:2005, GMP, FSSAI and HACCP certified.

The company started out in 2016 and has pioneered in manufacturing and supply of bacterial concentrates and enzymes. With its innovative products ranges of enzymes and probiotics in agriculture it has been successful in providing a high yielding and residue free crops. The company has 5 main enzyme products in its portfolio- SKBYeast N1, SKBYeast-P, SKB_Peclear, SKBYeast BG and SKB Aqua Clean.

SKBPL has entered into an agreement with a leading farmer producer company to establish India’s one of the largest plant for producing value added products from agroindustry waste. Because of its continuous endeavours in Research and Development, the products manufactured and supplied by SKBPL have been extremely appreciated by its clients in India, USA, Canada, Ukraine, Germany, Russia, Spain, Lithuania, Latvia etc.

In a short span of time, SKBPL has acquired a commendable name in the biotechnology industry with a client base of Fortune 500 companies.

INFINITA BIOTECH PRIVATE LIMITED

Gujarat based manufacturing company Infinita Biotech Private Limited clocked in a revenue figure of Rs 2.6 crore during the FY18-19 exhibiting a growth of 65 per cent in comparison to the revenue generated in the previous fiscal at Rs 1.57 crore. The majority of the revenue last year was gathered through the company’s export business which was around Rs 2.1 crore.

Incepted in 2015, the company is engaged into the manufacturing and marketing of biotechnological enzyme based biodegradable formulations for various industries and formation of customised enzyme formulations for specialised industries. Infinita serves an array of industries such as Distillery, Sugar, Brewery, Starch, Wine, Malt, Waste Water Treatment, Food, Animal Feed, Agriculture, Cellulosic Ethanol, Pharmaceuticals, Detergent and Biodiesel.

With a workforce of 12 employees, Infinita intends to make strong inroads into the areas of second generation ethanol, biodiesel and agriculture in the coming times. In terms of sales, the company expects that the FY19 - 20 will have an estimated growth of close to 100 per cent.
WHO urges countries to invest in eliminating hepatitis

WHO is calling on countries to take advantage of recent reductions in the costs of diagnosing and treating viral hepatitis and scale up investments in disease elimination. A new study by WHO, published in Lancet Global Health in July 2019, has found that investing $6 billion per year in eliminating hepatitis in 67 low- and middle-income countries would avert 4.5 million premature deaths by 2030, and more than 26 million deaths beyond that target date. A total of $58.7 billion is needed to eliminate viral hepatitis as a public health threat in these 67 countries by 2030. This means reducing new hepatitis infections by 90 per cent and deaths by 65 per cent. By investing in diagnostic tests and medicines for treating hepatitis B and C now, countries can save lives and reduce costs related to long-term care of cirrhosis and liver cancer that result from untreated hepatitis.

Imperial College partners with WHO

The Imperial College London’s Institute of Global Health Innovation (IGHI) has been chosen as a partner for the recently-launched Global Patient Safety Collaborative (GPSC), an alliance between the WHO and the UK Government. This initiative aims to bring patient safety to the top of the global health agenda, with a specific focus on low- and middle-income countries (LMICs), by training and equipping the next generation of leaders in patient safety. It will also push for greater coordination between countries by disseminating and promoting uptake of proven solutions for safer care. Through innovative programmes of education and research, researchers led by the Imperial National Institute for Health Research (NIHR) Patient Safety Translational Research Centre (PSTRC) will work with the GPSC to train and develop leaders in the field of patient safety.

WHO releases new measles surveillance data

Measles outbreaks continue to spread rapidly around the world, according to the latest preliminary reports provided to the World Health Organization (WHO), with millions of people globally at risk of the disease. In the first six months of 2019, reported measles cases are the highest they have been in any year since 2006, with outbreaks straining health care systems, and leading to serious illness, disability, and deaths in many parts of the world. There have been almost three times as many cases reported to date in 2019 as there were at this same time last year. This follows successive yearly increases since 2016, indicating a concerning and continuing upsurge in the overall measles burden worldwide. Major outbreaks are ongoing in Angola, Cameroon, Chad, Kazakhstan, Nigeria, Philippines, South Sudan, Sudan and Thailand.
The Dept. of IT & BT, Government of Karnataka is organising its 19th edition of its flagship event INDIA BID from 18th to 20th November 2019 at Bengaluru Palace, Bengaluru under the umbrella of the prestigious Bengaluru Tech Summit. This year, INDIA BID will showcase the consistent focus of the LifeScience Industry towards new innovations and impactful progress in the growth trajectory of the industry.

This event has always been a strategic platform for industries, technologies and technocrats worldwide to understand and to leverage the latest innovations and technical repercussions on our businesses and daily lives.

**Event Spectrum**

- Multi Track Conference (Global Innovation Alliance Zone)
- B2B Exhibition
- B2B Meetings
- Bengaluru Tech Exchange
- Show Stoppers
- Startup Zone
- Thought Leaders Conclave
- Bio Excellence Awards
- Posters - Walkway of Discovery

**Conference Focus**

**BioTechnology:** BioPharma • BioAgri • BioIT • BioIndustrial • BioServices
**Information Technology:** Blockchain • Artificial Intelligence (AI) • Internet of Things (IoT) • Telecom • Cyber Security • ML & Robotics • Intelligent Apps and Analytics • Immersive Experience (AR/VR)

**BTS 2018 Highlights**

- 197 Speakers
- 3127 Delegates
- 248 Exhibitors
- 189 Start-Ups
- 1638 Organisations
- 11218 Visitors

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www.indiabio.in | www.bengalurutechsummit.com
Sartorius launches services for mammalian cell bank manufacturing

Sartorius Stedim Biotech (SSB), a leading partner of the biopharmaceutical industry, has announced the launch of new services for mammalian cell bank manufacture under GMP conditions. These services are offered by its subsidiary, Sartorius Stedim BioOutsource, an experienced contract testing organization (CTO) based in Glasgow, UK, and in Cambridge, Massachusetts, USA. Based on these new services, SSB now offers the manufacture of GMP master and working cell banks (MCB/WCB) for mammalian suspension cells. This activity will be conducted in a custom-designed 260 sq mt GMP cleanroom facility that has been audited and approved in 2018 by the Medicine and Healthcare Products Regulatory Agency (MHRA) according to the latest guidelines. Exclusively dedicated to mammalian suspension cell lines, the facility uses selected equipment that enables closed-system manufacture of GMP-compliant cell banks, from vial thaw to automated filling. For maximum process reliability and assurance of sterility, this entire manufacturing service is offered as a fully qualified broth technology platform.

Thermo Fisher unveils AI powered analysis software

Thermo Fisher Scientific has introduced the Thermo Scientific Avizo2D software, an AI-powered automated imaging and analysis software designed to help materials and life science researchers acquire fast and accurate statistics from their electron microscopy (EM) images without extensive image processing expertise. The new software allows scientists to build customized recipes or automated, reproducible workflow scripts that speed up their image analyses. The software combines deep learning models, advanced image processing technology, and modules using Python scripts and scientific tools to help researchers seamlessly analyze their EM images.
Biocompatibility Redefined.


Control of our materials and processes leads to consistent quality and safety of your biologics.

Benefit from the excellent and reproducible extractables and particles profiles of our single-use solutions.

www.sartorius.com/single-use-redefined
Agilent introduces revolutionary real-time cell analyzer

Agilent Technologies Inc. has introduced a multimode real-time cell analyzer (RTCA), the first of its kind, combining the best of non-invasive biosensor measurement with live cell imaging. The new instrument builds on the success of the xCELLigence biosensor technology, which Agilent obtained through its acquisition of ACEA Biosciences late last year. The system offers several key advantages such as: provides label-free, real-time biosensor measurements, and kinetic imaging of the same live cell populations, independently, or simultaneously; Monitors cell health, adhesion, morphology, proliferation, and cytolysis in primary or native cells alone or in co-culture providing unprecedented insight into cellular mechanisms and functionality; and supports three fluorescence channels, a plethora of well-plate formats, an array of reporter reagents, and flexible user-defined schedules.

PerkinElmer designs assay for Aspergillus detection

PerkinElmer, Inc., a global leader committed to innovating for a healthier world, has announced the launch of the new EUROIMMUN Aspergillus Antigen ELISA. The enzyme-linked immunosorbent assay is specifically designed to detect the Aspergillus antigen galactomannoprotein and assist in distinguishing invasive aspergillosis (IA). Detection of Aspergillus antigen is included in the guidelines of the Infectious Diseases Society of America (IDSA), the European Organization for Research and Treatment of Cancer (EORTC) and the National Institute of Allergy and Infectious Diseases Mycoses Study Group (MSG) as a criterion of a probable IA infection. EUROIMMUN is widely recognized as a global leader in autoimmune testing and an emerging force in infectious disease, allergy and molecular genetic testing. Its expertise and capabilities extend across immunology, cell biology, histology, biochemistry and molecular biology.

Glen Research picks BioServe Biotech as distributor

US based Glen Research, a Maravai LifeSciences company and leader in the development of a wide range of reagents for DNA and RNA synthesis, has announced a distribution agreement with BioServe Biotechnologies India, a Hyderabad-based subsidiary of REPROCELL Inc. Under the terms of the agreement, BioServe will distribute Glen Research products and services in India, Sri Lanka, Bangladesh and Nepal. Glen Research provides a comprehensive range of reagents for synthesis, modification, labeling and purification of DNA and RNA oligonucleotides. Through this distribution agreement BioServe will market Glen Research reagents and products to Indian researchers, CMOs and biopharmaceutical companies involved in oligonucleotide synthesis.
IIT Kgp develops low-cost blood test device

Researchers from the Indian Institute of Technology (IIT) Kharagpur have developed a low-cost diagnostic device which can perform various pathological tests by using blood taken from a finger prick. The device requires only a paper strip based kit integrated with a smartphone to enable analytics and readout functions and an LED light for imaging. The device requires a single drop of blood and a drop of reagent, a substance used to cause a chemical reaction, on the paper-based reaction chamber. This detection method is designed to harness the flow of blood from an input source pad to a reaction pad for diagnosis. Extensive validation tests have been conducted for blood glucose and haemoglobin at laboratories as well as in the field, both in clinical environment and villages with limited clinical facilities.

IISc designs protein to kill drug-resistant bacterium

Researchers at the Indian Institute of Science (IISc), Bengaluru have designed an anti-microbial peptide (AMP) that can effectively and quickly kill a notorious multidrug-resistant bacterium called Acinetobacter baumannii. The researchers used a bioinformatics approach to design a new short protein or peptide called Omega76 that can kill A. baumannii by breaking down its cell membrane. Infected mice treated with Omega76 had much better survival rates. The team also found that high doses of Omega76 given for prolonged periods did not produce any toxic effects. Since it is safe and effective, it appears to be a promising candidate for developing new antibiotics.
Tamil Nadu based Annamalai University has inked a memorandum of understanding (MoU) with the National Taiwan University of Science and Technology to strengthen academic cooperation, research and human resource development. The MoU was signed recently in the presence of Prof. V. Murugesan, Vice-Chancellor of Annamalai University, S. Kabian, Dean, Faculty of Science and N. Nalini, Head of the Department of Biotechnology and Biochemistry. Research students from Annamalai University will also be able to carry out their joint research activities in the fields of material science and biotechnology in Taiwan. Research labs at the Taiwan National University of Science and Technology will also be tested for various biological applications particularly in the field of health and disease.

Syngene International Ltd, a leading global contract research organization, in association with Narayana Health, Agastya International Foundation (AIF) and Biocon Foundation (Corporate Social Responsibility (CSR) arm of Syngene), has announced the launch of CHAMPS (Child Health Activists Mentoring & Promoting Heath in Society), a student mediated initiative focused on preventing and managing early onset of non–communicable diseases (NCDs). The initiative aims at educating and training high school students to be change agents towards improving health seeking behaviour in their communities at large. The inaugural event also saw the launch of a mobile science lab, that will tour various schools and is designed for students to practically experience the magic of science. Equipped with science models and specifically designed experiments, the mobile lab is intended to reach under-resourced schools in rural areas across the country. The combined synergies of Narayana Health as knowledge partner, Syngene and Biocon Foundation as funding partners and Agastya International as the implementation partner will ensure greater awareness in the involved communities. The training modules are tailored to comprehension levels of students who have enrolled and has been designed to create awareness on hypertension and training them in the use of the Blood Pressure apparatus.

IIT Mandi collaborates with IIIT Una
The Indian Institute of Technology (IIT) Mandi, Himachal Pradesh is collaborating with the Indian Institute of Information Technology (IIIT) Una, Himachal Pradesh on research and academic activities. In addition to developing coursework, the institutes will also support each other in various joint initiatives which will allow the students to visit other institute for course-work and projects. This will provide an early experience to the students on how to be a part of a working culture. IIT Mandi faculty has already provided internship-based training for B Tech students from IIIT Una. Joint supervision of students pursuing master’s and doctoral degrees is also being envisioned as a part of this collaboration. These initiatives will provide a broad exposure to the students to all types of knowledge that will enable them to perform will in increasingly complex and inter dependent world.

Annamalai signs pact with Taiwan university
Tamil Nadu based Annamalai University has inked a memorandum of understanding (MoU) with the National Taiwan University of Science and Technology to strengthen academic cooperation, research and human resource development. The MoU was signed recently in the presence of Prof. V. Murugesan, Vice-Chancellor of Annamalai University, S. Kabian, Dean, Faculty of Science and N. Nalini, Head of the Department of Biotechnology and Biochemistry. Research students from Annamalai University will also be able to carry out their joint research activities in the fields of material science and biotechnology in Taiwan. Research labs at the Taiwan National University of Science and Technology will also be tested for various biological applications particularly in the field of health and disease.
Highlights of Agrovision

Grand National Agri Expo
- Participation of more than 400 Organisations
- Participation of Producers, Distributors, Research Organisations, Agriculture Marketing Boards, Banks, Insurance Companies, Machines & Tools, Fertilizers, Seeds, Various Departments of State & Central Govt.
- Opportunity to meet lakhs of Farmers from various parts of India
- Students, Consultants, Innovators, Research Scholars in agriculture.

Free Workshops for Farmers
- 28 Workshops shall be conducted on different topics by experts
- Enhancing yield of major crops by using latest technology & modern farming practices Enhancing supplementary Income of farmers through live stock management: Fisheries, Poultry, Beekeeping, sericulture, Vermiculture etc. Special Workshop on : Digital Innovation & IT in Agriculture, Climate change in Agriculture.
- Success stories by farmers.

Conferences on following subjects
- Opportunities for Medium, Small, & Micro Entrepreneurs in Agriculture and Food Processing
- Development of Dairy & Milk Processing

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Promega Biotech India Private Ltd, a 100 per cent subsidiary of Promega Corporation USA started its operation in August 2014 in New Delhi has completed five years. The company offers over 4000 products in the fields of genomics, proteomics, cellular analysis, molecular diagnostics, human identification, and applied biotechnology. Promega India has grown at CAGR of 24 per cent since its direct operation. It is addressing customers’ requirements through channel partners and directly across India. Promega India has customers mostly from Life Sciences and Genetic Identity areas. Now it has a few key customers in Diagnostics as well. The company was named “Best Innovative Biotechnology Solutions Company” in the India Business Awards, 2019 by Blindwink Solutions Private Limited, a leading global, insights driven market research company. In an interaction with BioSpectrum, Dr Rajnish Bharti, General Manager, Promega Biotech India Pvt. Limited talks about the company’s key offerings, products and future plans.

Edited excerpts:

Any new product or collaboration that is in the pipeline?
This is only our fifth full year of operation and we have a long way to go. The Indian biotech market is full of opportunities. We continue to explore the new market and we are trying to get into those unexplored areas through our marketing activities like road shows, seminars and digital marketing activities.

We are open for collaborations in the future. One of our recent collaborations is with CORE DIAGNOSTICS. The collaboration allows CORE Diagnostics to leverage Automated Nucleic Acid Purification with Promega Integrated Quantitation systems.

What are the challenges and opportunities that you face while doing business in India?
India’s life science and healthcare industries are some of the fastest growing sectors that have changed dramatically in the last decade, moving from import dependency to self-sufficiency.

My experience of the last 30 plus years in the field of life science is that this is the only market which has grown each year. Even in exceptional times, when the life science industry has faced funding challenges, we have still grown into the single digit.

The funding matrix is changing due to other government priorities and the biotech market is slowing down due to this changed matrix. The focus is now on product development and translational research. We continue to focus on growing Pharma and Molecular Diagnostic markets. We are also excited about the DNA Bill and I am confident that this will be approved soon in parliament.

How do you see the competition in the market?
This market is a price sensitive market, but with our unique, innovative and high-quality products, we always make a difference in the market. We are consistently striving with our quality offerings and efforts to increase our market share and we are very positive about it.

What is your outlook for the company in India?
Through our aggressive sales and marketing tactics, we are consistently focusing on increasing our market share. Long-term sustainable success is always a result of our products, culture and people. Employees are our key strength and we focus on employee engagement activities and training programs. To foster a supportive and dynamic work environment, Promega embraces the principles of emotional and social intelligence (ESI). ESI helps employees improve relationships, manage stress and strengthen the emotional infrastructure at Promega to support a strong future. Promega assists the surrounding community by supporting educational, creative and wellness initiatives. We will continue to grow! Not only due to the products that we are offering today but because we are working on technologies for the next five to ten years. Over the coming months and years, we have many products that we look forward to launching.

Kalyani Sharma
kalyani.sharma@mmaactiv.com
Apex Healthcare industry body—NATHEALTH has announced changes in its leadership. Preetha Reddy has been elevated to the post of Senior Vice President and Dr Harsh Mahajan takes over as Vice President for the year 2019-20. Dr Ashutosh Raghuvanshi has been inducted to the Leadership team as Treasurer NATHEALTH. Dr Sudarshan Ballal and Badri Iyengar continue their responsibilities as President and Secretary respectively.

Paras Healthcare announced the appointment of Puneet Srivastava as its Vice President. He will lead the Sales and Marketing function at a group level. He will be based out of the Corporate Office of Paras in Gurugram, Haryana.

Srivastava is a seasoned Sales & Marketing professional with an illustrious career spanning almost 25 years in P&L Management, Business Development, Key Account Management, Branding and Event & Campaign Management besides his stint as Sales & Marketing expert. He has a successful and well-recognized sales & marketing profile spreading across industries like Shipping, FMCG, Banking & Insurance and Education & Training. Prior to joining Paras Healthcare, Srivastava was associated with the Max Healthcare, Max Life Insurance, Videocon and DHL Worldwide Express. He is a well-respected senior leader in the industry who has been conferred with many coveted industry awards.

Paras Healthcare ropes in Puneet Srivastava as VP

NATHEALTH announces change in Leadership Team

Rajit Mehta, Max Healthcare stepped down from the office of Senior Vice President and as a member of the Governing Council. Senior Vice President of NATHEALTH Preetha Reddy is the Executive Vice Chairman of Apollo Hospitals and Dr Harsh Mahajan is a renowned radiologist & Founder of Mahajan Imaging. Newly elected treasurer of the Federation Dr Ashutosh Raghuvanshi is the new CEO and MD of Fortis Healthcare.

Erez Israeli steps up as CEO at DRL

Dr Reddy’s Laboratories (DRL) has elevated c (CEO). Israeli will report to GV Prasad, who has been re-designated from CEO to co-chairman and managing director. The appointment is effective from August 1. Israeli had joined Dr Reddy’s as its chief operating officer in April last year. Prior to joining the Indian company, he was president and CEO at Israel-based Enzymotec, which develops and manufactures nutritional ingredients and medical foods. He was earlier associated with another Israeli drug giant Teva.
VG Somani has been appointed as the new Drug Controller General of India (DCGI). DCGI heads the Central Drugs Standard Control Organisation (CDSCO) which is responsible to ensure quality drugs supply across the country. In addition, CDSCO also has authority to give approval to new drugs and regulating clinical trials. Somani, who was serving as the Joint Drugs Controller of India, was in the race for the top post at the Indian drug regulatory body with S Eswara Reddy. Dr S Eswara Reddy was holding the position of DCGI on an ad-hoc basis. The appointment of Somani will end the wait of having full-time DCGI for the last two years.

Sun Pharma has announced a major senior management rejig, giving additional responsibilities to Aalok Shanghvi, son of Dilip Shanghvi, the promoter and Managing Director. Aalok, who is currently the Senior-Vice President, Emerging Markets and Global R&D, will have additional responsibility for generic business development. On the other hand, Kal Sundaram, who was India and emerging markets head, will now be responsible for Japan and China businesses besides the company’s strategic initiatives. Kirti Ganorkar, who was heading the global business development function, will now head the India formulations business.

Apollo Hospitals have appointed world renowned Radiation Oncologist, Prof. Dr Dattatreyudu Nori, as International Director, Apollo Cancer Centres, Apollo Hospitals Group. Beginning this month, Dr Nori will be available for consultations 10 times at Apollo Hospitals in India for 4 months in a year. A Padma Shri Awardee, Dr Nori has been honoured with many prestigious awards for immigrants for medicine and cancer care, including the highest civilian honour in the US in 2014, the “Ellis Island Medal of Honor” for his exemplary and outstanding qualities in both his personal and professional life. In 2017, the Indian Cancer Congress honoured him with its highest recognition - “Living Legend in Cancer Care.” Dr Nori, with over four decades of experience, is recognised as a global thought leader in cancer research with many path breaking and innovative developments related to cancer treatment attributed to him. Dr Nori is also a consultant to the United Nations International Atomic Energy Agency, advising on formulation of guidelines for cancer treatment in developing countries.
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Sophisticated Deep Neural Network for cell detection - This allows for optimal accuracy. When Trypan Blue is added (Figure 1) the system can also detect cell viability. The Corning Cell Counter can detect clusters of cells, which leads to accurate cell counts of "highly concentrated samples" (up to 1 x 10^7 cells/mL; Figure 2).

Figure 1. Dead cells stained with Trypan blue are detected by the image analysis algorithm. Red circles represent dead cells, green circles represent live cells.

Figure 2. The image analysis algorithm is able to detect clusters of cells. Red circles represent dead cells, green circles represent live cells.

* Measured using a 73 Mbps download speed and a 20 Mbps upload speed. Actual speed can vary depending on the internet connection.

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Dr VK Paul, Member (Health), NITI Aayog, Government of India said that the public and private sectors in the healthcare sector have come together and are fully committed to serve the people of India, speaking at ‘FICCI HEAL 2019 - Health of Healthcare in India’, organised by FICCI supported by NITI Aayog and National Health Authority.

“Most important highlight of Ayushman Bharat is that it has now finally established ‘One India, one nation, one health sector’. Private-public demarcations are over once and for all. We are working together on agreed terms and methodologies through dialogue and systems with an endeavour to find solutions to the challenges of our healthcare system” he said.

Dr Paul said that over the last year, country has added 25 per cent additional MBBS seats, which is unprecedented. “From about 60,000 MBBS seats last year, this year we have about 76,000 seats and actually a potential of about 80,000 seats,” he said.

He also said that strengthening human resources for the health sector is the key focus of the government, for which it does not differentiate between public and private sectors.

The government is working to establish 75 additional medical colleges in the next 4-5 years largely through PPP models for district hospitals and other mechanisms. This is in addition to the creation of 82 medical colleges that began 5 years ago.

“The emphasis on human resources in this government is profound. If you consider Ayushman Bharat to be the highlight of the Independence Day speech of Prime Minister last year, this year for the health sector he only spoke about human resources, which has gained centrality in the development agenda of the nation,” he added.

Dr Paul further said that with the reforms in the health sector, a consortium of private players can now set up a medical college unlike in the past when a medical college had to be established by a single entity. He urged the private sector to use their resources for training specialists to help achieve the aspired numbers.

Sangita Reddy, Senior Vice President, FICCI and Joint MD, Apollo Hospitals Enterprise Ltd said, “Ayushman Bharat is transformational for the country. Now we need to up the dialogue on healthcare further and converge the power of Ayushman Bharat with the viability for the sector to make quality healthcare sustainable.”

YS Chi, Chairman, Elsevier, RELX Group said that health records, digital doctor and medical research are the three key tenets that will drive reforms in the Indian healthcare sector. Future medicine will require close coordination between augmented intelligence and doctors, he added.

Dr Arvind Lal, Chair, FICCI Health Services Committee and CMD, Dr Lal Pathlabs said, “As the country aims to become a $ 5 Trillion economy, healthcare industry will play a major part in building a prosperous & a healthy India.” He added that “fund allocation to the North Eastern states has shot up by almost 250 per cent over the last 5 years. Imagine if this was to happen in health care. We urge the government to increase the public health spend to at least 2.5 per cent, as envisaged in the National Health Policy 2017, and preferably to 3 per cent, at the earliest.”

FICCI-EY knowledge paper on ‘Re-engineering Indian Healthcare 2.0’ and FICCI-ELICIT information guides to ‘Facilitate execution of End of Life Decisions’ were released during the event.

Gautam Khanna, Co-Chair FICCI Health Services Committee and CEO, PD Hinduja Hospital delivered the concluding remarks of the inaugural session at the conference.
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Heal Force Leads You to Healthier Life
NATHEALTH welcomes Corporate Tax cut, recommends GST Reforms

PBD BUREAU
NEW DELHI, SEP 20

APEX Healthcare Industry Body NATHEALTH has dubbed the government's move to cut down Corporate Tax as progressive and said, rationalisation of tax structure would provide much-awaited booster dose to the sector.

Finance Minister Nirmala Sitharaman today announced a big reduction in the income tax rate for corporates. The government has slashed basic corporate tax rate to 22 percent from 30 percent while for new manufacturing companies it has been cut down to 15 percent from 25 percent.

Reduction in corporate tax and other relief would create a favourable business climate for the companies which were under tremendous pressure due to several internal and external market forces," said Dr H Sudarshan Ballal, President, NATHEALTH.

Siddhartha Bhattacharya, Secretary-General, NATHEALTH, said "Since GST is not payable on health care services, health care service providers are not eligible to avail credit on the input taxes paid by it, which ultimately becomes a cost for the service provider."
NATHEALTH urges to scale-up PMJAY

New Delhi: The Healthcare Federation of India NATHEALTH, an apex healthcare industry body, has urged the government to scale up Pradhan Mantri Jan Arogyayojna (PMJAY) to pave way for universal health insurance to those, who have been excluded from the scheme, so far. On the completion of one year of effective and successful implementation of Ayushman Bharat Mission, the healthcare body said that under the scheme, 18,000 hospitals and health care providers have already been empanelled across the country to provide healthcare services.
Healthcare industry welcomes Govt’s decision

PTI - NEW DELHI

Healthcare industry on Friday welcomed the government’s decision to slash corporate tax, and said rationalisation of tax structure will provide much-awaited booster dose to the sector. In a major fiscal booster, the Government on Friday slashed effective corporate tax to 25.17 per cent inclusive of all cess and surcharges for domestic companies.

“Reduction in corporate tax and other relief would create a favourable business climate for the companies which were under tremendous pressure due to several internal and external market forces,” Nathealth President said.

The apex healthcare industry body believes that the corporate tax reduction move would be supplemented by the Goods and Services Tax (GST) reforms as well.

Apollo Hospitals Chairman Prathap C Reddy said: “We heartily welcome the measures announced by the hon’ble Finance Minister today. Corporate India has for long been advocating standardised rates of corporate taxation, as a tool to drive creation of investible surplus and enhanced dividend payouts to drive purchasing power”.