The Comparative Study of the Chinese Innovative R&D Techniques

Lokesh Pattnaik
College of engineering & Technology, Bhubaneswar

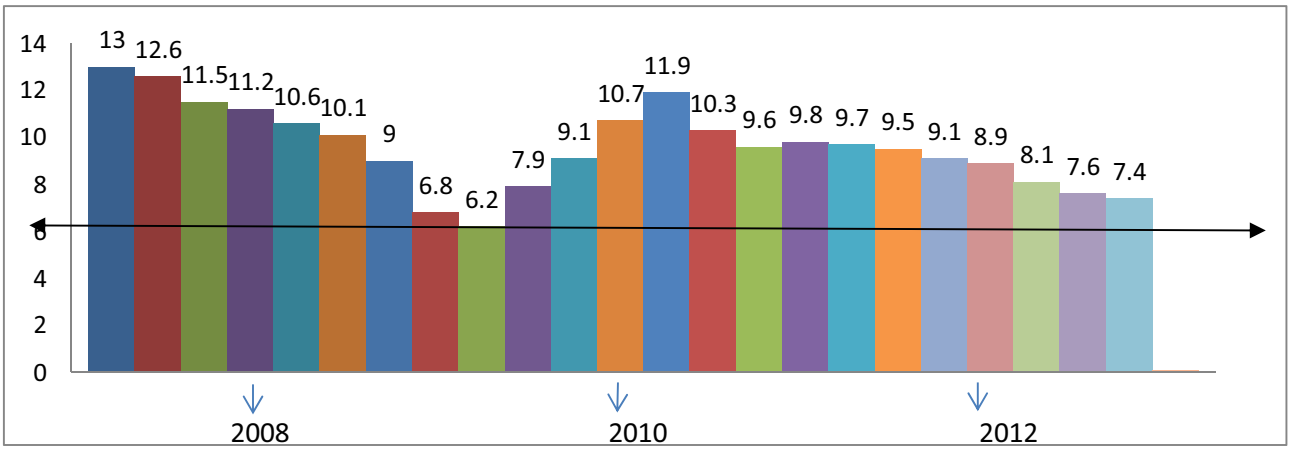
Abstract - The motto of this paper is to make comparative descriptions about on R&D in Chinese industries with American, Japan & Indian industries. The paper needs to be come out because of rapid growth of Chinese R&D and GDP. There was a wrong philosophy which is no more about on Chinese products that it is cheap, beautiful & strong for short period of time. But Chinese always wants to be diversity in their products and sell the products with the market value which make the Chinese more success. Measured in terms of purchasing power parity (PPP), China's R&D expenditure reached nearly $200 billion in 2012, almost twice the level of spending in 2008. China's spending on this account has registered double-digit increases over the past few years and indications are that its spending in 2013 will rise by 12% on the heels of an 11% increase in 2012. Owing to this frenetic increase, China is expected to spend more than 52% of the planned US spending on R&D in 2013.

I. INRODUCTION

This paper gives the analytical descriptions about Chinese innovative R&D techniques with U.S, JAPANESE & INDIAN R&D and why the Chinese GDP growth is higher than respective countries. This can be comparison broadly with some distinguished following points.

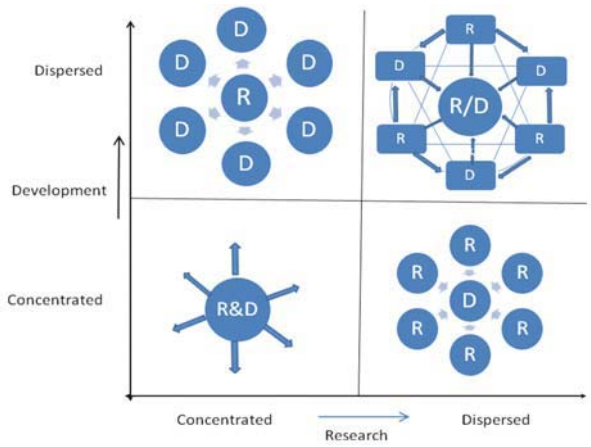
1. R&D approaches 2. Publication of research papers 3. R&D centers 4. Adaptation 5. Problems, 6. Spending on R&D, 7. Thinking's, 8. Finding and Conclusion.

R&D Approaches in China



Annual Growth Rate of Chinese GDP (Percent Change in Gross Domestic Product)

The figure shows the GDP growth is 7.9 at the end of 2013, which is comparatively higher than other countries. If we consider currency has risen around 25% in real term compared with U.S. It is the second largest economic country in 2012. In 2008 world gone through big crises, in this case china invented its own centralized R&D process and independent R&D, which helps the Chinese industries to overcome from that period of time.



Four categories of R&D configuration in China

These two dimensions lead to four categories of R&D configuration in China (Figure):
1. Concentrated (focus one's attention) research and development;
2. Dispersed (in different direction) research and concentrated development;
3. Concentrated research and dispersed development;
4. Dispersed research and development.

(Sources- Research on Collaborative Innovation System of Automobile Manufacturing, IEEE JOURNAL, MAO Zhaofang1,2, WANG Gang2, LI Xiaomei* School of Management, Tianjin University, Tianjin, CHINA)

R&D Approaches in U.S

The report of battle said that R&D returns to the U.S economy are "likely highest when the research is both generated and used within U.S". Return on investment being 45% which is minor of respondents, that is significant increases over couple of years and becomes 51%.

R&D Approaches in JAPANESE

Japan makes low interest loans for public financial institution for "financing and developing new technology". Some direct subsidies from the government, public corporation and special R&D tax deduction.

R&D Approaches in INDIAN

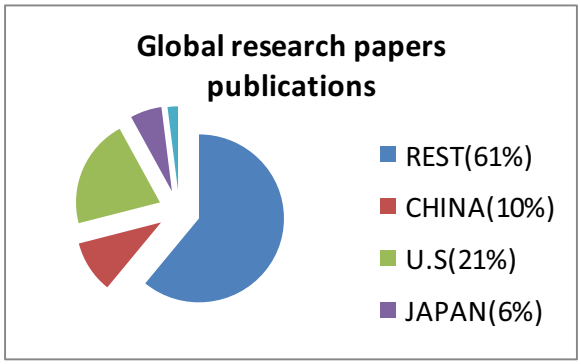
Recently the in-house R&D method is following by the Indian industries. India gone through a problem called underinvestment. To solve this problem we need to follow two ways

(i) Increasing the profits by innovation.

(ii)By undertaking R&D in areas where the private sector underinvestment

(Source: Sunil Mani, center for development studies)

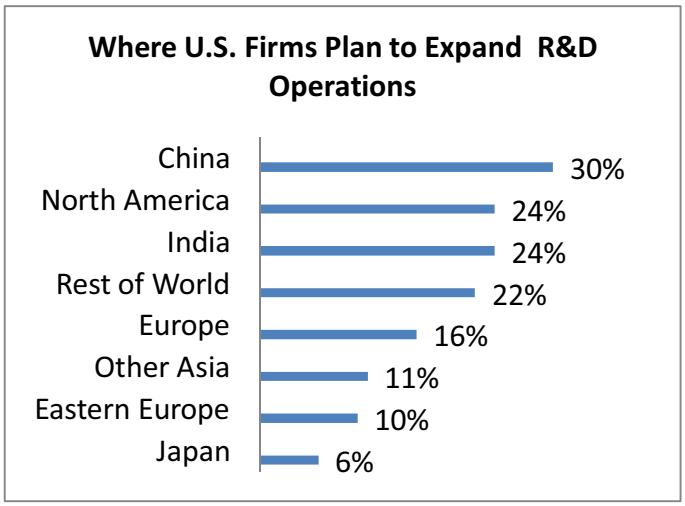
Publication of research papers

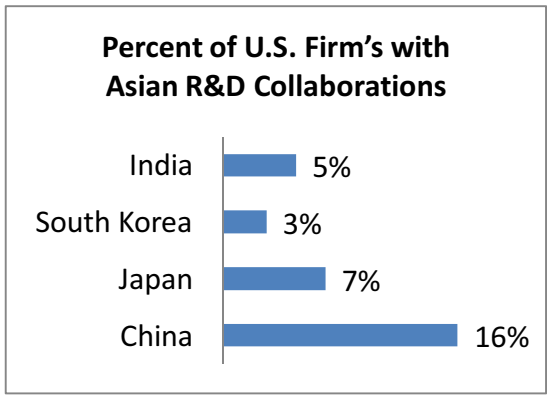


R&D centers in China

Over 300 foreign R&D centers have been established in China. Huewi has built up a global infrastructure that consists of more than 30,000 R&D employees; R&D centers Dallas, Banglore, Moscow and stockholm and established joint ventures with Symantec and Siemens.

R&D centers in U.S





(Source: Batelle, R&D Magazine Survey)

R&D centers in Japan

There is a high scope of R&D centers in Japan is leading with huge demanding places. Foreign companies looking to Japan as a key base of R&D because of political stability, solid infrastructure, world class manufacturer Highest labor skill with 27% followed by China 23%.

(Source: Invest Japan division, Japan external trade organization)

R&D centers in India

Over 1000 R&D spenders already have entered in India. Over 718 (MNC) currently have R&D centers in India. Over 200,000 engineers growing all over the world of India.

(Source: SILICON INDIA MAGAZINE)

PROBLEMS ARISEN IN CHINESE R&D

- Problems in local market for ex-Use of Chinese language computers.

PROBLEMS OF THE INNOVATION SYSTEM MAINLY FOCUS ON:

- Independent innovation system.

- Innovation process management aspect.
- Invest decision aspect.
- Standardization aspect.
- Innovation information systems aspect.

PROBLEMS ARISEN IN U.S R&D

The problem may effect to U.S industries:

- Agility(quick respond to the customer, ex-system performance, operating cost)
- Sustainability(it is the integration of processes, decision-making and the environmental concerns of an active industrial system to achieve economic growth
- Supply chain integration
- Advance manufacturing process
- R&D spendings by U.S department of defense is declined by $2.5billion to $75 billion.

PROBLEMS ARISEN IN Japan R&D

The direct subsidies of industrial R&D is not very good indicator of the magnitude of R&D resources actually put at the disposal of industries by the Govt. of Japan.

PROBLEMS ARISEN IN Indian R&D

The in-house R&D method backed by a number of case studies, that is why firms unable to capture full benefits. Two-third of money comes from Indian Govt. it may lead to decline the GNP growth.

ADDOPTATION IN R&D IN CHINA

The implementation of centralized R&D in the industries to learn foreign advanced experience and focus on integrated innovation capabilities to make independent R&D.

ADDOPTATION IN R&D IN U.S

The integrated R&D that effectively achieves process and personal safety, environmental protection and superior energy will realize faster time to market, excellent asset optimization, these factors determine the leading U.S manufacturing.

ADDOPTATION IN R&D IN Japan

It needs to be increase the private R&D to structural adjustment of economy. Japan industries should look for some soft measures which helps to grow the productivity, these are Relocation of workers, Industries needs to be grow and promoting research associations to help private firms involved in cooperative R&D effect

The major focuses on:

- Adopt existing product
- Develop new product
- Apply research to generate new science

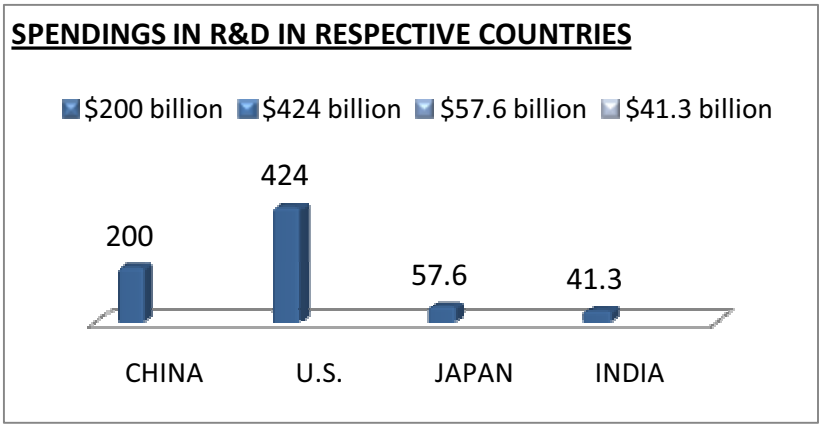
ADDOPTATION IN R&D IN India

- There are two ways to solve the problem a. Increase profit of innovation b. By undertaking R&D in areas where the private sectors is in underinvestment

(Source: Sunil Mani, Center for development studies)

- In the OECD report states that once again brought into focus the positive role of Govt. in promoting industrial R&D & innovation.

(Source: economy policy going to grow OECD report 2011)



- China spends 0.6% on its R&D from GDP.
- U.S R&D spending increases upto 1.6%.
- Japan spends 3.5% on its R&D from GDP.
- India spends 0.85% on its R&D from GDP.

Thinking about On R&D in China

- China to become second largest R&D spender.
- In future it will be the role model in R&D for faster growing countries.

(Source: Lance Whitney, CNET Blog Network author)
The continued expansion of R&D in China is both inspiring in magnitude from a U.S. competitive perspective," Marty Grueber, Battelle Research Leader and co-author of the report, said in a statement. "The Chinese are doing everything in their power to grow and develop through an increasing understanding and emphasis on research and technology.
(Source: Battelle publication & R&D Magazine)
Thinking about On R&D in U.S

With over $400 billion R&D spending from public and private sectors, U.S continues its world leading commitment to innovation as an essential growth.
(Source: Mr. jeffrey wadsworth, president and COE BATTLE the business and information of U.S)

Thinking about On R&D in Japan

Japan's R&D environment also differs somewhat from those in Europe and the United States. "In Japan, at first you start to feel that there are fewer young people with IT knowledge on the job market," Saleck says. "In Europe or the United States, R&D companies look for recent graduates in IT, math or physics and assume certain skills. In Japan, if you hire straight from a university what the person studied is not decisive.
(Source: Axel Henning Saleck, head of SAP Co-Innovation Lab Tokyo)
Thinking about On R&D in India

Today, the company has about 5,500 people working in R&D spread across India and the rest of the world. At any given point in time, there are several R&D projects going on both at the company and inside many global universities, different startup companies, and different vendor partners that Tata has collaborated with across the US, Europe and India.
(Source: Dr. Tim Leverton, the chief of Tata Motors, R&D)
Findinds and conclusion on R&D in China

Chinese industries based on centralized R&D and independent R&D. It is known for innovative ideas for manufacturing product. R&D as a percent of GDP has remained stable over the first 5 years for U.S 2.7%, for Japan 3.2%, China 2% on 2010 & 2.5% in 2020. Economy has grown by 9% to 10%.
Findinds and conclusion on R&D in U.S

National investment in R&D remains strong in the U.S, which helps the U.S industries to grow. The integrated R&D helps to get the investment e stability in the productivity. The highest investment makes the stable the GDP, though it may effect to the GNP.

Findinds and conclusion on R&D in Japan

Japanese customers believe in long term relationship in the enterprises. They develop fundamental technology for key customer than to others. The foreign company like SAP & Du pont can gain a foothold for global market promoting globally competitiveness. It is the adequate place to built industries.

Findinds and conclusion On R&D in Indian

Though industrial production of India is far behind from others, some soft measures show the caliber in R&D, these are regarding to place, it is suitable for R&D. The amount of R&D dedicated in basic research has increased from 20% of total ten years ago to more than 26% now. The in-house R&D centers make the GDP growth to 4.8.

II. FINAL CONCLUSION

Comparatively all countries has some lagging behinds where china has succeed in all departments regarding to place, skill full workers, R&D expenditure, paper published, the process of R&D and in GDP growth.

Therefore, under progressive countries need to follow the Chinese centralized R&D and independent R&D, for which they will improve their productivity and their GDP rate.

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