

## TREND ANALYSIS OF INNOVATION AND GLOBAL COMPETITIVENESS IN THE CONTEXT OF INDIA

**Syed Rizwan Naqvi**

*DGM ,Bharat Electronics Ltd., Ghaziabad*

### ABSTRACT

*Global Competitiveness Indexing (GCI) report published by World Economic Forum (WEF) provides an overview of competitive performance of around 140 economies on annual basis based on approximately 114 indicators .The ranking of individual countries based on their competitiveness is known as Global Competitiveness Index. The evaluation of global competitiveness is broadly classified in three categories ---- first one is Basic Requirements Category, second one is Efficiency Enhancers Category and the third one is Innovation & Sophistication factors. India has shown gloomy performance in Basic Requirements Category as well as Efficiency Enhancers Category .The paper focuses the performance of India in terms of Innovation factors as India has shown positive trends on evaluation of past 5 years data .*

**Keywords:** *Global Competitiveness,Innovation.*

### I. INTRODUCTION

With the advent of globalization, businesses have begun expanding globally, thus eliminating trade barriers, ease in technology transfer and finally leading to cut-throat competition among domestic and international organizations .Countries started developing innovative strategies to outperform other countries for profit maximization and economic boost .At the global level , there was a need for assessment of all the economies in terms of their competitiveness with respect to each other . World Economic Forum (initially known as European Management Forum) , a non-profit foundation based in Geneva ,Switzerland took an initiative in generating annual comprehensive report (WEF Global Competitiveness Report) depicting competitiveness of each country out of around 140 countries . Depending upon number of parameters (approx. 114 indicators) attributing to competitiveness, each country is awarded rank known as Global Competitiveness Index.

The parameters responsible for global competitiveness of individual countries are broadly classified into three major factors—Basic Requirements factors, Efficiency Enhancers factors and Innovation & Sophistication factors. Basic Requirements Factors consists of 4 pillars, Efficiency Enhancers category consists of 6 pillars and Innovation & Sophistication factors consists of 2 pillars thereby leading to 12 main pillars. Each of the main pillars consists of miscellaneous parameters on the basis of which Global Competitiveness indexing is carried out for the particular country.

## II. RESEARCH METHODOLOGY

Research method used in research paper is time-series. Source of input data (which is unique in nature) is report generated on annual basis by WEF (World Economic Forum). Report consists of comprehensive ranking of global competitiveness, ranking of pillars and sub pillars of global competitiveness. Global Competitiveness Index (GCI) ranking is dependent on all the main pillars but as the main focus of the research paper is global competitiveness and innovation, and innovation is one of the pillars of global competitiveness, so emphasis is made on ranking of global competitiveness and one of its pillar- innovativeness and supporting sub-pillars of innovativeness ranking. As reports are available on annual basis, so analysis is done on year-wise basis. Basic focus of report is on trend analysis of ranking of India in Global Competitiveness, innovative growth and factors responsible for innovative growth. Year wise data shows some pattern either upward pattern or downward pattern as we progress from one year to the next.

## III. STUDY

**3.1 Trends of Global Competitiveness and Innovation Factor** –As we move in global competitiveness from 2006 to 2016, we find it is downward trend from a ranking of 42<sup>nd</sup> (2006-07) to 71<sup>st</sup> (2014-15) but in 2015-16 we find in GCI(Global competitiveness Index) ranking a climb by 16 ranks to 55<sup>th</sup> rank.

As we traverse in Innovation factor ranking from 2006 to 2016, we find ranking of India is broadly showing downward trend from 26<sup>th</sup> Rank(2006-07) to 49<sup>th</sup> rank(2014-15). On trend analysis of innovative ranking of India, it is showing downward trends from 26<sup>th</sup> rank (2006-07) to 32<sup>nd</sup> rank(2008-09), then slight improvement to 30<sup>th</sup> rank in 2009-10, sharp fall to 39<sup>th</sup> rank in 2010-11, slight jump by one rank to 38<sup>th</sup> rank in 2011-12, fall to 41<sup>st</sup> rank in 2012-13 & 2013-14, again fall to 49<sup>th</sup> rank in 2014-15 and finally rise to 42<sup>nd</sup> rank in 2015-16.



Figure 1 : Annual trends for GCI ranking

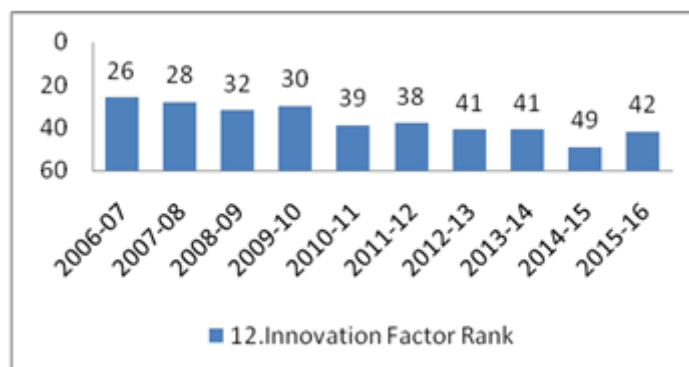


Figure 2: Annual Trends for Innovation factor ranking

### 3.2 Trends of Capacity for Innovation

As far as capacity for innovation is concerned , there is fall in ranking from 28<sup>th</sup>(2006-07) to 35<sup>th</sup> rank (2008-10),slight jump to 33<sup>rd</sup> rank in 2010-11,again fall from 33<sup>rd</sup> rank(2010-11) to 42<sup>nd</sup> rank(2012-13),slight jump to 41<sup>st</sup> rank in 2013-14 and then fall from 41<sup>st</sup> rank(2013-14) to 50<sup>th</sup> rank(2015-16) .

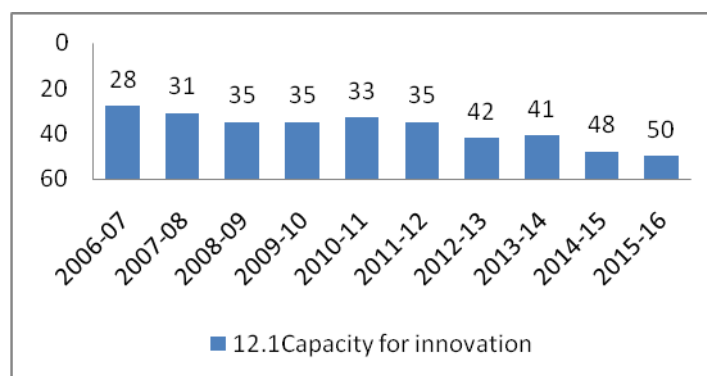
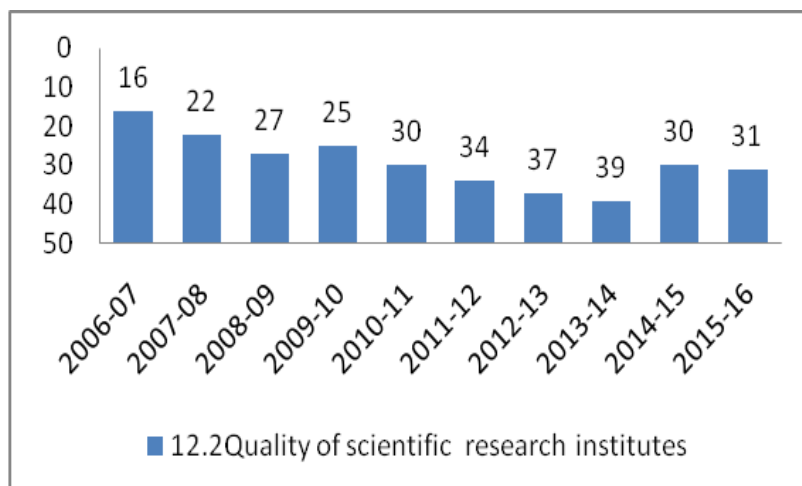


Figure 3: Annual Trends of Capacity for Innovation

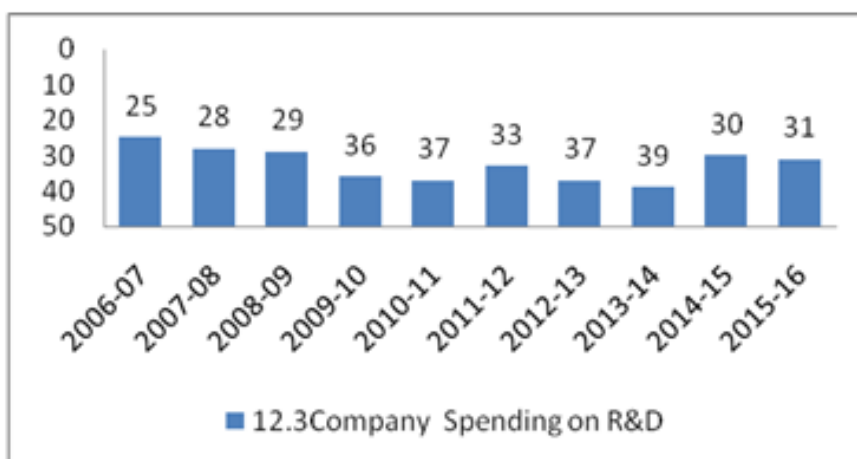
### 3.3 Trends of Quality of Scientific Research Institutes—.

On trend analysis of quality of scientific research institutes, it is found that there is downward trend from 16<sup>th</sup> rank (2006-07) to 27<sup>th</sup> rank (2008-09), slight improvement to 25<sup>th</sup> rank in 2009-10, downward trend from 25<sup>th</sup> rank (2009-10) to 39<sup>th</sup> rank (2013-14), sharp jump by 9 ranks to 30<sup>th</sup> rank in 2014-15 and then again fall by one rank to 31<sup>st</sup> rank in 2015-16.



**Figure 4: Annual trends for Quality of Research Institutes**

### 3.4 Trends of Company Spending on R & D

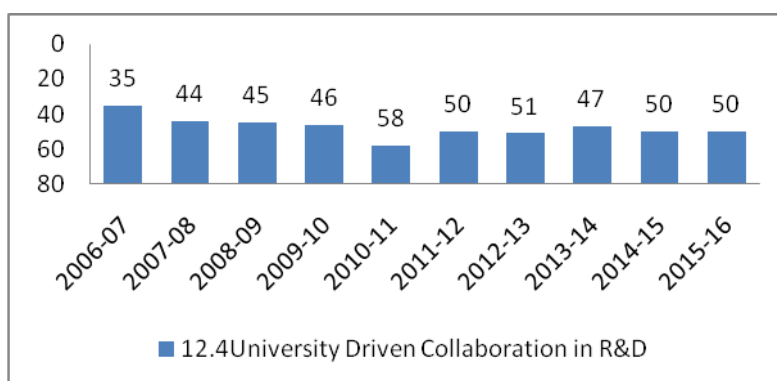


**Figure 5: Annual Trends for Company Spending on R&D**

On trend analysis of Company spending on R&D , it is found that there is declining trend from 25<sup>th</sup> rank(2006-07) to 37<sup>th</sup> rank(2010-11), little climb in rank to 33<sup>rd</sup> rank in 2011-12, fall from 33<sup>rd</sup> rank(2011-12) to 39<sup>th</sup> rank(2013-14), again climb by 9 ranks to 30<sup>th</sup> rank and final dip by one rank to 31<sup>st</sup> rank in 2015-16.

### 3.5 Trends of University Industry Collaboration in R & D

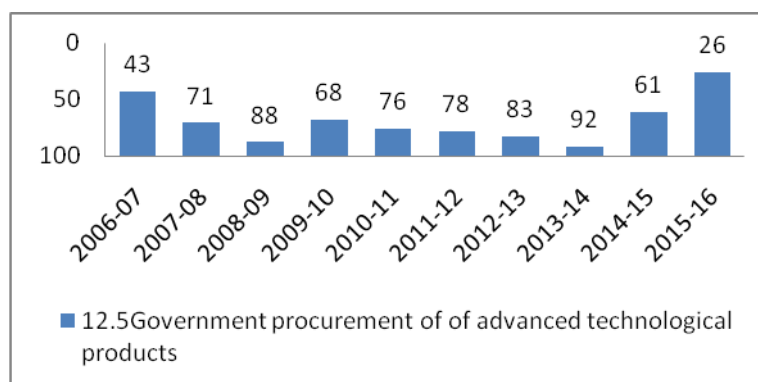
On trend analysis of university industry collaboration in R&D, there is sharp fall from 35<sup>th</sup> rank(2006-07) to 44<sup>th</sup> rank(2007-08), then slight decline in ranking from 44<sup>th</sup> rank(2007-08) to 46<sup>th</sup> rank(2009-10) , sharp fall again to 58<sup>th</sup> rank in 2010-11 and again sharp jump by 8 ranks to 50<sup>th</sup> rank in 2011-12 , little fall in one rank to 51<sup>st</sup> rank in 2012-13, slight jump in ranking by 4 ranks to 47<sup>th</sup> rank, than slight fall by 3 ranks to 50<sup>th</sup> rank in 2014-16.



**Figure 6 : Annual trends for University driven Collaboration in R & D**

### 3.6 Trends of Government’s Procurement of Advanced Technological Products

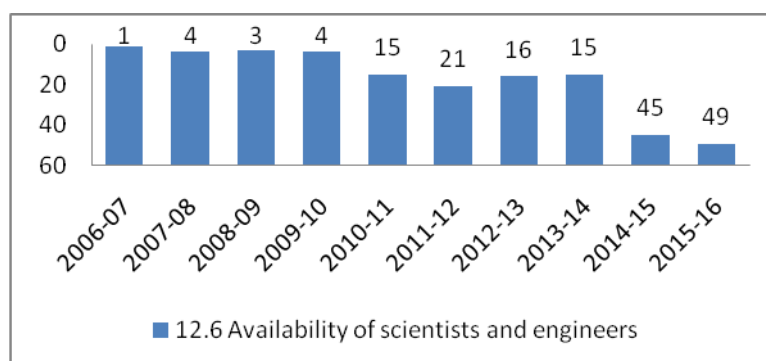
On trend analysis of Government procurement of advanced technological products , it is found that there is downward trend from 43<sup>rd</sup> rank (2006-07) to 88<sup>th</sup> rank(2008-09) ,jump in ranking to 68<sup>th</sup> rank in 2009-10,then again downward trend from 68<sup>th</sup> rank(2009-10) to 92<sup>nd</sup> rank(2013-14) and finally rising trend from 92<sup>nd</sup> rank(2013-14) to 26<sup>th</sup> rank (2015-16) .



**Figure 7: Annual Trends for Government Procurement of Advanced technological Products**

### 3.7 Trends of Availability of Scientists and Engineers

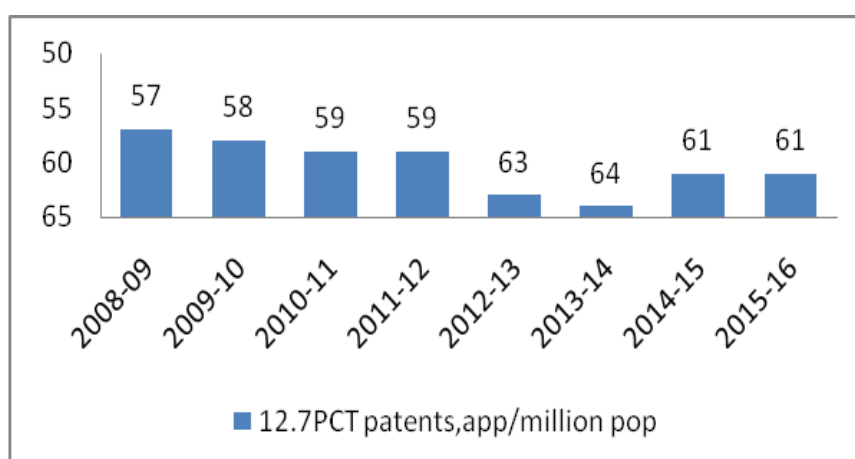
On trend analysis of availability of scientists and engineers , it is found that India was ranking first in 2006-07 ,then slightly dip by 3 rank to 4<sup>th</sup> rank in 2007-08,little improvement to 3<sup>rd</sup> rank in 2008-09,then slight fall to 4<sup>th</sup> rank (2009-10),then sharp fall to 15<sup>th</sup> rank in 2010-11,again fall to 21<sup>st</sup> rank in 2011-12 ,improvement in ranking by 5 ranks to 16<sup>th</sup> rank in 2012-13,again up in ranking by one rank to 15<sup>th</sup> rank and then sharp dip in ranking by 40 ranks to 45<sup>th</sup> rank in 2014-15 and further more dip by 4 ranks to 49<sup>th</sup> rank in 2015-16 .



**Figure 8: Annual trends for Availability of Scientists and Engineers**

### 3.8 Trends of PCT patents, applications per million population

It is found that number of applications filed under the PCT (Patent cooperation Treaty )per million population (data source –OECD –Organization for Economic Cooperation and Development ) show downward trend from 57<sup>th</sup> rank(2008-09) to 59<sup>th</sup> rank(2010-12) ,then again sharp jump from 59<sup>th</sup> rank (2012-13) to 64<sup>th</sup> rank(2013-14) and finally slight improvement from 64<sup>th</sup> rank(2013-14) to 61<sup>st</sup> rank(2014-16) .



**Figure 9: Annual trends for PCT Patents, app/million population**

## IV. RESULTS AND ANALYSIS

### 4.1 Analysis for Capacity for Innovation

Capacity for innovation depends primarily upon size of economy and GDP per capita. India is performing badly in terms of capacity for innovation and termed insufficient capacity for innovation as one of the problematic factors for doing business in India. India needs a policy for enhancing capacity for innovation .In order to fulfill the need for enhancing capacity for Innovation, government has, already launched Medium to Long Term National Science and Technoplogy Development Plan for 2006-2020. The plan emphasizes achieving sustainable economic growth,seeking innovation-driven growth strategies and further enhancing innovation capacity .

## 4.2 Analysis for Quality of Scientific Research Institutes

India is ranking among top 50 in terms of quality of Scientific Research Institutes and is considered the most positive strength of innovative pillar of India. Over the years, India has developed a stable foundation for scientific, technological, and business education by setting up centers of excellence such as Indian Institute of Science (IISc), Indian Institutes of Technology (IITs) and Indian Institute of Management (IIMs). The IISc, Bangalore and Indian Institute of Technology Delhi (IIT-D) are placed at 147 and 179 ranks respectively in QS (Quacquarelli Symonds) World University Rankings for 2015-16. In the current year, IISc Bangalore has made fresh entry in QS World University Ranking list whereas IIT-D has improved its ranking from 235<sup>th</sup> rank (2014-15) to 147<sup>th</sup> rank (2015-16). India has shown good performance in 2015-16 in quality of universities and number of citations in which India has reached to the level of China (nearly) or similar to high income group averages. Due to boost in quality of research institutes, ranking of India in Innovation pillar is shooting up.

## 4.3 Analysis for Company Spending on R & D

India's Gross Expenditure on Research and Development (GERD) as percentage of GDP has remained so far less than 1% as compared to the developed and emerging economies despite increase in absolute terms. Despite 2009 financial crisis, R&D spending has maintained robust relative growth. R&D spending includes both gross domestic expenditure on R&D and business enterprise expenditure on R&D. In spite of global nature of research and innovation activities, these activities are concentrated to high income and select economies like India. But India's recent strong GDP growth and commitment to R&D currently rank it as the sixth largest R&D spender in the world.

## 4.4 Analysis for Government procurement of Advanced technological products

Being a developing nation, India is still going through the dilemma of procurement of advanced eco-friendly technological products or traditional low-cost technologies with high carbon footprint. Government procurement policy plays significant role in promotion of innovation. Government support to innovation is reflected in public procurement policies which is further reflected in country's high number of patents, favorable financial environment, ease of access to venture capital. Corruption plays major hindrance in procurement process as it interferes with the allocation of resources to their most efficient uses and undermines growth. In 2015-16, India has shown remarkable jump to 26<sup>th</sup> rank in procurement of advanced technological products.

## 4.5 Analysis for University Industry Collaboration

India is lagging behind in university-industry collaboration so there is an immediate need to develop an interface model for university-industry interface through consortia, joint lab facility or joint research programmes. Multinational corporations are finding India as a boon for investment in research & development (R&D) outside of their headquarter countries as India has a huge market size and it is a low cost affair to develop R&D facility in India. India should take this opportunity by devising the suitable policy for multinationals to tie up with universities for joint research and development activities, which will create a win-win situation for both university as well as corporations.

## 4.6 Analysis for Availability of Scientists and engineers

India has shown top ranking in availability of scientists and engineers from 2006 to 2010 but it has dropped in the consecutive years due to immigration of science and engineering graduates to U.S.A. and European countries. As per recent report from National Science Foundation’s National Center for Science and Engineering Statistics (NCSES) found that number of scientists and engineers have increased by 85 percent from 2003 to 2013. India should plan a policy for attracting and retaining talent by understanding and fulfilling their expectations .

## 4.7 Analysis for PCT (Patent Cooperation Treaty) patents, applications per million populations

In India, Intellectual property Rights (IPR) Regime is required to make a balance between protection of IPRs to support commercialization of innovation and catering to social needs. Thus people have got low inclination towards filing of patents. India should develop a culture for patenting.

## V. CONCLUSION

Government needs to focus on innovation policies as these need to occupy a central role in developing and emerging economies, where promoting innovation is central to development plans and strategies and is key to addressing pressing societal problems such as pollution, health issues, poverty and unemployment. India needs to improve upon three areas –capacity for innovation, university industry collaboration in R & D and PCT patents, application per million populations.

## References

- [1] A.K.Sengupta, V.Parekh.
- [2] Excellence in higher Education in India :Way Forward. A. K. Sengupta, V.Parekh. 2009, Journal of Emerging Knowledge on Emerging markets, pp. Vol1, issue 1.
- [3] Schwab, Professor Klaus and Salai-i-Martin, Professor Xavier. The Global Competitiveness Report. Geneva : World Economic Forum, 2014-15.
- [4] The Global Competitiveness Report. Geneva : World Economic Forum, 2013-14.
- [5] Schwab, Klaus and Salai-i-Martin, Professor Xavier. Global Competitiveness Report. Geneva : World Economic Forum, 2015-16.
- [6] Schwab, Professor Klaus and Salai-i-Martin, Professor Xavier. The Global Competitiveness Report . Geneva : World Economic Forum, 2012-13.
- [7] The Global Competitiveness Report. Geneva : World Economic Forum, 2011-12.
- [8] The Global Competitiveness Report. Geneva : World Economic Forum, 2010-11.



# International Conference on “Latest Innovations in Science, Engineering and Management”

Indian Federation of United Nations Associations, New Delhi, India

1st October 2016, [www.conferenceworld.in](http://www.conferenceworld.in)

ICLISEM - 16

ISBN : 978-93-86171-08-5

- [9] The Global Competitiveness Report . Geneva : World Economic Forum, 2009-10.
- [10] Schwab, Professor Klaus and Porter, Professor Michael E. The Global Competitiveness Report. Geneva : World Economic Forum, 2008-09.
- [11] The Global Competitiveness Report. Geneva : World Economic Forum, 2006-07.
- [12] The Global Competitiveness Report. Geneva : World Economic Forum, 2007-08.
- [13] Industrial Research Institute. 2016 Global R&D Funding Forecast. s.l. : Industrial Research Institute(IRI) , Research-Technology Management(RTM) and R&D Magazine, 2016.