

## APPENDIX A

### STATISTICS OF SCIENCE PRODUCTION IN MODERN IRAN

As a direct result of the occurrence of the Islamic Republic a fast trend of immigration to Western countries by Iranian scientists began. This only took a faster pace with the beginning of the 1980-1988 war with Iraq. This was the beginning of a crisis in academic society as well as the scientific research arena. It has to be mentioned that despite all of this, and the fact that the Islamic Republic has no political relationship with the United States, and is under tough sanctions imposed by the United Nations and its member countries, the Islamic Republic has been able to gain access to the latest technological trends and scientific breakthroughs which is the very result of hard work and proper investment.(Etemad & Sobouti, 2008, p. 24)

Based on the statistical measures published by the Institute for Scientific Information (ISI) the position of the Iranian researchers in the publication of research papers is a lot more satisfying than that of other Islamic/regional countries. This shows the very fact that the policies taken by the Iran Ministry of Science, Research, and Technology and the Iran Ministry of Health and Medical Education are wise and sound to compensate for the loss of time and resources occurred in the past three decades.

Iranian scientists have produced 88,827 scientific records during the period between 1990 and 2010. The detailed figure for the year of 1990 shows 186 research papers and ten years later the figure reaches 1,387 in 2000 which is of course not satisfying enough. As a result of suitable economic incentive and enough investment in the decade that followed, the number of papers reached 18,319 scientific records which in comparison with 1990, 186 and 2000, 1387 papers respectively is a huge leap forward.

Dr Jafar Mehrad, the director of the Regional Information Center for Science and Technology (RICeST) and the head of the Islamic World Science Centre (ISC) believes that the year on year comparison of the scientific records by Iranian scientists between 2009 and 2010 shows an increase of 1,341 papers, from 16,978 to 18,319 respectively. The output of papers in the first 15 days of 2011 was an astonishing 400 records by Iranian scientists and this trend is expected to grow steadily in the days to come. .(Figure.1) ([www.econews.ir/fa/newsContent-id\\_153375.aspx](http://www.econews.ir/fa/newsContent-id_153375.aspx),2011/1/17)

Year	Iran Share From Science Production
1985	50
1990	186
2000	1387
2009	16927
2010	18319

**Fig.1** Iran Share From Science Production (1985-2010),Number of Annually Published ISI Papers.

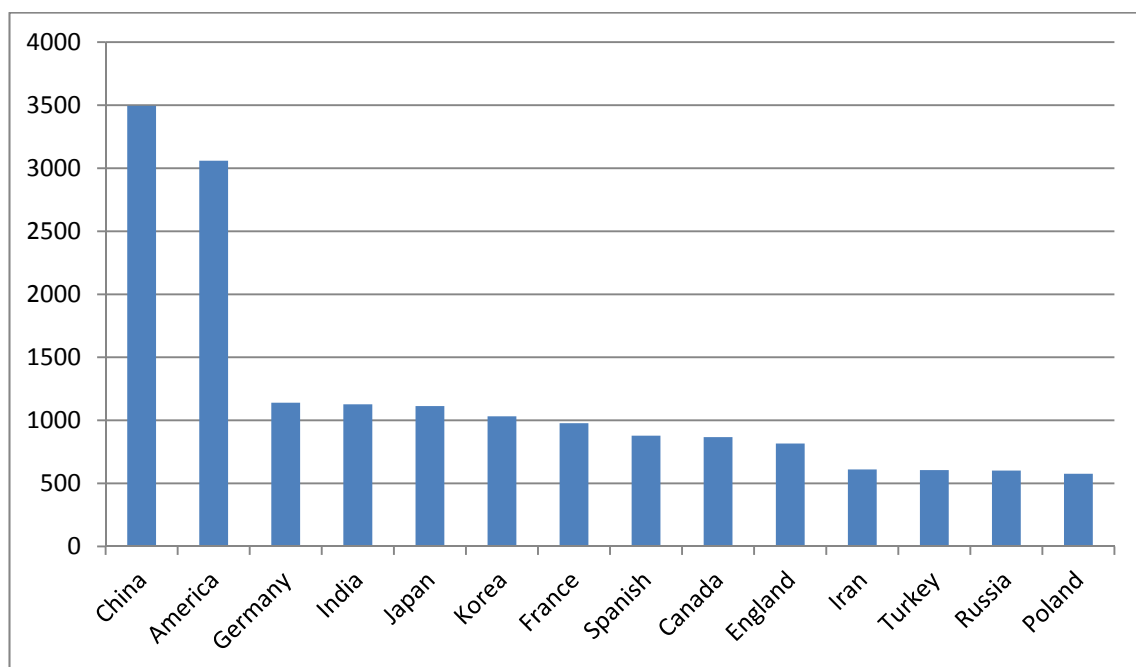
By comparing the Islamic countries, we can see a different view. Turkey is the first runner with 25,710 research papers in 2010 which shows an increase of 7,691 papers year on year.(Figure.2) . For more information please visit: ([www.econews.ir/fa/newsContent-id\\_153375.aspx](http://www.econews.ir/fa/newsContent-id_153375.aspx),2011/1/17)

Row	Islamic Countries Condition in Scientific Production in 2010	The Number of Scientific Documents
1	Turkey	25710
2	Iran	18319
3	Malaysia	6287
4	Egypt	6090
5	Saudi Arabia	3669
6	Singapore	10217

**Fig.2** Islamic Countries Condition in Scientific Production in 2010

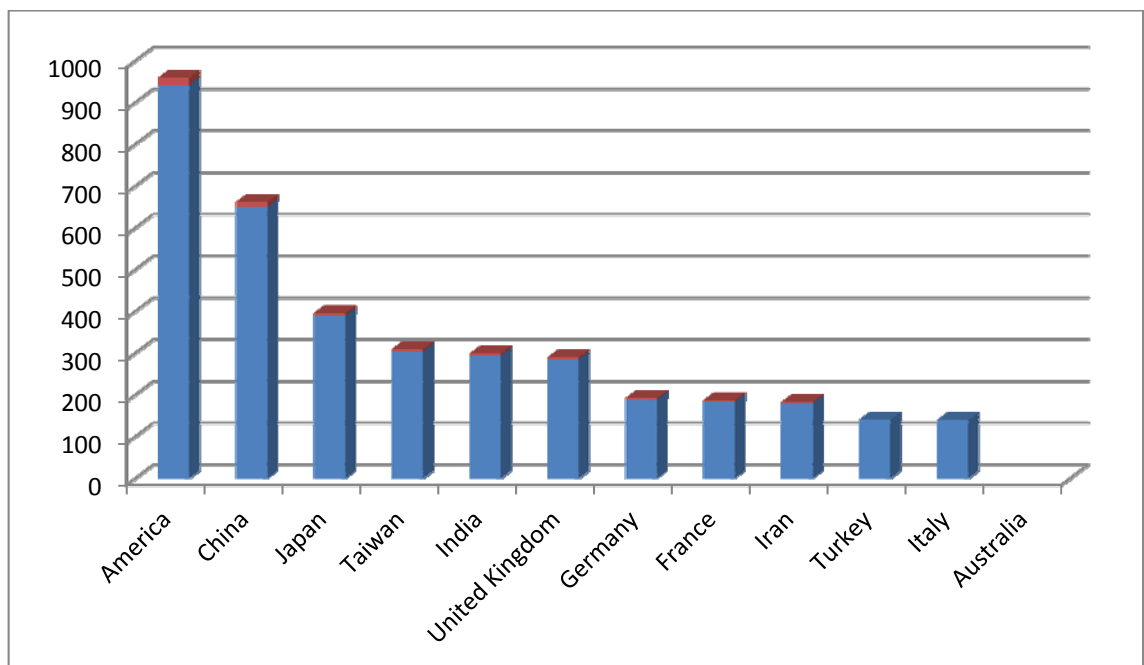
Iran gained the 11<sup>th</sup> place among the 119 countries contested, the field of chemical engineering with 610 research papers, passing Turkey with 606, Russia with 602, and Hungary with 576 research papers respectively.

China with 3,495 papers, United States of America with 3,059 papers, Germany with 1,140 papers, India with 1,127 papers, Japan with 1,113 papers, South Korea with 1,032 papers, France with 978 papers, Spain with 878 papers, Canada with 867 papers, and the United Kingdom with 816 papers were the best 10 performers surpassing Iran.(Figure.3) .(Mehrad, 09 Sept.2010)



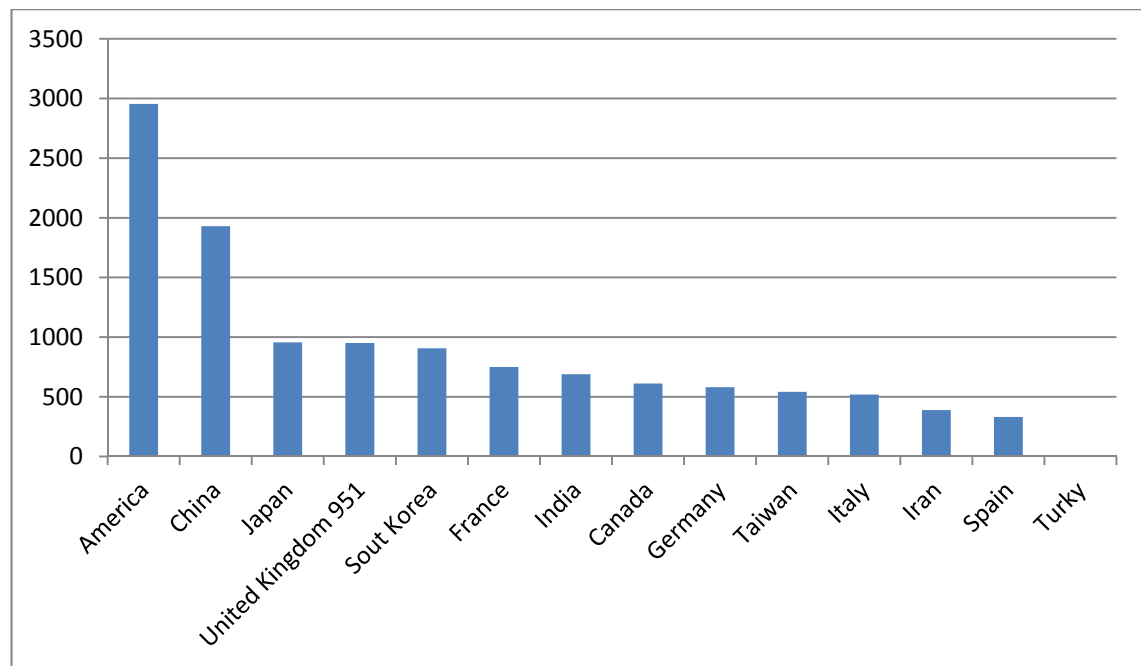
**Fig.3** The field of Chemical Engineering in World (2010),Number of Published ISI Papers .

In the field of industrial engineering, Iran gained the 11<sup>th</sup> position among the 78 participating countries surpassing Turkey with 141 papers, Italy with 140 papers and Australia with 110 papers respectively. The best 10 performers were: The United States of America with 942 papers (17.7% of the total), China with 650 papers (12.2% of the total), Japan with 389 papers (7.3% of the total), Taiwan with 304 papers (5.7% of the total), India with 294 papers (5.5% of the total), the United Kingdom with 285 papers (5.4% of the total), Germany with 189 papers (3.6% of the total), and France with 184 papers (3.5% of the total). Iran's share of the total is 3.2% and therefore took the 11<sup>th</sup> place. (Figure.4) (Mehrad, 09 Sept.2010)



**Fig.4** The field of Industrial Engineering in World (2010), Number of Published ISI Papers .

In mechanical engineering Iran's place is the 11<sup>th</sup> among the 103 competing countries. Iranian scientists produced 389 scientific records in 2010 equal to 2.4% of the total number of records in that year. Top 5 countries are The USA, China, Japan, the UK and South Korea with 2954, 1929, 951, and 906 papers respectively. After them come France, India, Canada, Germany, Taiwan, and Italy with 750, 689, 611, 581, 542, and 519 records respectively holding the 6<sup>th</sup> through 10<sup>th</sup> place in 2010. (Figure.5) (Mehrad, 09 Sept.2010)



**Fig.5** The field of Mechanical Engineering in World (2010), Number of Published ISI Papers

Among the developing countries, only Iran, India, South Korea, Turkey, Hungary, Brazil and Taiwan have managed to gain places among the top 12 countries. This is a very positive position considering the current situation of Iran and Iran has set to grow steadily in all other fields.(Mehrad, 09 Sept.2010)

By considering the number of Iranian doctors in other countries, Iran has also managed to develop a very strong position in medicine as well. Iran has a very equipped Bone marrow transplantation (BMT) centre in Tehran, and has a very good record in organ transplantation as well.(News, 28 Dec,2010)

Iran has had units of cornea, kidney, heart, and lungs transplantations since 1935 and is also among the 5 countries with the technology to produce artificial lungs.

Iran's position in medicine among the 147 countries on the ISI's annual list in 2010 was 33. Iran has produced 0.91% of the total number of scientific papers in medicine in 2010. Iranian geneticists managed to give birth to the first cloned calf (Bonyana), the second cloned calf (Tamina), and the second cloned sheep in the world. For more information please visit: <http://www.royaninstitute.org/cmsen>

It is also worth mentioning that Iran is among the only 7 countries in the world which have the technology to medical uses of nuclear power (nuclear medicine, i.e. a branch of medicine and medical imaging that uses radionuclide and relies on the process of radioactive decay).

Iran stands in the 15<sup>th</sup> place in the field of nanotechnology and the 1<sup>st</sup> among the Islamic countries to have the technology. Iran managed to send its own satellite to orbit in 2008. For more information on Omid I please visit: <http://news.bbc.co.uk/2/hi/7866357.stm>

Iranian scientists have managed to produce close to 1% of total science in 2009 which is equal to 17,000 scientific papers out of 1,670,000 total papers produced worldwide.

This figure was 0.5% at the end of 2007, 0.7% at the end of 2008 and 0.8% at the end of 2009. It has been set to reach to up to 2% of the total scientific records up to the end of the 5<sup>th</sup> Development Plan(2014) (Figure.6) ("Table of contributions Iran from science of global production," 2010).

Year	The Percentage of Iran Share from World Science Production
2005	0.3
2006	0.4
2007	0.5
2008	0.7
2009	0.8
2010	1

**Fig.6** The Percentage of Iran Share from World Science Production

Firooz Bakhtiari Nejad, General Manager Research in the Ministry of Science Research and Technology believes that the average percentage of scientific development in Iran at the end of 2014 has been 26%, which is 13 times as much as the global average and it is projected that this figure will approach better results in the years to come.



