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Indiaâ??s Life Science Instrumentation Industry- A Disruptor with Global Ambitions?

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The Indian laboratory and analytical instrument industry is on the brink of a transformative journey, propelled by rapid technological advancements and a growing emphasis on indigenous innovation. With the convergence of cutting-edge technologies such as Artificial Intelligence, Machine Learning, Big Data Analytics, Online and At-line testing, Cloud computing, and Process Analytical Technologies, the industry is poised for accelerated growth and expansion. Experts from different fields of the industry have highlighted the burgeoning opportunities for domestic players in the laboratory equipment and analytical instrument segment, exploring the evolving landscape, challenges, and strategies for fostering innovation and competitiveness. Letâ??s explore further.



In recent years, India's laboratory and analytical instrument industry has witnessed robust growth, driven by the country's leadership in pharmaceuticals, biotechnology, and healthcare. However, despite this progress, a significant portion of high-end processing and analytical measurement equipment is imported from leading Western countries.

According to Chandrahas Shetty, President of the Indian Analytical Instruments Association (IAIA), over 80 per cent of such equipment is sourced from countries like the USA, Germany, France, Italy and others. This dependency underscores the urgent need for domestic players to capitalise on emerging opportunities and reduce reliance on imports.

Highlighting the dynamic nature of the industry, with emerging advancements leading to transformative changes, one notable trend identified by Shetty is the shift from traditional laboratory-based testing to online and at-line testing methodologies. This transition has significantly reduced testing time and costs associated with product wastage. The adoption of online analysis of raw materials allows for immediate identification of quality issues, enabling swift corrective action and minimising production delays.

Emerging Trends

While on one hand online and at-line testing is gaining prominence, still laboratory testing remains relevant, especially for comprehensive analysis, noted Shetty. The trend of inline and at-line testing during the manufacturing process further emphasises the importance of real-time data acquisition and analysis.

Another significant trend identified by Shetty in the laboratory equipment and analytical instruments sector is the increasing demand for cloud-based data management systems. Organisations are keen on storing their data on the cloud for easy accessibility across the organisation. This trend extends to Laboratory Information Management Systems (LIMS), which are now being migrated to cloud platforms for enhanced efficiency and collaboration.

Looking ahead, Shetty predicts a rapid integration of artificial intelligence (AI) in method generation and development processes. AI technologies, fueled by the availability of background data, are poised to revolutionise analytical methodologies and streamline workflows.

In addition to advancements in analytical instruments for traditional processes, Shetty highlighted innovations in bioprocess analytics. Instruments capable of measuring parameters such as pH and CO2 in bioreactors are gaining traction, particularly in the biopharmaceutical industry. Single-use technology is also emerging as a solution to streamline bioprocess cleaning procedures, with leading companies like Serum Institute of India adopting these technologies.

Giving his perspective about the role and objectives of IAIA, the President said that they have been involved in gathering the laboratory equipment and analytical instrument manufacturers, suppliers and customers at one platform for more than two decades now and arranging them a platform to delve and discuss on the challenges, opportunities and facilitating developing new business networking among the stakeholders and playing a key role in helping the industry grow to leaps and bounds.

“The IAIA, in collaboration with partners like Messe Muenchen India, plays a crucial role in facilitating industry dialogue and showcasing emerging trends. Events such as the Analytica Anacon provide a platform for stakeholders to exchange views and explore opportunities in the sector. Our Mumbai Laboratory Equipment and Analytica Anacon was confined to only the manufacturers, our next show is in Hyderabad in September this year, and we will rope in more customers, who are using the laboratory and analytical instruments and this event will be encompassing not just laboratory and analytical equipment providers but it will also have the customers from pharmaceutical, biotechnology, healthcare, diagnostic and research institutions,” informed Shetty.

While the Indian market continues to import a significant portion of machinery, Shetty remains optimistic about the potential for domestic production growth. Government initiatives such as Production Linked Incentives (PLI) and Make in India are expected to bolster domestic manufacturing, paving the way for a thriving indigenous industry.

Challenges and Opportunities

The prevailing scenario of the laboratory equipment and analytical instruments industry presents both challenges and opportunities for Indian players. While the majority of domestic manufacturers engage in generic manufacturing, there's a dearth of specialised technologies and innovative manufacturing capabilities. Dr Rajnish Bharti, Vice President and General Manager, Promega Biotech India, emphasises the importance of government support in fostering domestic innovation. Initiatives like PLI and Make in India are commendable, but greater funding allocation for innovative research and development is essential to spur indigenous manufacturing of advanced laboratory and analytical instruments.

Adding further, Dr Rajnish Bharti noted that the market for laboratory and analytical instruments is growing globally, driven by increasing investments in research and development, particularly in pharmaceuticals and biotechnology.

According to the Mordor Intelligence forecast study report, the global markets for laboratory and analytical instruments are expected to grow from $49.47 billion in 2023 to $66.27 billion by 2028, at a CAGR of 6.02 per cent. The study has also revealed that the Asia Pacific region including India, China, Japan, Korea and Australia are the fastest growing markets, while North America is the largest market catering to the sector.

In India, the expansion is similarly fueled by rising healthcare demands and a growing focus on regulatory compliance and quality assurance in manufacturing. The India analytical laboratory instruments market is set to record a CAGR of 6.33 per cent during 2024-2032, and is expected to reach revenue of $4142.85 million by 2032 from the current revenues of approximately $2000-2500 million.

The significant growth in the analytical laboratory instruments market is mainly attributed to the government’s increased emphasis on expanding production activities. A major driving force behind this expansion is the thriving pharmaceutical industry, which plays a crucial role in India’s analytical laboratory instrument markets.

Referring to new and innovative developments in the laboratory and analytical instrument sector, Dr Rajnish Bharti highlighted the development and adoption of high-throughput sequencing, CRISPR technology, and improved automation and robotics. “Promega has been at the forefront of many of these advancements, integrating new technologies into our offerings to enhance precision and efficiency. For example, advancements in automation have led to more streamlined workflows in laboratories, significantly reducing manual labour and increasing reproducibility and scalability,” says Dr Rajnish Bharti.

Path to Progress

To compete effectively on the global stage, Indian companies must adopt a 'look global, act local' strategy, focusing on innovation, quality, and customer-centricity.

Leading global players such as Thermo Fisher Scientific, Waters, Agilent Technologies, Bio-Rad Laboratories, Roche, Shimadzu, Danaher, PerkinElmer and Bruker have all established their presence in India, leveraging local expertise and expanding their service offerings.

The emphasis on nurturing homegrown talent, investing in research and development, and fostering collaboration between industry and academia is critical to driving innovation and achieving self-reliance in laboratory equipment manufacturing.

Catching up further on this trend, many global players are setting their Global Capacity Centres (GCCs) in India. According to data from a Nasscom-Zinnov report, India had 1,580 GCCs with 1.66 million employees as of 2022-23. At least 20 per cent of the Forbes 2000 global companies have set up their GCCs in India till 2023. Of this, 8 per cent of GCCs are established by the biosupplier and life sciences companies including pharma, biotech and healthcare. Major among them include Legatos, BMS, AstraZeneca, Providence, Baxter, GSK, Optum, and Teva Pharma. This share is estimated to grow to up to 55 per cent by 2030. The expansion is also leading to GCCs in-sourcing a lot of their technology functions from IT companies.

Hyderabad, which has around 16 per cent of all GCC units in India, is flanked by research institutes in biotechnology and pharmaceuticals attracting companies like Novartis and AstraZeneca. “There is a lot of appetite for GCCs in Hyderabad, which has become a mature GCC centre for many companies. Kolkata also has potential. It also boils down to the ecosystem and incentives that local governments can offer. Hyderabad has been leading in this regard,” opined Arindam Sen, Partner and GCC Sector Lead-Technology, Media and Telecommunications, EY India.

Segmentation of Industry

At present, the India analytical laboratory instruments market segmentation includes type and end-user or application. The type segment includes molecular analysis instruments, elemental analysis instruments, separation analysis instruments, centrifuges, chromatography, electrophoresis, microscopy, cell counting instruments, PCR (Polymerase Chain Reaction), spectroscopy and other types, while the segment by application includes research and diagnostic application among others.

Particularly analytical laboratory instruments play a crucial role in research and academic institutions, facilitating a wide range of scientific experiments and analyses. Commonly utilised instruments in these settings encompass pipettes, microscopes, balances and scales, spectrophotometers, as well as specialised equipment for electrophysiology, muscle physiology, spectroscopy, tissue and cell biology, and biosensing free radical analysis.

These tools are indispensable for research endeavours, sample analysis, and data generation, contributing significantly to scientific discoveries and product development. Moreover, academic core labs offer a cost-effective means to access specialised equipment, receive training, and conduct impartial data analysis, thereby enhancing experimental quality and nurturing the development of future scientists.

Several examples of analytical laboratory instruments employed in research and academic institutions include mass spectrometers, utilised for the purification, quantification, identification, and determination of chemical compounds in various samples. Chromatography systems, such as High-Performance Liquid Chromatography (HPLC) and Flash Chromatography, are employed for the separation and analysis of compounds. Spectrophotometers play a role in the quantitative estimation of substances like blood sugar, creatinine, and haemoglobin.

Spectrometers, including AAS, X-ray, and fluorescence spectrometers, find applications for various analytical purposes. Titrators determine the concentration of acids, bases, or other substances by measuring the volume of added acid or base required to reach a specific pH or pOH, whereas autoclaves serve the purpose of sterilising laboratory equipment and materials to uphold strict standards of hygiene and sterility in research and academic institutes. Centrifuges are utilised to separate solids from liquids or concentrate and purify samples based on their density. pH Metres measure the acidity or alkalinity of a solution, a crucial aspect in various scientific experiments and analyses.

According to Vipul Chhatbar, CEO of MEDISPEC, there are various new developments and innovative advancements coming up in the laboratory and analytical instrument sector. For instance, the Next-generation sequencing technologies have revolutionised genomics and molecular biology research. “With continuous advancements, we've seen improvements in sequencing speed, accuracy, and cost-effectiveness. These innovations have democratised access to genomic information, aiding in gene discovery, understanding genetic variation, and advancing personalised medicine initiatives. Surface Plasmon Resonance (SPR) is another new technological innovation that is fast being adopted in the laboratory and analytical instrument sector. Our partnership with Nicoya Life Sciences has introduced cutting-edge SPR instruments, such as the OpenSPR and Nicoya Alto. These instruments facilitate real-time, label-free analysis of molecular interactions, revolutionising drug discovery, biochemistry, and molecular biology research,” highlights Vipul Chhatbar, while signifying how the collaborative and partnership initiatives can help deliver new technologies for the customers.

Towards a Brighter Future

As India continues its journey towards self-sufficiency in laboratory and analytical instruments, concerted efforts from industry stakeholders, government agencies, and academia are paramount. By harnessing the collective potential of innovation, entrepreneurship, and strategic partnerships, the Indian laboratory equipment industry can chart a path towards sustainable growth, export competitiveness, and global leadership. With a steadfast commitment to innovation and excellence, India's laboratory and analytical instrument industry is poised to redefine its role on the global stage, contributing to the nation's economic prosperity and scientific advancement.

Conclusion

The future of India's laboratory and analytical instrument industry is filled with promise and potential. By embracing innovation, fostering collaboration, and leveraging emerging technologies, Indian companies can position themselves as formidable contenders in the global marketplace. With the right support and conducive ecosystem, India's journey towards self-reliance in laboratory equipment manufacturing is well underway, heralding a new era of growth, prosperity, and innovation.

Amguth Raju

(with inputs from Shivani Thakar)