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CULTURE OF RESEARCH AND INNOVATION: IMPERATIVE FOR INDIA TO BECOME GLOBAL LEADER

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ABSTRACT

Developing countries that aspire to become emerging economies and eventually advanced countries have to use all the options available to them to improve their technological performance. It is in their interest to adopt relevant techniques from existing best practice being used abroad for some areas of high-technology activity. At the same time, countries will expend effort and resources in developing their domestic innovation systems. Developing countries increasingly design policies intended to increase their innovation capacity. Innovation policies have taken different forms, depending on countries' perceived needs; their impact has also varied across countries at similar levels of development. Certain developing countries have managed to continually improve their innovation inputs and outputs. Others still struggle. Innovation is gaining prominence in all kinds of economic activity around the world. Not only advanced economies but also developing nations are finding that innovation is one of the main drivers of economic growth. This renewed understanding of the significance of innovation is having a growing impact on the course of policy formulation in many countries. A closer look suggests that developing nations are no longer lagging behind high-income ones in their efforts to introduce policies that will increase their innovation capacity. On the contrary, in many cases developing nations are taking the lead in embracing innovation to boost their industrial and economic growth.

The present paper examines the trends in IPR & India's standing in world in terms of global Research and Innovation. The paper studies the leading countries in Research and Innovation.

The paper also shows India's ranking in innovation on various parameters. At the end paper examines the reasons of India's lagging behind in innovation and also suggests some recommendations to drive innovation in India.

KEYWORDS— Global Innovation Index, Research and Innovation, Patents, Trade Marks

I. INTRODUCTION:

Innovation is a driver of national competitive advantage, and ultimately the individual is the primary source of innovation. Therefore, connecting human development and government intervention becomes a crucial task in supporting growth strategies. Inspiration for innovation usually stems from a combination of three factors: an urgent and pressing need to bring about a change; how people perceive and pursue that change till the end; and a congenial environment to accomplish that change.

Innovation is always driven by self-induced passion, pressure of compelling circumstances and undying perseverance for achievement. The assiduous application of technological improvement in transport and communication worldwide has created an unprecedented growth in global connectivity and transmission of information. Globalisation itself is a product of innovation.

The pace of economic and industrial progress is directly proportional to the efforts made towards research and development (R&D), which acts as a reliable measure of innovative capacity. R&D spend in India has grown to 0.9% of the country's GDP. More needs to be done to match the government's target of achieving R&D expenditure of 2% of GDP, as this will also help the nation in increasing the manufacturing base under the Make in India program.

OBJECTIVE:

The study has been geared to achieve the following objectives;

1. To study the organizational Structure of CGPDTM
2. To examine the trends in Intellectual Property Rights (IPR)
3. To understand the detailed concept of Global Innovation Index & its Ranking Parameters.
4. To study the India's ranking in Global Innovation and on various innovation parameters.
5. To study the top countries by Research and Developments Spending
6. To examine the reasons of India's lagging behind in Research & Innovation.

RESEARCH METHODOLOGY:

The research paper is an attempt of exploratory research, based on the secondary data sourced from various journals, magazines, articles and the websites. Available secondary data was extensively used for the study.

ADMINISTRATION OF INTELLECTUAL PROPERT RIGHTS IN INDIA:

Intellectual Property is an essential component for the development of a country. Intellectual Property Rights confer exclusive rights on creators and inventors who contribute to the betterment of the society through their creations in different fields of knowledge. The Intellectual Property systems not only boost the collective knowledge of the society but also escalate their dissemination. In the past few decades, the Indian IPR ecosystem underwent radical transformation. In order to cope with the challenges, IP offices in India have been modernized by augmenting their infrastructure in terms of human resources and technology up gradation. Information dissemination is an extremely important and indispensable component for Intellectual Property Rights system and today's tech-savvy world demands appropriate transparency in the areas of public governance. In conformity with this demand innovation changes have been brought in the IPR systems so as to ensure transparency.

The Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM) is a subordinate office of the Department of Industrial Policy and Promotion (DIPP) under the Ministry of Commerce and Industry, Government of India. The office administered the laws relating to Patents, Design, Trade Marks and Geographical Indications in an effective manner to create an environment of just and balanced IP eco-system in the country. The Patent Information System and the Rajiv Gandhi National Institute of Intellectual Property Management (RGNIIPM) at Nagpur are also under the administrative control of CGPDTM.

CONTROLLER GENERAL OF PATENTS, DESIGNS, AND TRADE MARKS:

The Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM) is located at Mumbai. The Head Office of the Patent office is at Kolkata and its Branch offices are located at Chennai, New Delhi and Mumbai. The Trade Marks registry is at Mumbai and its Branches are located in Kolkata, Chennai, Ahmadabad and New Delhi. The Design Office is located at Kolkata in the Patent Office. The Offices of The Patent Information System (PIS) and National

Institute of Intellectual Property Management (NIIPM) are at Nagpur. The Controller General supervises the working of the Patents Act, 1970, as amended, the Designs Act, 2000 and the Trade Marks Act, 1999 and also renders advice to the Government on matters relating to these subjects. In order to protect the Geographical Indications of goods a Geographical Indications Registry has been established in Chennai to administer the Geographical Indications of Goods (Registration and Protection) Act, 1999 under the CGPDTM.

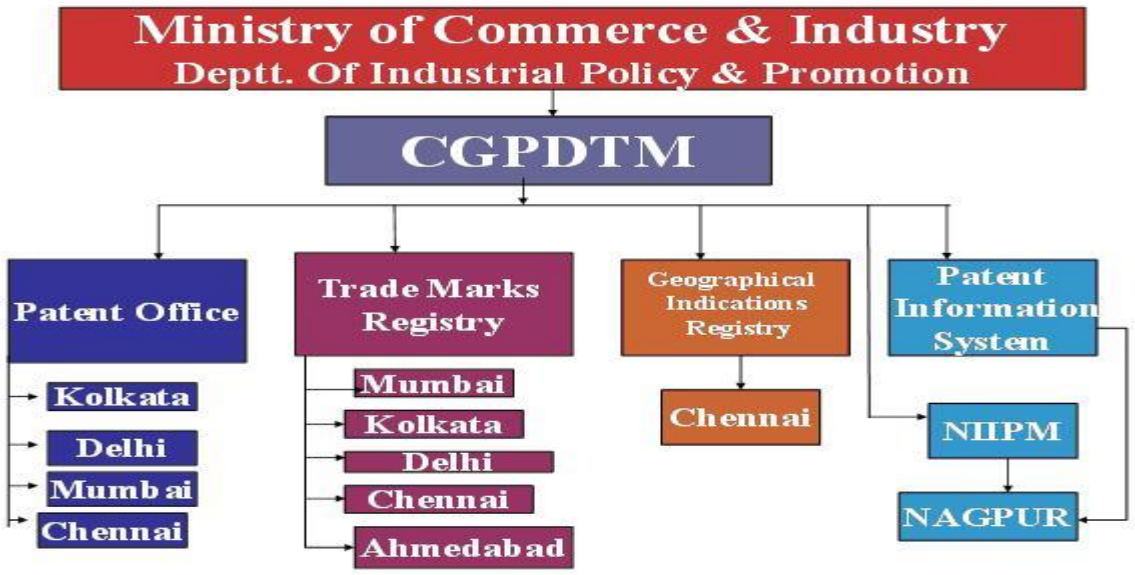

Figure 1: Organisation Structure of CGPDTM

Source: http://www.ipindia.nic.in/

TRENDS IN IPR-AT A GLANCE:

The Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM) have witnessed an overall increase of around 2.16 % in filing of intellectual property applications during reporting year 2013-14 compared to previous year.

Application	2009-10	2010-11	2011-12	2012-13	2013-14
Patent	34,287	39,400	43,197	43,674	42,951
Design	6,092	7,589	8,373	8,337	8,533
Trade mark	1,41,943	1,79,317	1,83,588	1,94,216	2,00,005
Geographical Indication	40	27	148	24	75
Total	**1,82,362**	**2,26,333**	**2,35,306**	**2,46,251**	**2,51,564**

Table 1: Trend in IPR

Source: Annual Report of Controller General of Patents, Designs, Trademarks

A. PATENTS:

During year 2013-14, 42,951 patent applications were filed. The office witnessed a marginal decrease of 1.65% in filing as compared to the previous year. A patent application is treated as examined in reporting year if the first examination report has been issued by the office during the year. Disposal includes granted, refused and abandoned applications.

Trends in Patent Applications

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Filed	34,287	39,400	43,197	43,674	42,951
Examined	6,069	11,208	11,031	12,268	18,615
Granted	6,168	7,509	4,381	4,126	4,227
Disposal of request for examination (granted + refused + abandoned)	11,339	12,851	8,488	9,027	11,411

Table 2: Trend in Patent Applications

B. DESIGNS:

During the year, 8533 design applications were filed, which showed a slight increase of 2.35% as compared to last year. The number of design applications examined also increased to 7,281 in 2013-14. 7,178 designs were registered during the year as compared to 7,252 during 2012-13.

Trends in Design Applications

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Filed	6,092	7,589	8,373	8,337	8,533
Examined	6,266	6,277	6,511	6,776	7,281
Registered	6,025	9,206	6,590	7,252	7,178
Disposal of Applications	6,045	9,221	6,705	7,300	7,226

Table 3: Trend in Design Applications

C. TRADEMARKS:

In the year 2013-14, 2, 00,005 trademark applications were filed. As compared to the previous year there was an increase of about 2.98% in the filing. 2, 03,086 applications were examined and 67,876 trademarks were registered during the year.

Trends in Trade Marks Applications

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Filed	1,41,943	1,79,317	1,83,588	1,94,216	2,00,005
Examined	25,875	2,05,065	1,16,263	2,02,385	2,03,086
Registered	67,490	1,15,472	51,735	44,361	67,876
Disposal of Applications	76,310	1,32,507	57,867	69,736	1,04,756

Table 4: Trend in Trade Marks Applications

D.GEOGRAPHICAL INDICATIONS:

Since 15th September 2003, a total no. of 479 applications has been received till March 2014. In the year 2013-14, 75 applications were filed and a total number of 22 Geographical Indications were registered.

Trends in Geographical Indication Applications

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Filed	40	27	148	24	75
Examined	46	32	37	30	42
Registered	14	29	23	21	22

Table 5: Trend in Geographical Indication Applications

E. TRENDS OF IPRs GRANTED/REGISTERED:

A comparative trend of IPRs granted/registered during the year 2009-10 to 2013-14 is given below. The figures in brackets give the total disposal comprising granted refused and abandoned applications.

Comparative Trends of IPRs granted/registered (and disposed)

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Patents	6,168 (11,339)	7,509 (12,851)	4,381 (8,488)	4,126 (9,027)	**4,227 (11,410)**
Designs	6,025 (6,045)	9,206 (9,221)	6,590 (6,705)	7,252 (7,300)	**7,178 (7,226)**
Trade Marks	67,490(76,310)	1,15,472 (1,32,507)	51,735 (57,867)	44,361(69,736)	**67,876 (1,04,756)**
Geographical Indication	14	29	23	21	**22**

Table 6: Trend of IPRs Granted/Registered

TOP INDIAN APPLICANTS FOR PATENTS FROM SCIENTIFIC AND RESEARCH DEVELOPMENT ORGANISATIONS:

Top Indian applicants for patents from scientific & research development organisation are;

Sl. No.	Name of Scientific and Research & Development Organization.	Applications filed
1.	COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH	267
2.	DEFENCE RESEARCH & DEVELOPMENT ORGANISATION	116
3.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH	71
4.	DEPARTMENT OF BIOTECHNOLOGY, GOVERNMENT OF INDIA	34
5.	JUBILANT LIFE SCIENCES LIMITED	29
6.	G H R LABS AND RESEARCH CENTRE	26
7.	HETERO RESEARCH FOUNDATION	17
8.	CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING	17
9.	INDIAN COUNCIL OF MEDICAL RESEARCH	14
10.	INDIAN SPACE RESEARCH ORGANIZATION	12

Table 7: Top Indian applicants for patents

TOP 10 INDIAN APPLICANTS FOR PATENTS FROM INSTITUTES/UNIVERSITIES:

Sl. No.	Name of Institute/University	Applications filed
1	INDIAN INSTITUTE OF TECHNOLOGY (Collective)	342
2	AMITY UNIVERSITY	92
3	SAVEETHA SCHOOL OF ENGINEERING, SAVEETHA UNIVERSITY	74
4	BHARATH UNIVERSITY	37
5	INDIAN INSTITUTE OF SCIENCE	32
6	G. H. RAISONI COLLEGE Of ENGINEERING	27
7	SIDDAGANGA INSTITUTE Of TECHNOLOGY	24
8	SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCE AND TECHNOLOGY	20
9	UNIVERSITY OF CALCUTTA	15
10	SASTRA UNIVERSITY	13

Table 8: Top 10 Indian Applicants for Patents from Institutes/Universities

TOP 5 INDIAN PATENTEES:

Sl. NO.	Name of Organization	Patents granted
1	COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH	98
2	SAMSUNG INDIA SOFTWARE OPERATIONS PVT.LTD	84
3	HINDUSTAN UNILEVER LIMITED	32
4	BHARAT HEAVY ELECTRICALS LIMITED	22
5	TATA MOTORS LIMITED	21

Table 9: Top 5 Indian Patentees

ABOUT THE GLOBAL INNOVATION INDEX:

The Global Innovation Index 2015 (GII), in its 8th edition in September 2015, is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO, an agency of the United Nations). The core of the GII Report consists of a ranking of world economies' innovation capabilities and results.

Over the last eight years, the GII has established itself as a leading reference on innovation. Understanding in more detail the human aspects behind innovation is essential for the design of policies that help promote economic development and richer innovation-prone environments locally. Recognizing the key role of innovation as a driver of economic growth and prosperity, and the need for a broad horizontal vision of innovation applicable to developed and emerging economies, the GII includes indicators that go beyond the traditional measures of innovation such as the level of research and development.

GLOBAL INNOVATION INDEX 2015:

The Global Innovation Index (GII) aims to capture the multi-dimensional facets of innovation and provide the tools that can assist in tailoring policies to promote long-term output growth, improved productivity, and job growth. The GII helps to create an environment in which innovation factors are continually evaluated. It provides a key tool and a rich database of detailed metrics for 141 economies this year, which represent 95.1% of the world's population and 98.6% of global GDP. The key findings from GII states that Switzerland, the United Kingdom (UK), Sweden, the Netherlands, and the United States of America (USA) are the world's five most-

innovative nations; at the same time, China, Malaysia, Viet Nam, India, Jordan, Kenya, Uganda, and a group of other countries are outpacing their economic peers in 2015.

GLOBAL INNOVATION INDEX'S CONCEPTUAL FRAMEWORK:

The Global Innovation Index GII) relies on two sub-indices, the Innovation Input Sub-Index and the Innovation Output Sub-Index, each built around pillars.

Five input pillars capture elements of the national economy that enable innovative activities: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication. Two output pillars capture actual evidence of innovation outputs: (6) Knowledge and technology outputs and (7) Creative outputs.

Each pillar is divided into sub-pillars and each sub-pillar is composed of individual indicators (79 in total). Sub-pillar scores are calculated as the weighted average of individual indicators; pillar scores are calculated as the weighted average of sub-pillar scores. The framework is revised every year in a transparent exercise to improve the way innovation is measured.

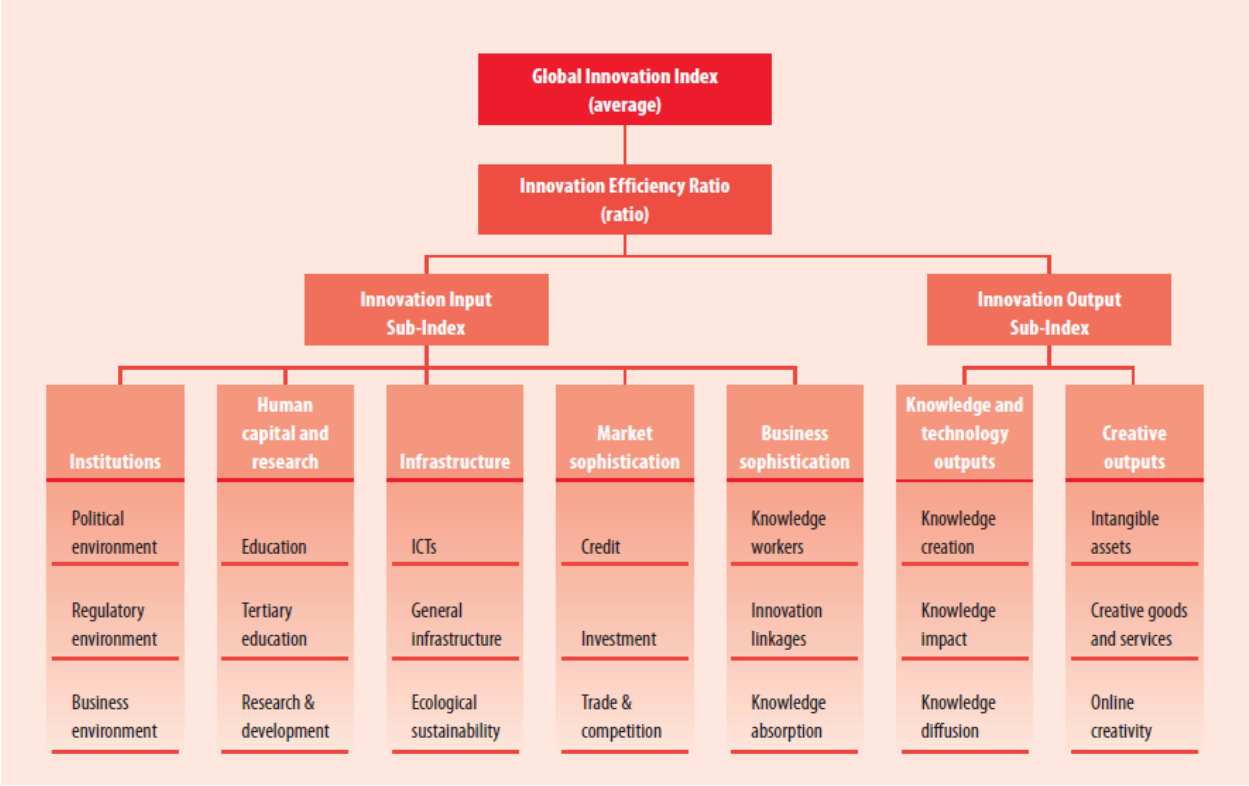

Figure 2: Global Innovation Index Conceptual Framework

Source: www.globalinnovationindex.org

INDIA AND GLOBAL INNOVATION INDEX (GII):

India ranks 81 out of 141 countries on the Global Innovation Index (GII) 2015, well behind middle income countries such as Brazil, China and South Africa. But, in the Central and Southern Asia region, it retains its top stop in the regional ranking, followed by Kazakhstan and Sri Lanka. But Globally, Switzerland, followed by the United Kingdom, Sweden, Netherlands and the US are ranked as the most innovative countries in the world. The GII 2015, released on 17 September 2015, is calculated on the basis of how a country fares on seven key parameters - institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs and creative outputs.

According to the report, top scoring middle income economies, such as China, Brazil and India are closing the gap with the developed world on innovation quality, in large part fuelled by an improvement in the quality of higher education institutions. India, along with China, Malaysia, Vietnam, Jordan, Kenya and Uganda, is part of a group of countries that are outperforming their economic peers, with India being one of the eight economies that can be signaled as innovation achievers outperforming their peers on overall score.

Despite falling five positions in the overall rankings since 2014, India, along with 10 other developing countries, is now categorised as innovation outperformers. But "relative fall in India's overall ranking this year is due to availability of old data up-to 2103-14 period, and it does not truly reflect the performance of the economy in last one year" . The new innovation policies put in place by the new Indian government, which are not yet effectively captured by the data used in the GII. The report says India's strength lies in knowledge diffusion (ranked 34th), research & development (44th), general infrastructure (43rd) and investment (42nd). On innovation quality, it ranks 3rd among middle income countries, behind Brazil.

Figure 3: Global Innovation Index 2015 Ranking

Source: Global Innovation Index 2015

The report notes that this year, the country has made substantial improvements in patents filed. But despite its notable achievements, the report contends that "India still needs to implement substantial reforms in its innovation policy to further improve its innovation performance." The country has consistently "performed poorly during the past four years in political stability, ease of starting a business, tertiary inbound mobility and environmental performance" it adds.

REGIONWISE TOP PERFORMERS:

India, receiving a score of 31.74 (out of 100) ranked 81st of the 141 countries surveyed, 8th amongst 34 Lower-Middle Income Countries, 1st from the 11 Central and South Asian region countries, and 31st out of 141 countries in terms of efficiency ratio.

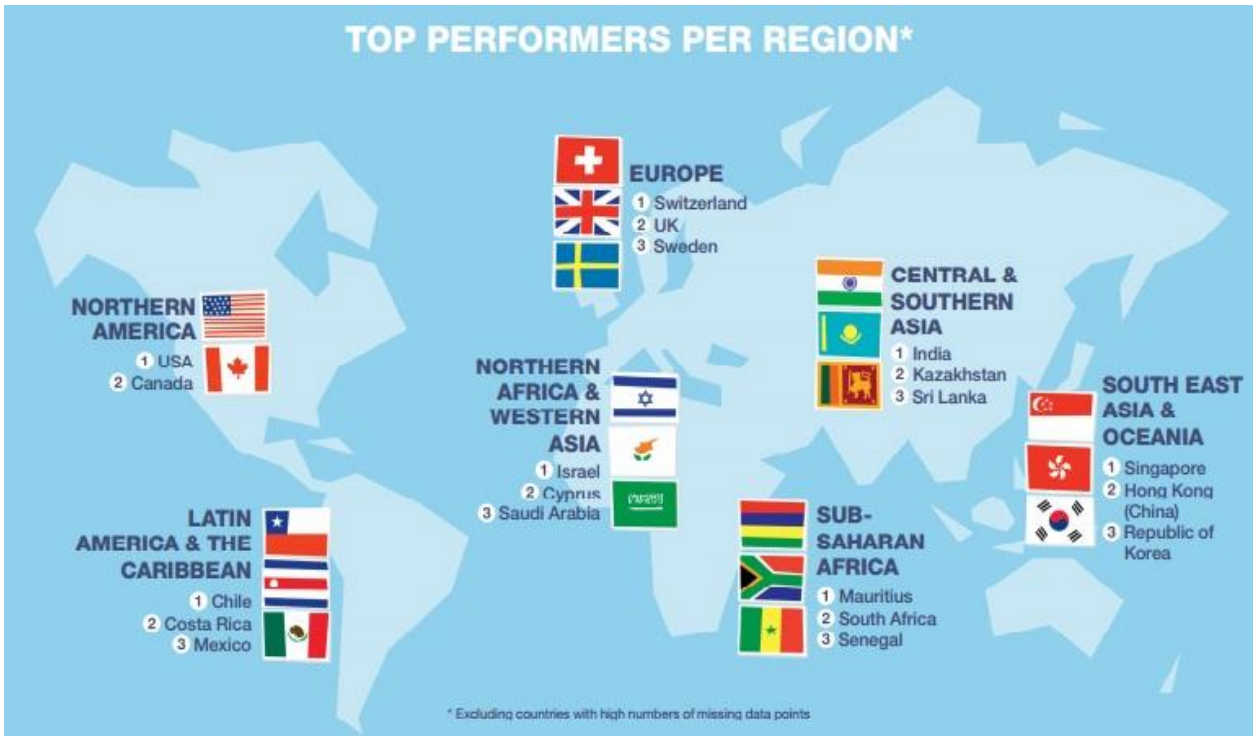

Figure 4: Region Wise Top Performers

Source: www.globalinnovationindex.org

YEAR WISE RANK OF INDIA:

India has been continuously falling in Global Innovation Index. In 2008 India got 23rd Rank out of 107 countries. GII 2015 released in September 2015, saw India ranked a disappointing 81 out of the 141 countries surveyed.

YEAR	2008	2009	2010	2011	2012	2013	2014	2015
RANK (INDIA)	23	41	56	62	64	66	76	81
TOTAL COUNTRIES	107	130	132	125	141	142	143	141

Table 10: Year Wise Rank (India)

Source: www.globalinnovationindex.org

India's poor performance on the ease of doing business is well recorded. The country ranks 130 on the World Bank's Ease of Doing Business. The revised rankings are released in September end, which shed light on the progress made by the country on improving the ease of doing business over the past year. On the innovation sub-indices, the country performs poorly on

institutions (ranked 104th) and infrastructure (87th), with the report noting that its position has deteriorated in human capital and research (103rd), market sophistication (72nd), business sophistication (116th) and creative outputs (95th).

WHERE INDIA STANDS IN GLOBAL RESEARCH AND INNOVATION:

Indian research is hampered by stifling bureaucracy, poor-quality education at most universities and insufficient funding. Successive governments have pledged to increase support for research and development to 2% of India's gross domestic product, but it has remained static at less than 0.9% of GDP since 2005. Here is a position of India in terms of global Research and Innovation;

A. SCIENTIFIC WORKFORCE IN INDIA COMPARED TO COUNTRIES LEADING IN RESEARCH:

The first and foremost challenge that confronts the government is of encouraging enough people to take up research. With barely two lakh researchers, the country of over 1.2 billion people has one of the lowest densities of scientific workforce, ranking even below Chile, Kenya, including the US and UK when it comes to research workforce density in the labour population.

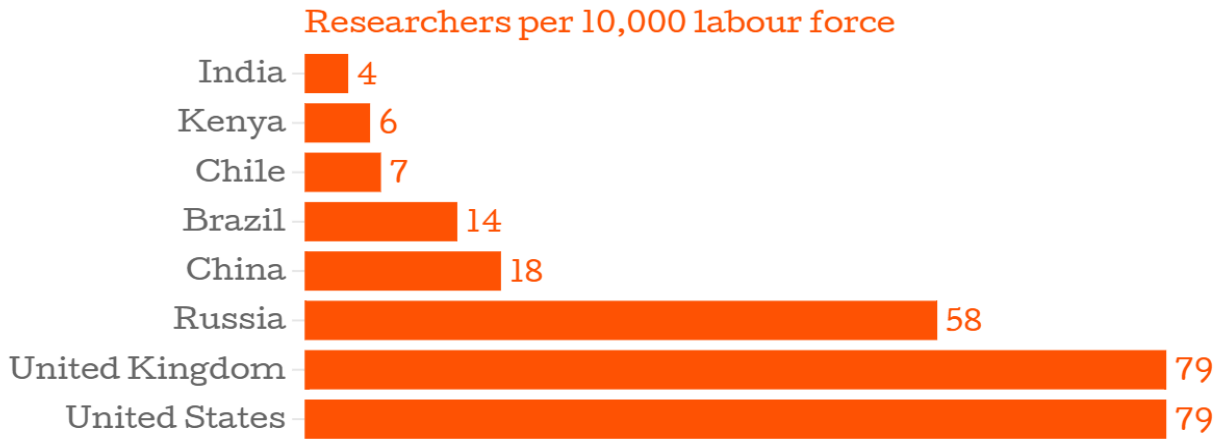

Figure 5: Researchers per 10,000 Labour Forces

Source: Nature Magazine, May 2015

B. DOMESTIC AND FOREIGN PATENT APPLICATIONS FILED IN VARIOUS COUNTRIES:

This has a direct impact on the number of patents and research paper India puts out. India's rate of filing patents is on the rise because of the entry of multinational corporations, but it is measurably low per capita, compared to others. In 2013, South Korea filed over 4,400 patents per one million of population while India could manage only 17.

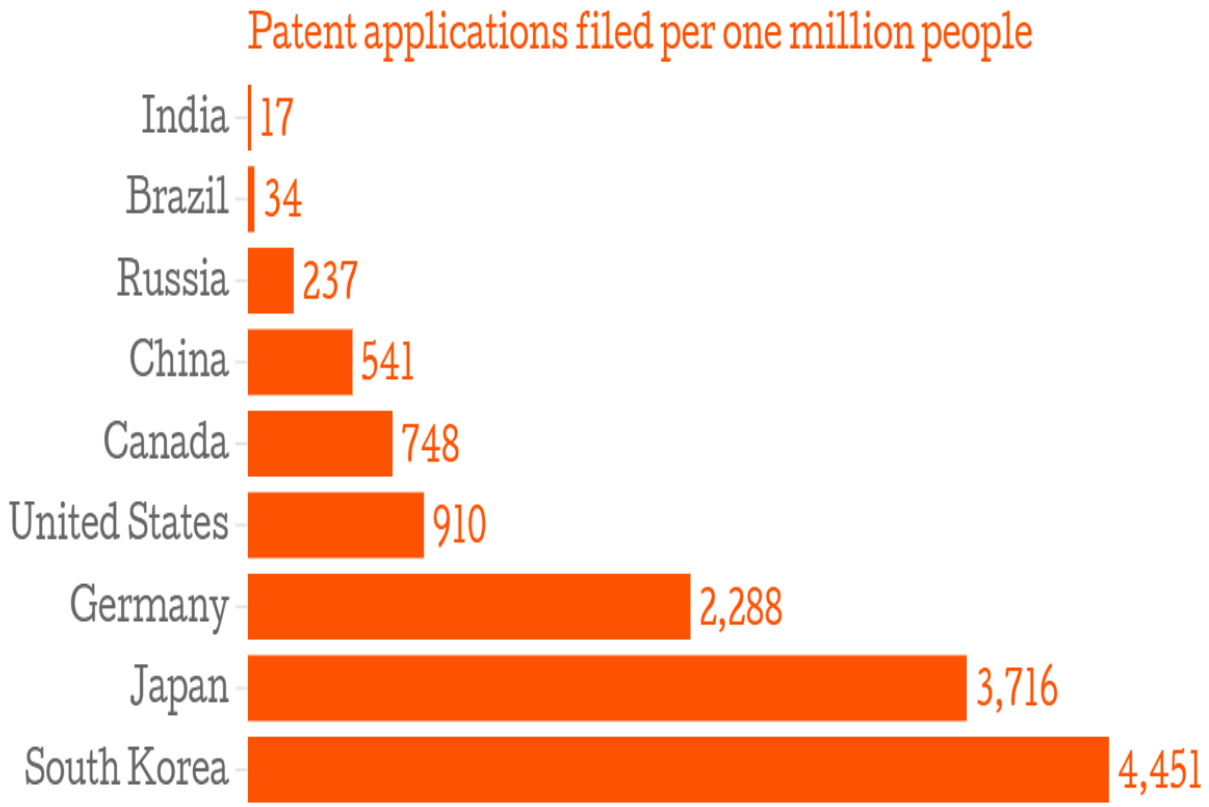

Figure 6: Patent Application Filled Per One Million People

Source: Nature Magazine, May 2015

C. NUMBER OF RESEARCH PAPER PUBLISHED IN 2011:

A report compiled by the consultancy and research firm *EY* had a similar observation about insufficient number of research papers authored by Indian academicians. In 2011, for instance, China's academics published almost five times more research papers as compared to their Indian counterparts.

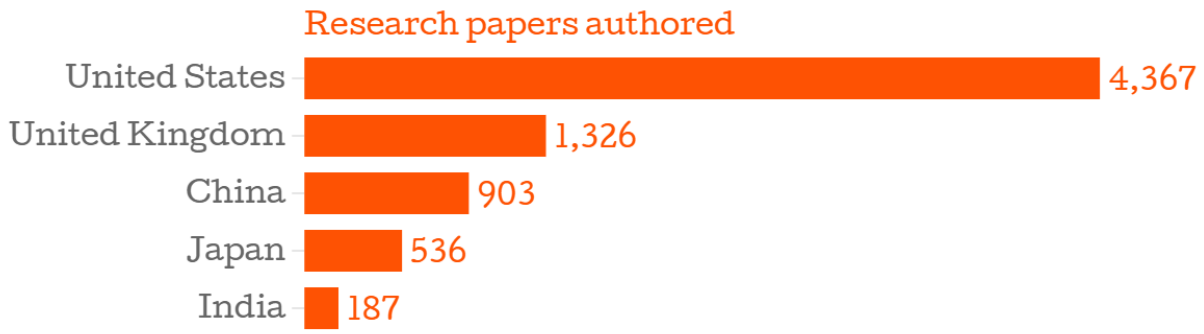

Figure 7: Research Paper Authored

Source: Times Higher Education

D. SPENDING PER RESEARCHER IN VARIOUS COUNTRIES (IN PPP in US$):

It is not that Indian spending is much lower than other countries when it comes to investing in research. Even as the US spends over $3,43,000 per researcher, India manages to spend $1,71,000, which is more than what countries like Pakistan and Spain manage, and almost equal to China's spending of $1,73,000 per researcher.

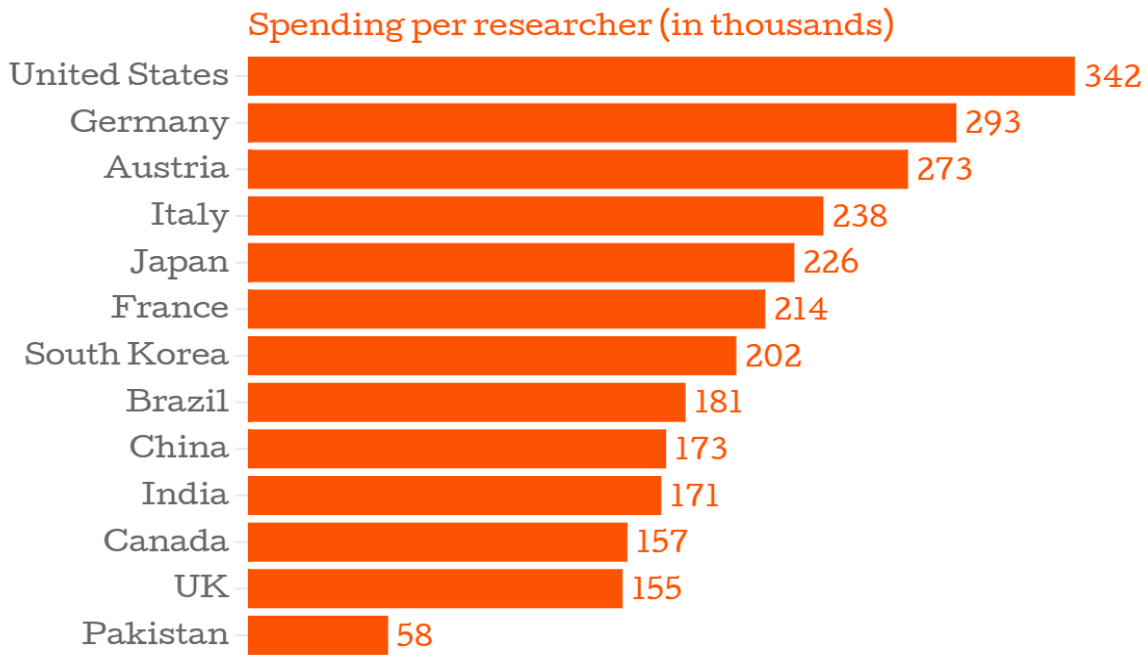

Figure 8: Spending Per Researcher

Source: Nature Magazine, May 2015

E. SCOLARLY IMPACT OF RESEARCH PUBLICATIONS (2007-2011):

However, this doesn't necessarily translate into quality research as the *Nature* magazine highlighted. Even though India's scholarly output has quadrupled since the year 2000, the rate has been surpassed by the likes of Brazil and China. At the same time, India's scholarly impact, measured by the number of times papers from the country are cited in other research work, was 30% below the world average in the year 2013.

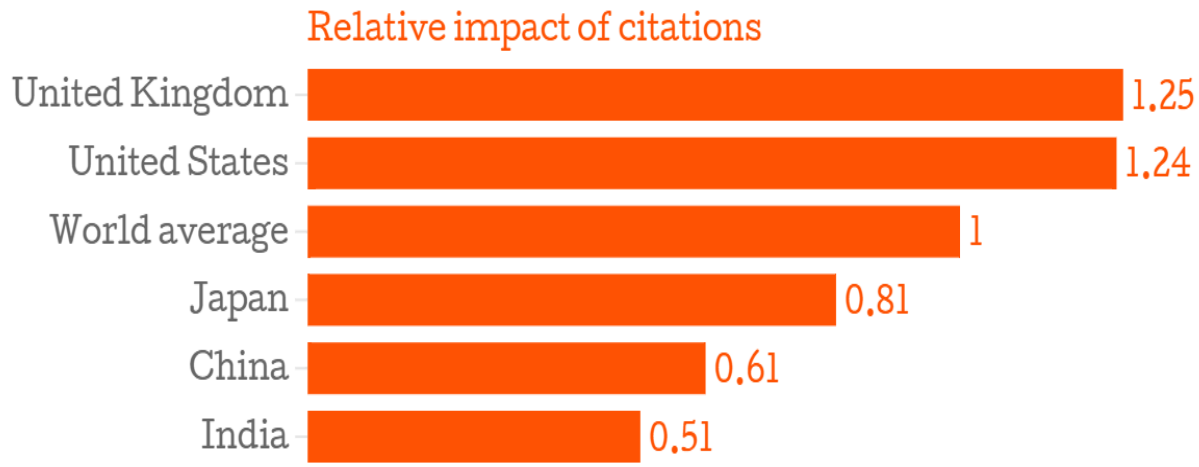

Figure 9: Relative Impact of Citation

Source: Data compiled by EY, 2013

All is not lost, however, as the magazine lauded the world class research centers that India possesses the investment in Research and Development flowing in from the businesses and an increasing share of women in obtaining research degrees and grants.

Commending the government for taking some steps in the right direction, the magazine noted that much more needs to be done. "India must tackle the bureaucratic morass that is impeding research and innovation. Scientists complain that funds for grants routinely arrive months late and that it can take years to fill positions," it noted.

TOP 10 COUNTRIES BY RESEARCH AND DEVELOPMENT SPENDING:

Research and development is the bedrock of innovation. A big investment in R&D indicates a thriving and entrepreneurial industrial spirit. This is the list of countries by research and development (R&D) spending in real terms and as per latest data available.

Rank	Country/ Region	Expenditures on R&D (billions of US$, PPP)	% of GDP PPP	Expenditures on R&D per capita (US$ PPP),	Year
1	US	405.3	2.7%	1,275.64	2011
2	China	337.5	2.08%	248.16	2013
3	Japan	160.3	3.67%	1,260.42	2011
4	Germany	69.5	2.3%	861.04	2011
5	South Korea	65.4	4.36%	1,307.90	2012
6	India	44	0.9%	37	2013
7	France	42.2	1.9%	640.91	2011
8	UK	38.4	1.7%	602.78	2011
9	Russia	32.8	1.0%	240.62	2013
10	Canada	24.3	1.8%	688.47	2011

Table 11: Expenditure on R&D

Source: Global Innovation Index

According to data US and China leads the table in spending on Research and Development in terms of PPP. But when we talks in terms of GDP South Korea tops the list with 4.36% followed

by Israel 4.2%, Japan 3.67%, Sweden 3.3%, Finland 3.1%, US 2.7% and Austria with 2.5 % of GDP. India spends only 0.95% of its GDP on Research and Developments. This figure is far behind from its competitors.

AREAS OF INDIAN PATENTS:

India has registered most of its patents in Chemistry with total no. of 2998 patent rights followed by Mechanical Engineering, Pharmaceuticals, Engineering and Electronics.

AREAS OF PAPETNTS	TOTAL NO. OF PATENTS
Chemistry	2998
Mechanical Engineering	2080
Pharmaceuticals	997
Engineering	967
Electronics	539

Table 12: Areas of Indian Patents

Source: Controller General of Patents, Designs, Trademarks

While India's continually dropping rank ought to raise some cause for worry, it is interesting to note that the Report refers to India as an "Innovation Achiever" a term they use to describe economies that are performing at least 10% better than their peers for their level of GDP. India also is ranked 3rd for "Innovation Quality" amongst Middle Income Countries, behind China and Brazil.

CHALLENGES OR WHY INDIA LAGS BEHIND IN RESEARCH & INNOVATION:

Despite high-profile successes such as the Mars mission, and its well-known prowess in IT, India lags badly in technological research and development. This is because of following reasons:

A. **Inadequate funding of R&D:** India is spending only 0.95% of GDP on R&D. Which is far less than its competitors especially if we compare ourselves to the US, China and Brazil.

B. **Lack of vision and financial support** has ensured prototypes created by students remain on paper. As a result, the famed Indian ingenuity only goes for making money.

C. **Non-conducive education system:** The general education system is still too focused on grades and careers and is not oriented toward innovation and entrepreneurship.

D. **Brain- Drain**: According to National Science Foundation 29.6 Lakh Asian Scientists and Engineer has already moved to settle down in America. Out of that 32%, it means 9.5 Lakh people are of Indian Origin. According to Payscale.com, on an average a researcher gets 2.5 Lakh annual salaries in India. This is 22% below than the average salary of IT and Engineer Professionals.

E. **Inadequate Infrastructure:** One of the major reasons of lagging behind is Lack of infrastructure in India. We import technology from outside and try to convert it according to Indigenous situation. We should develop our own technology based on specific needs of country.

F. **Inadequate protection of intellectual property rights (IPR):** In India, the intellectual property regime is weak. Innovators do not generally seek protection for their intellectual property unless forced to. For most entrepreneurs, patents and other forms of protection take too long and cost too much. Patent literacy is very low, even among educated innovators, and there is a lack of expert help available, except in the medicine and pharmaceutical industry. Therefore India lags behind from most countries in terms of annual patent filing.

G. **Risk aversion among entrepreneurs**: Indian entrepreneurs often seek established technology as a basis for starting their business; they are hesitant to take on innovative ideas because of the risks involved

H. **Difficult and lengthy funding procedures** is a big issue in Research and Innovation.

RECOMMENDATIONS TO DRIVE INNOVATION IN INDIA:

The Government of India declared 2010-20 as the "Decade of Innovation", for which the responsibility of preparing roadmap is on National Innovation Council. The National Innovation Council is "the first step in creating a crosscutting system which will provide mutually reinforcing policies, recommendations and methodologies to implement and boost innovation performance in the country". In light of the above study, the following are suggested as the primary areas in which government needs to carefully and deliberately formulate robust policy measures to achieve economic growth driven by innovation:

Higher Education: The progress of the nation depends on its sustained growth of education and research in science and technology. To meet the objective, our research should bear international comparison in terms of standards of attainment. A major weakness of Indian education and research is the relatively very small part played by the universities in the sum total of Indian research. The government can take several steps to encourage research and innovations in the universities. The government needs to devise a suitable policy for the higher education sector.

Entrepreneurship: Policy concerning entrepreneurship at the national and provincial level needs to be formulated to stimulate this process, which is currently nonexistent.

Industrial Innovation: In order to infuse a culture of innovation and R&D into Indian SMEs, proper fiscal and tax guidelines must be set by the government so that more and more SMEs see benefit in R&D and adopt this as their future business strategy.

Ease of Doing Business: India ranks poorly in terms of its ease of doing business parameters. This can be achieved only through policy-level amendments.

Infrastructure development: Although IT infrastructure in the country has improved by leaps and bounds over the years, the scenario in the physical infrastructure development remains grim. Clear policy guidelines and investment in these sectors will boost the economy and trigger new innovative solutions for existing bottlenecks.

Intellectual Property Rights (IPR): The existing IPR regime in India has traditionally been weak when compared with that of developed economies in terms of protecting new technologies and innovations. India cannot afford to allow a weak IPR regime to remain a long-term barrier for its new entrepreneurs if it intends to fulfill its aspirations of becoming an innovation-driven economy.

Other Areas: Promotion of research in liberal arts and social sciences, including inter-disciplinary research is significant too. The government needs to increase its allocations for R&D activities. At the institutional level, there is a need to link teaching with research. The government needs to invest in faculty development and provide incentives for research, promote collaborative efforts between institutions in research. The government must find ways to study and address this important driver of innovation while restructuring its existing laws and its enforcements.

CONCLUSION:

India is a lower-middle-income economy in Central and Southern Asia with more than 1.2 billion people and an economy of $1.8 trillion GDP in absolute terms for 2014, and according to Global Innovation Index (GII) ranking for last four consecutive years, has been an outperformer in its peer group in terms of its innovation capacity. For India to emerge as a successful innovation hub, and for Indian innovation to impact the world in a great way, we need to look beyond the Silicon Valley model of innovation. Many of India's problems are unique and require specific innovation and invention for Indian needs. Force fitting product developed for a European, Japanese or American customer feels like fitting a square peg into a round hole. We have already seen the successes of companies such as Micromax based initially on the dual-SIM mobile phone. Indians can spawn hundreds of Micromaxes to meet the unique needs of Indian consumers and companies. I believe that India needs product innovation across all major sectors from consumer products, to transportation, to energy, to agriculture, to water resources. Innovation can lift hundreds of millions of Indians out from poverty and can also add to the wealth of millions of professionals whose intellectual accomplishments are on par with their western peers.

Most importantly the Indian entrepreneur needs freedom and support, which means, he or she must have the freedom to construct and choose from a set of entrepreneurial and innovation models—both from the West and from India, and if necessary, from elsewhere. Restriction of business models to geographic regions or definitional paradigms or innovation ideologies is anathema to progress. Like the Upanishads say, "Let good thoughts come to us from all sides." That is true freedom—intellectually, entrepreneurially. The Indian government has made appropriate reforms to induce innovations. The introduction of "The Science, Technology and Innovation Policy 2013" is a big step in this right direction.

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