

HUMAN RESOURCES AND SKILL DEVELOPMENT IN PHARMACEUTICAL INDUSTRY IN INDIA

O. P. Singh* and A. K. Singh**

***Abstract:** Skill development has been considered as the backbone of economic development. Entrepreneurship, skill development and new venture creation has long been a driving force in commercializing new technologies and developing new markets, creating new jobs, and growing economies. It has been well established that the level of economic growth of a region, to a large extent, depends on the level of entrepreneurial and skill development activities in the region. Government of India has launched National Skill Development Mission and National Skill Development Policy. The national policy on skill development envisages to creating opportunities for all to acquire skills throughout life and specially for youth, women and disadvantaged group, promoting commitment by all stakeholders to own skill development initiatives, developing a high quality skilled workforce, entrepreneurs relevant to emerging employment market needs. The policy has widened the scope of skill training and entrepreneurship development through utilizing the existing educational infrastructure and expansion of institutions engaged in skill training and vocational education. Government of India has also introduced several schemes, programmes and projects for providing training, vocational education and entrepreneurship development to youth, women and disadvantaged groups. Pharmaceutical industry has shown impressive growth and it has enormous potential for human resources and skill development. Against this view point, present paper purports to review the performance of pharmaceutical industry in India and assess the scope of human resources and skill development.*

INTRODUCTION

Entrepreneurship has been considered as the backbone of economic development. It has been well established that the level of economic

* Associate Prof. Deptt. Of Community Medicine and Public Health, KG Medical University, Lucknow

** Assistant Director, Regional Centre for Urban and Environmental Studies, Lucknow

growth of a region, to a large extent, depends on the level of entrepreneurial activities in the region. The myth that entrepreneurs are born, no more holds truth, rather it is well recognized now that the entrepreneurs can be created and nurtured through appropriate interventions in the form of entrepreneurship development programmes. In the era of liberalization, privatization and globalization along with ongoing Information Technology revolution capable entrepreneurs are making use of the opportunities emerging from the changing scenario. However, a large segment of the population, particularly in the industrially backward regions generally lags behind in taking advantage of these opportunities (Singh, 2009). Entrepreneurship development and training is one of the key elements for development of micro and small enterprises, particularly for the first generation entrepreneurs (Krishna, *et al.*, 2011). Though, India has improved its performance in education, however, there is growing deficit of skilled manpower (Clark, 2005). Therefore, there is a need to provide skill development and entrepreneurship development training to such population in order to mainstream them in the ongoing process of economic growth and development. Skill up gradation and entrepreneurship has been considered as the backbone of economic development (World Bank, 2006). It has been well established that the level of economic growth of a region, to a large extent, depends on the level of entrepreneurial activities in the region.

Skill development is essential for development and economic prosperity of the nation. The level of growth of a region depends on the level of entrepreneurial activities in the region (Acszolton, *et.al.*). The entrepreneurs can be created and nurtured through appropriate interventions in the form of entrepreneurship development programmes. In post economic liberalization, privatization and globalization era, capable entrepreneurs are making use of emerging opportunities unleashed by new business environment. However, a large segment of the youth population, particularly in the backward regions lags behind in taking advantage of opportunities of employment. Therefore, there is a need to provide skill development and entrepreneurship development youth in order to mainstream them in the ongoing

process of economic growth and development (Dahlam, and Anuja, 2005).

Entrepreneurial skill development and training is, thus, one of the key elements for development of micro and small enterprises (MSEs), particularly, for the first generation entrepreneurs. India has over 470 million persons below the age of 18 years. India's potential to earn a demographic dividend from its burgeoning youthful population is often cited, but generally without the rider that should accompany it. India will not realize its demographic dividend unless its youth are able to earn income. The government of India is seized of the imperative to create employment opportunities for its youth through skill development. The National Skill Development Corporation is one of its kind public private partnerships in India. It aims to promote skill development by catalyzing creation of large, quality and for profit vocational institutions. Pradhan Mantri Kaushal Vikas Yojana is the flagship scheme of Government of India, implemented through National Skill Development Corporation under the Ministry of Skill Development and Entrepreneurship. Industry is also witnessing an increased participation from corporate and public sector enterprises who are coming forward and investing back in the country's youth by supporting skill development through their CSR initiatives under various partnerships such as financing, providing infrastructure, recognition of prior learning, adoption of national qualification framework and occupational standards etc. However, skill India is daunting task of keeping sight on the manpower requirement of the industry and the infrastructure needed for achieving the targets of skilling. Skill development is an effective tool to overcome exclusion; however, it is necessary to monitor the outcome of education, knowledge and training in terms of improvement in employability which would facilitate not only entry into labour market but also social inclusion. Skill development is not sufficient to address the problem of un-employment in India. There is also need of creating job opportunities for youth, women and particularly poor (Gupta and Singh, 2015).

Skill development is critical for economic and social development of India. It is imperative to ensure employment

opportunities for more than 12 million youths entering working age annually. It was estimated that during the seven-year period of 2005-2012, only 2.7 million net additional jobs were created in the country (FICCI, 2015). In order to enable employment ready workforce in future, the youth need to be equipped with necessary skills and education. The skill development is one of the priorities of government which aims to enhance participation of youth, seek greater inclusion of women, disabled and other disadvantaged sections into the workforce, and strengthening the present system, making it flexible to adapt to technological changes and meeting the demands emanating from the labour market. Skill development efforts in India are spread across approximately 20 separate ministries, 35 State Governments and Union Territories as well as the private sector. Ministry of Skills Development, Entrepreneurship, Youth and Sports was created in 2014. The Ministry has been entrusted with the coordination of all stakeholders during the evolution of an appropriate skills development framework, removal of disconnect between demand and supply of skilled manpower, skills up gradation, building new skills, innovative thinking and assuring availability of talents. The National Policy on Skill Development was first formulated in 2009 to create a skills ecosystem in India. However, the government has introduced National Policy on Skill Development and Entrepreneurship in 2015. The policy aims to provide an umbrella framework to all skill related activities carried out within the country, to align them to common standards and link skill activities with demand centers (Singh and Singh, 2016). While India has a large young population, only 10 percent of the Indian Labor force (8 percent informally and 2 percent formally) have vocal skills. Thus, there is a skill gap of about 244 million across 21 key sectors. Aligning skills for empowerment and training the youth for secure, sustainable employment and entrepreneurship is imperative.

PHARMACEUTICAL INDUSTRY

The Indian pharmaceutical industry has achieved an eminent global position in pharma sector and has been witnessing phenomenal growth in recent years. It is well known that India is emerging as a

world leader in generic pharmaceuticals production, supplying 20 percent of the global market for generic medicines. The industry accounts for 8 percent of global production, and is exporting to over 200 countries (Planning Commission, 2013). India is a major vaccine producer and has 18 major vaccine manufacturing facilities. These vaccines are used for the national and international market which makes India a major vaccine supplier across the globe. Indian pharmaceutical industry has been playing a pivotal role in supply of affordable and quality pharmaceuticals to the developed and developing countries. It is third largest in terms of volume and thirteen largest in terms of value. The industry is estimated to grow at 20 percent compound annual growth rate over the next five years. India is among the top 20 pharmaceutical exporting countries and the exports have grown very significantly at a CAGR of around 19 percent in the 11th plan period. The industry has seen tremendous progress in terms of infrastructure development, technology base and the wide range of products manufactured (Planning Commission, 2013). The challenge for policymakers is how to capitalize on the achievements of the Indian pharmaceutical sector to improve access to medicines and make health systems responsive to the health needs of the population. Evidence shows that infrastructure development, capacity building of human resources, procurement strategies, and policies on generic medicines, new regulatory frameworks, and government coordination for approvals are crucial to foster access. The Indian medical device industry is expected to continue growing with the demographic changes such as aging population, increased life expectancy and the expanding markets in developing countries (WHO- FICCI, 20015). At present, there are approximately 1000 domestic firm primarily manufacturing low technology products. Recently, the companies have expanded operations to produce medium-end medical devices also. The industry is turning technology intensive thereby producing high quality and cost-effective medical devices (Assocham, 2014). .

Planning Commission, Government of India in its Working Group Report for 12th Plan noted that adequate availability of drugs as well as devices at affordable prices has been the cause of concern. Despite the stated goals of tackling this problem, the progress

remains to be slow and the impact is not visible. At macro level, the facilities for different disease investigations and patient management continue to be grossly inadequate despite attempts of the government to open AIIMS like institutions and granting permission to open a large number of medical colleges, the number of health personnel remains far below the norms and is also not equitably distributed. These personnel are either not adequately trained in research methodology or have poor motivation due to various reasons in most parts of the country. Though a lot of initiatives have been taken to improve the situation, it will take quite some time to reach desirable standards (Planning Commission, 2011). A major constraint in the current scenario is the lack of adequate and properly trained human resources for the health research. As a result, the output does not match the input. The Department plans to strengthen human resource base of the country by organizing focused training programs within and outside India, for mid career professionals in medical colleges and other academic establishments. It is imperative to strengthen human resource and create enabling environment for research in medical colleges, universities and health research institutions to promote health research. Optimum use of Information Technology, using the National Knowledge Network for health research, education and health management is called for.

Indian pharmaceutical sector accounts for about 2.4 per cent of the global pharmaceutical industry in value terms and 10 per cent in volume terms. India accounts for 20 per cent of global exports in generics. In 2015, pharmaceuticals industry of India exported products worth \$15 billion and the exports are expected to reach \$40 billion by 2020. The country's pharmaceutical industry is expected to expand at a CAGR of 12.89 per cent over 2015–20 to reach \$55 billion. Indian healthcare sector, one of the fastest growing sectors, is expected to advance at a CAGR of 17 per cent to reach \$250 billion over 2008–20. The generics market is expected to grow to \$26.1 billion by 2016 from \$21 billion in 2015. India's generics market has immense potential for growth. The Indian pharmaceuticals market increased at a CAGR of 17.46 per cent in 2015 from \$6 billion in 2005 and is expected to expand at a CAGR of 15.92 per cent to \$55 billion by 2020. By 2020, India is likely to be

among the top three pharmaceutical markets by incremental growth and sixth largest market globally in absolute size India's cost of production is significantly lower than that of the US and almost half of that of Europe. It gives a competitive edge to India over others. Increase in the size of middle class households coupled with the improvement in medical infrastructure and increase in the penetration of health insurance in the country will also influence in the growth of pharmaceuticals sector. Indian pharma companies are capitalising on export Trade data of Indian pharma sector (USD billion) opportunities in regulated and semi-regulated markets. Department of Pharmaceuticals targets to export \$18.02 billion worth of pharmaceuticals in 2016. Indian drugs are exported to more than 200 countries in the world, with the US as the key market India is the world's largest provider of generic medicines. The country's generic drugs account for 20 per cent of global generic drug exports (in terms of volumes) In terms of value, exports of pharmaceutical products increased at a CAGR of 14 per cent during 2012-15 US is the largest export market for India. Dr Reddy's has the largest share (24.45 per cent) in the Indian pharma market, with sales of \$1.66 billion during March 2015 Lupin has the second largest share of 23.71 per cent in the Indian pharma market with sales of \$1.61 billion. Cipla, with a revenue base of \$ 1.55 billion for March 2015 sales, ranks third in the market Aurobindo ranks fourth in the market, with a revenue base of \$1.17 billion for March, 2015 sales While these top four companies garnered 20 per cent market share, top 10 companies comprise nearly 39 per cent of the market share.

Over the period of 2010-15, total healthcare spending increased at a CAGR of 7.04 per cent. Pharmaceutical sales, as a percentage of total healthcare spending, also increased to 32.88 per cent during the period. Growing per capita sales of pharmaceuticals in India offers ample opportunities for players in the market Per capita sales of pharmaceuticals was expected to increase at a CAGR of 19.4 per cent by 2016. Economic prosperity would improve affordability for generic drugs in the market and improve per capita sales of pharmaceuticals in India (IBEF, 2016). . Government expenditure on health increased from \$14 billion in 2008 to \$30.4 billion in 2015 The expenditure is expected to increase at a CAGR of 18.1 per cent

over the period of 2008–16. Government of India under Union Budget, 2015-16, \$ 243.86 million allocated to set up medical institutions and six more institutions of the stature of AIIMS in Jammu and Kashmir, Punjab, Tamil Nadu, Himachal Pradesh and Assam and Bihar. Supported by favourable government policies, the private sector's share is expected to reach \$ 80 billion by 2016. With increasing urbanisation and problems related to modern-day living in urban areas, about 50 per cent of spending on in-patients has been reported on lifestyle induced diseases. This has increased the demand for specialised care. In order to standardise the quality of service delivery, control cost and enhance patient engagement, healthcare providers are focusing on the technological aspect of healthcare delivery. A new trend is emerging as luxury offerings in healthcare sector. More than essential requirements, healthcare providers are making offerings of luxurious services such as pick and drop services for patient by private helicopters and luxurious arrangements for visitors to patient in hospital.

EMPLOYMENT POTENTIAL IN PHARMA SECTOR

In India, pharmaceutical manufacturing units are primarily concentrated in Maharashtra and Gujarat. The two states together account for about 44 percent of the total number of pharmaceutical manufacturing units in the country. Maharashtra remains an attractive destination for pharma companies due to better infrastructure facilities, conducive industrial environment, enhanced support from small-scale companies and skills in chemistry. Gujarat has been very proactive in encouraging new investments in the state. It employs approximately 52,000 people in the pharma sector. Himachal Pradesh, Jammu & Kashmir, Uttaranchal, Sikkim and Jharkhand are tax-free states which have witnessed attractive investment destinations for pharma companies. The pharma sector in Himachal Pradesh and Uttarakhand is considered to be among the fastest growing in India. The growth in these areas can be attributed to the incentives announced by the state governments in their Industrial Policy, 2004. The state government of Himachal Pradesh has also launched initiatives to focus on developing new technologies in the areas of biotechnology for agriculture, animal

husbandry and healthcare. The chemical and allied industries provide employment in the state in the tune of 9,376 persons (NSDC, 2013). Haridwar, Roorkee, Dehradun and Rudrapur are reportedly the main hubs of pharmaceutical firms in Uttarakhand with about 200 pharma manufacturing units. Baddi and some other pockets in Himachal Pradesh have over 300 units. Alembic, Dr. Reddy Lab, Alkem, Mankind, Torrent, Lupin, Cadila, Indswift Lab, Unichem, Morepen, Klitch, Ranbaxy, Nector, Surya, Cachet, Indchemie, Galpha are some of the major companies to have established their units in these areas. The investment in the region is reported to be worth an estimated Rs. 30 billion in recent years. The development has also resulted in employment for thousands across the region. Under the North East Industrial and Investment Promotion Policy, 2007, the governments of the North eastern states provide tax benefits to investors. Excise duty exemption on finished products, income tax exemption and capital investment subsidy on investment in plant and machinery are some of the incentives being offered by the government. Sikkim has witnessed movement of many pharma companies into the state, due to the abundance of natural resources, as well as the monetary benefits offered by the government. Education, bioinformatics and infrastructure projects have been initiated in the North eastern states to provide support to R&D in pharma, biotech and allied activities. As of 2011, 14 major companies, such as Cipla, Sun Pharma, Alkem and Zydus Cadila, had made investments in this region (NSDC, 2013).

There are enormous employment opportunities in pharma sector in India. Serum Institute of India Ltd. has over 3,000 qualified scientists and professional employees. Biocon, Syngene and Clinigene together provide employment to more than 7,100 qualified personnel, ranging from biologists, chemists, medical practitioners, pharmacologists, engineers, finance/legal/marketing analysts. A large percentage of the workforce in the pharmaceutical sector is categorized under the informal or un-organized. In view of the growing business, the sector is likely to prefer for management graduates and accountants, while the production and research component will prefer for people with science and pharmacy backgrounds.

Medical universities and colleges in India offer diplomas, undergraduate and post graduate degrees in pharmaceutical sciences. Graduates in science also find employment in the pharmaceuticals sector. The higher spectrum of R&D organizations requires candidates who have a doctorate or post doctorate degree. Maximum number of employees in the pharma sector is engaged in the production and quality control division. Ph.D/ M.Tech/ M.Sc degree holders account for only negligible proportion of the workforce in the chemicals and pharmaceuticals segment, while a majority of the people employed in the sector have an educational background of 12th grade or below (NSDC, 2013). The Indian pharma sector has been successful in creating rich talent pool of researchers, scientists, doctors and project managers. The pharma sector is expected to create a significant number of indirect employment opportunities with aggressive hiring at the entry level. Hiring by major pharma companies has grown by about 24 per cent in 2013-14 which indicates the high level of employment growth in the sector. Industry is estimated to employ over 1.8 million persons across the value chain. Manufacturing and pharma retailing account for maximum share of employment in the sector. Overall employment in the industry is expected to reach over 3.5 million by 2022 (NSDC, 2013).

There has been impressive growth of technical higher educational institutions in India during 1999-2000 to 2013-14. There were 204 pharmacy institutions which increased to 1419 in 2013-14. Thus, number of institutions providing education in pharmaceutical sector increased by 6.9 times during the period. The intake capacity of students in pharmacy institutions was reported 64211 in 2008-09 which increased to 168287 in 2013-14. The intake capacity of students in pharmacy institutions has increased by 2.6 times. This is almost three times less than the growth of educational institutions in pharmacy (Table 1).

As per information available from Ministry of Human Resource Development, Government of India, there has been significant growth of pharmacy institutions in India providing undergraduate, postgraduate and diploma courses in pharmaceutical sector. During

Table 1
Growth of Educational Institutions in Pharmacy in India

<i>Year</i>	<i>No. of Educational Institutes</i>	<i>Intake of Students</i>
1999-2000	204	-
2006-07	736	-
2008-09	1021	64211
2009-10	1081	68537
2010-11	1114	98746
2011-12	1137	102746
2012-13	1145	121652
2013-14	1419	168287

Source: NSDC, 2013

the period of 2006-07 to 2014-15, the institutions providing undergraduate courses increased by 53.83 per cent while institutions providing postgraduate courses increased by 21.06 per cent and growth in educational institutions running diploma courses increased by 21.67 per cent (Table 2).

Table 2
Pharmacy Educational Institutes in India

<i>Year</i>	<i>Under Graduate</i>	<i>Post Graduate</i>	<i>Diploma</i>
2006-07	665	698	429
2007-08	854	708	431
2008-09	985	713	435
2009-10	1029	718	468
2010-11	1041	721	479
2011-12	1053	726	783
2012-13	1036	822	490
2013-14	1029	841	498
2014-15	1023	845	522

Source: MoHRD, 2015

The intake capacity of postgraduate students in these institutions increased by 251.26 per cent while students under diploma courses increased by 31.97 per cent and undergraduate students in these institutions increased by 16.99 per cent during the period of 2006-07 to 2014-15 (Table 3).

Table 3
Intake of Students in Pharmacy Educational Institutes in India

<i>Year</i>	<i>Under Graduate</i>	<i>Post Graduate</i>	<i>Diploma</i>
2006-07	76030	15570	25948
2007-08	77582	15793	26069
2008-09	78763	15905	26311
2009-10	80370	16016	28307
2010-11	81594	16083	28973
2011-12	83259	16194	29214
2012-13	83519	22400	30574
2013-14	85474	51228	31276
2014-15	88950	54692	34246

Source: MoHRD, 2015

As per estimates of NSDC, Government of India, human resource requirement is expected to increase from 1.86 million in 2013 to 3.58 million in 2022. Thus, the workforce in pharmaceutical sector is likely to increase by 92.47 per cent. During 2013, about 37 per cent workforce was employed in manufacturing sector while wholesale and retailing accounted for 15.59 per cent. In 2022, more than half of the workforce will be required in pharmaceutical retailing while about 1/3rd workforce will be required in manufacturing sector (Table 4).

NIPER, Mohali, Himachal Pradesh offers master's and doctoral programs in various fields of pharmaceutical sciences. The preferred courses are Pharmaceutics, Quality Assurance, Pharmacology and Medicinal Chemistry. NIPER hosts several research facilities, including the National Bio, Availability Center and National Toxicology Center. The Institute of Chemical Technology, formerly

Table 4
Human Resource Requirement in Pharmaceutical Sector in India

Segment	Employment (In Millions)			Employment Growth (2013-17) (In Millions)	Employment Growth (2017-22) (In Millions)	Employment Growth (2013-22) (In Millions)
	2013	2017	2022			
Manufacturing	0.69	0.89	1.15	0.20	0.25	0.45
R&D	0.07	0.09	0.11	0.02	0.02	0.04
Wholesale Sales	0.20	0.29	0.42	0.09	0.13	0.22
Pharma Retail	0.90	1.32	1.90	0.43	0.58	1.00
Total	1.86	2.60	3.58	0.74	0.98	1.72

Source: NSDC, 2013.

the University Department of Chemical Technology focuses on training and research in various branches of chemical engineering, chemical technology and pharmacy. Teaching as a profession is declining now days. Thus, getting good teachers on board is difficult. Retaining them in academic institutions is also an issue, lucrative offers available from different sources. Institutes lack proper infrastructure for training students. Coherent course curriculum is of utmost importance to develop a good skill set among the students. Poor curriculum results in lesser of demand of pharma students for employment in industry.

CONCLUSION

The quality infrastructure, good curriculum, and good teachers would be required to ensure quality education, entrepreneurship and skill training in pharmaceuticals sector. There is a need for investments in infrastructure and human resources. Human resource development efforts and infrastructure creation is also required at state level so as to improve the number and competencies of human resources, promote the domestic production of drugs, medical devices, and equipment for drug manufacturing. States could also explore technology transfer mechanisms as well as knowledge sharing regimes to promote the establishment of local

pharmaceutical industries. There is a need for additional resources for investment in infrastructure and human resources for training and skill up gradation. Actions are to be taken to evolve medical technology clusters with common facilities for development, calibration, testing, quality control, waste management etc. Creating an ecosystem for the benefit of small and medium sized enterprises focusing on medical technology would add to the growth impetus. There should be an increase in the training for regulatory staff to ensure consistent interpretation of regulatory approval processes

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