

To Study the Job Profiles & Competencies Required in Growing Bio-Tech Industry in India

Siva Pasupathi¹, Pravin Bodade²

¹Student, RMD Sinhgad School of Management Studies, Pune, Maharashtra, India

²Assistant Professor, RMD Sinhgad School of Management Studies, Pune, Maharashtra, India

Abstract: Biotech industry is emerging to provide solution for the challenges faced in health care, agricultural industry and chemical, FMCG and many more industries. However biotech industry needs a skilled human resource to cater to this growing industry. This research paper explores the current state of global & Indian biotech industry. It also analyses the job profiles and competencies to execute the responsibility. It also explains the compensation packages and career progression related to three major areas like Research & Development, Quality Control, Quality Assurance and Validation and Clinical Research.

Keywords- Biotech Industry, Job profiles, competencies, compensation packages

I. INTRODUCTION OF BIOTECH INDUSTRY

As per United Nation's (UN) Convention on Biological Diversity, "Biotechnology is the use of living systems and organisms to develop or make products, or any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use"

Biotechnology industry is evolving to heal and improve our lives and the health of our planet. Biotech industry is contributing for efficient manufacturing processes and reducing operating cost. India's Biotech industry is expected to grow USD100 billion by FY2025 from USD7 billion in FY2015. Innovative technology leads the industry to develop more precise tools for detecting disease and tailoring treatments to minimize health risk and decreasing the infectious disease. Biotech industry helps to improve manufacturing process and reduce cost by streamlining the steps in chemical manufacturing.

Biotech industry also plays an important role in farming practices by using biotech crops. It needs fewer application of pesticides and develop healthy crops with all nutrition. Biotech industry deals with drug discovery "pipeline" that starts with basic research to identify genes or proteins associated with particular diseases which could be used as drug targets and diagnostic markers. In addition to direct drug development, there are companies that are looking for futuristic ways to use new disease-related genes to create new clinical diagnostics. Every drug development involves a lot of these tests to identify the most responsive drugs coming on the market. To support these research a long list of research and

lab supply companies that provide basic kits, reagents, and equipment. For example, companies such as Life Technologies, Thermo-Fisher, Promega and a host of others provide lab tools and equipment for bioscience research, and companies such as Molecular Devices and DiscoverX provide specially engineered cells and detection systems for screening potential new drugs. The biotechnology technique used for drug development can also improve agricultural and food products. Due to technological leap forward biotech did not really fundamentally change the nature of the agricultural industry.

Major Biotech Markets: Medical and Agricultural The medical and agricultural industries have undergone various revolutions with new research and development programs and business strategies to discover alternative products. Research and development of last five decade lead to market segmentation of biotech industry into Medical and agricultural. Biotechnology is also used in areas like chemical industrial production. However the use in these areas remains limited.

II. GLOBAL OVERVIEW OF BIOTECH INDUSTRY

The Global Biotechnology industry comprises a diverse range of companies engaged in the development of pharmaceuticals, pest-resistant crops and biofuels, among other products. Biotech industry has also ensured availability of drugs for chronic diseases which has affected masses, ensuring healthy world.

Established companies undertake various laborious research. This makes the firm more research-intensive organizations in the world. Their product pipelines, a vital component of expansion needs a huge capital investment.

In the business world new discoveries of drugs for the treatment of diseases provide opportunities for growth and gains in stockholder value.

The biotech industry has a long gestation period before it starts the commercial production. This leads to volatility & financial losses due to delay or product trial failures. Technological advancement made biotech drugs expensive, however, the drugs formulated were complex and not easy to duplicate, and costly to develop.

The biotechnology industry use living organisms or molecular and cellular techniques to develop products that are used in agriculture, food and industrial and medicine production.

Industrial biotechnology is the application of biotechnology for manufacturing purpose. Industrial biotechnology might considerably impact the chemical industry. It can enable economies to become less needy on fossil fuels.

The impacts of an altering climate on agriculture land use will have an effect on the availability of biomass as well as food production worldwide.

Overview of Indian biotech industry: The Indian biotech industry holds about 2 per cent share of the global biotech industry. The biotechnology industry in India, comprising about 800 companies, is valued at US\$ 11 billion and is growing at a Compound Annual Growth Rate (CAGR) of 20 per cent as per Indian brand equity foundation report.

The biotechnology sector of India is highly innovative and is on its strongest growth path. The sector, with its immense growth potential, will continue to play a significant role as an innovative manufacturing hub. The sector is one of the most significant sectors in enhancing India's global profile as well as contributing to the growth of the economy.

India has the second-highest number of US Food and Drug Administration (USFDA)–approved plants, after the USA and is the largest producer of recombinant Hepatitis B vaccine. Out of the top 10 biotech companies in India (by revenue), seven have expertise in bio-pharmaceuticals and three specialize in agri-biotech.

Over the years, the biotechnology industry in India has witnessed a significant increase in the number of merger and acquisitions. It is said that due to the country's high-skilled labor and other low-cost advantages, many biotechnology firms in India gained numerous export contracts and other research and development related biotechnology services.

The high demand for different biotech products has also opened up scope for the foreign companies to set up base in India. India has emerged as a leading destination for clinical trials, contract research and manufacturing activities owing to the growth in the bio- services sector.

India's biotech sector has attracted significant amount of attention over the past two decades. Several global companies have aggressively joined hands with Indian companies due to India's strong generic biotechnology potential.

With the country offering numerous comparative advantages in terms of R&D facilities, knowledge, skills, and cost effectiveness, the biotechnology industry in India has immense potential to emerge as a global key player.

India has all the ingredients to become a global leader in affordable healthcare. If there is an annual investment of US\$ 4.01 billion to US\$ 5.02 billion in the next five years, the biotech industry can grow to US\$ 100 billion by 2025, with a

25 per cent return on investment, and set a growth rate of 30 per cent year-on-year.

III. GOVERNMENT INITIATIVE FOR THE GROWTH OF BIOTECH INDUSTRY

Department of Biotechnology (DBT) is the nodal agency under the Ministry of Science & Technology, Government of India for the promotion of research, development and innovation in the field of biotechnology. DBT funds and supports all Indian universities, research organizations, nongovernmental organizations and companies working in the area of biotechnology. These willinclude institutes under CSIR, Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR), Defense Research and Development Organization (DRDO) etc.

It is setting up biotech parks, incubators as well as pilot projects to promote and encourage entrepreneurial ventures in biotech and provide a template for promotion of biotech startup companies.

DBT has structured programmes aimed at bridging technology gap, training of scientific manpower instate of art technologies and creating environment for the development of cost effective innovative technologies.

IV. KEY SEGMENTS IN THE INDIAN BIOTECHNOLOGY INDUSTRY

- a) *Bio-pharm* -Bio-pharmaceutical products are therapeutic or preventative medicines that are derived from materials naturally present in living organisms, using recombinant DNA (rDNA) technology
- b) *Bio-services*-Bio-services mainly include clinical research and CRO along with custom manufacturing
- c) *Bio-agri* - Bio-agriculture is segmented into hybrid seeds, transgenic crops, bio pesticides and bio-fertilisers.
- d) *Bio-industrial*- Bio-industrial predominantly comprises enzyme manufacturing and marketing companies
- e) *Bio-informatics*- Bio-informatics deals with the creation and maintenance of extensive electronic databases on various biological systems; it is currently the smallest part of the domestic biotechnology industry

V. JOB PROFILES IN INDIAN BIOTECH INDUSTRY

The job profiles in Indian biotech industry are broadly explained as follows

Research & Development	Quality: Quality Control, Quality Assurance and Validation	Clinical Research: Clinical Research, Regulatory Affairs and Medical Affairs/ Drug Information
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Lab Assistant	Quality Assurance (QA)	Documentation Associate/Assistant
Bioinformatics Scientist/Engineer	Documentation Specialist	Regulatory Affairs Associate
Research Assistant	Quality Assurance (QA)	Clinical Data Manager/Associate
Research Associate	Manager/Supervisor	Clinical Research Associate
Principal Research Associate	Quality Control (QC) Technician	
Scientist	Quality Control (QC) Analyst	
Senior Scientist	Quality Control (QC) Manager/Supervisor	

(Source: www.naukri.com, www.monster.com, www.glassdoor.com)

VI. MAJOR COMPETENCIES' NEEDED FOR VARIOUS JOB RESPONSIBILITIES:

Research & Development

- Initiates, directs and executes scientific research and development that is critical to corporate strategies and image.
- Designs, implements and executes scientific research and development projects in collaboration with a larger research team
- perform research and development experiments for projects and products
- Develops gene discovery algorithms for integrating sequence-based/functional
- Knowledge about genes to help scientists analyze and interpret gene-expression data.
- Designs and develops software, databases, and interfaces for analyzing and manipulating genomic databases.
- Performs a variety of research/laboratory tasks and experiments under general supervision.

Quality: Quality Control, Quality Assurance and Validation-

- Supervises the development, implementation and maintenance of quality control
- Performs a wide variety of inspections, checks, tests and sampling procedures
- Assures that products, processes, facilities and systems conform to quality
- Provides required documentation and implements documentation systems.
- Responsible for providing clerical and administrative support related to documentation system requirements

Clinical Research: Clinical Research, Regulatory Affairs and Medical Affairs/ Drug Information

- Is key participant in the design, implementation and monitoring of clinical trials, preparation of integrated medical reports, Investigational Device Exemptions (IDE), periodic reports, New Drug Applications

(NDAs) and Biological License Applications (BLAs).

- Responsible for the statistical integrity, adequacy and accuracy of the clinical studies/databases.
- Primary responsibility is to ensure the validity of clinical trials and format them for statistical purposes.
- Ensures all company products meet worldwide regulatory requirements by supporting all assigned regulatory aspects of product approval and post marketing compliance.
- Responsible for coordination and administration of document production procedures

VII. COMPENSATION FOR VARIOUS JOB PROFILE IN BIOTECH INDUSTRY

Each job description includes the required level of education and experience and approximate compensation.

The pay level mentioned may be volatile which varies according to the nature of the job and the organization.

Department	Job Profile	Median Salary Range (Rs. Lakhs)	Annual Salary Range (Rs. Lakh)
Research & Development (Preclinical) Discovery Research, Bioinformatics and Animal Sciences	Research Assistant	233,428	1,22,554 - 4,42,862
	Bioinformatics Analyst/Programmer	377,500	3,35,000 - 4,20,000
	Research Associate	817,298	181,771 - 6,35,528
	Senior Research Associate	631,623	297,858 - 1,208,048
	Senior Scientist	1,615,032	2,36,540 - 13,78,493
	Scientist	913,908	406,182 - 1,421,634
Production and Quality	Entry-Level Market Research Analyst	302,811	173,649 - 605,381
	Entry-Level Manufacturing Engineer	317,397	143,617 - 623,538
	Entry-Level Production Manager	2,331,518	484,025 - 1,975,070
	Supply Chain Manager	1,578,323	464,395 - 2,227,855
	Quality Assurance (QA) Documentation Coordinator/Associate	215,049	109,215 - 449,160
	Quality Assurance (QA) Documentation Specialist / Analyst	314,459	162,391 - 685,555
	Quality Assurance (QA) Manager/Supervisor	407,316	209,269 - 925,614
	Quality Control (QC) Technician	330,552	165,275 - 652,094
	Quality Control (QC) Analyst	237,722	123,533 - 474,383
	Quality Control (QC) Manager/Supervisor	540,437	308,505 - 919,655

Clinical Research	Clinical Pharmacist	307,226	161,906 - 827,452
	Regulatory Affairs Associate	1,216,859	286,588 - 1,860,542
	Clinical Data Manager/Associate	487,745	241,285 - 955,001
	Clinical Data Analyst	294,032	147,065 - 704,674
	Clinical Data Coordinator	351,623	202,354 - 572,094
	Clinical Research Associate	353,193	178,408 - 527,979
Sales and Marketing			
	Entry-Level Market Research Analyst	302,811	173,649 - 605,381
	Entry-Level Brand Manager	644,961	285,394 - 1,643,530
	Entry-Level Sales Representative, Pharmaceuticals	454,621	225,620 - 683,621
	Senior Sales Executive	775,896	268,010 - 1,015,772
	Regional Sales Manager	912,781	272,447 - 1,280,668
	Marketing Executive	766,157	239,606 - 1,053,102
	Area Sales Manager	662,565	225,292 - 874,545

VIII. FUTURE PROSPECT OF CAREER GROWTH WITH DEMAND AND SUPPLY SIDE PERSPECTIVE FOR BIOTECH INDUSTRY

Specific areas of job growth are scientific careers and Non-scientific careers in biotech industry.

Scientific careers: The important growth areas in biotech industry are Research and development (Preclinical and clinical) and manufacturing.

Research and development involves in finding new products as the company search for new products the search for staff expands.

Non Scientific careers: The biotech industry projects the tremendous growth of industry worldwide, as the growth involves expansion and manufacturing of the products.

As companies mature , positions in planning , public relations, investor ,distribution management, material planning , accounting , financing and legal counsel become available .

Biotech industry is in a nascent stage &poised for next level of growth. It needs a skilled human resource for different job profiles to support the exponential growth rate till 2025.Professionanls with a niche skill set have a great chance to prosper in the biotech industry.

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