

## Research and technology, prerequisite for economic growth and improvement (Iran Case Study)

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**Abstract:** Today, the role and position of research and technology in countries development and especially in less developed countries is evident to everybody. It can be said that, one of the main factors of development, self-sufficiency, independency and comprehensive security of each country relates to the rate of its technology and searching, in such a way that policy makers of 4<sup>th</sup> and 5<sup>th</sup> economic, social and cultural Development Plan, have stressed on an approach based on knowledge –based improvement. According to Iranian Documents of 20 years, Iran should reach to a higher position in searching and technology in the Middle East up to 2025. It is evident that this can be achieved just by investment and especial attention to research and technology in the future. So, with regarding to the fast change in the competitive and globalization world, in this article the comparison and statistical analysis of the influential factors on technologies of the 8 Asian selected countries to level of income (high - upper medium - under medium - low) were studied and also Turkey because of the neighborhood situation and similar development Index and France and America in 2008 were also noticed, and finally the empirical procedures for gaining the 1404 goals were presented.

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### 1. Introduction

Each country for development needs more attention to searching and technology. Searching is the basis for scientific development economically, culturally, socially, politically and military. Moreover, it brings scientific localization and independence for the country. Indeed, searching is the basis for evolution, development and promotion of the culture in each country. One of the most important factors on development of the industrial countries is special attention to searching and technology in all the scientific fields and high budgets has been assigned to the research projects. Developing countries for getting free from current situation and gaining the idealistic position have no remedy except for understanding the importance of research and technology and this will be achieved by training capable and eager Human Capitals for researching and also developing and serious reviewing the assigned credits for this sector and also promoting the private sector to enter in this field.( Erik, Arnold, et.al.1988)

Promotion of the research and technology relates to the eager and believes of the researchers and students to it. In this way, noticing to research and technology is a very important case to be studied, because will cause development economically,

socially, culturally and technically. It has been said that both knowledge without practice and practice without knowledge are the pests of the social life. On the other hand, using the research in different parts, permanent development, is an effective factor in development and new technologies revenue operation. So, it is evident that while an economic activity or social has not been established in scientific organizations, there will not been a permanent development. In short, reaching to new technologies will achieve just with research.

#### 1.1. Iran from the development index perspective in development plans

With 73 million people in 2008 Iran has a 17<sup>th</sup> place in the world and according to the UN report in 2008, has the 88<sup>th</sup> place in HDI (Human Development Index). As it has been seen, there is an unreasonable gap between these two indexes and all the governors and people should do their best in improving the research and technology sector in the country and this is not an easy work and has so many problems such as:

1- Deficiency in research credits- research credits and its relation to GDP (Gross Domestic Product) is one of the fixed criterions for evaluating

development index in the world which unfortunately is very less in Iran.

2- Improper distribution of research credits- the research credits between universities and other governmental departments is not distributed properly, in such a way that, the maximum of the research credits has been given to departments which have no professional researchers and do not use scientific potentials in their researches.

3- While the society's necessity is high, fewer researches have been done. 4- There is no organic relationship between society necessities and practical researches and if there is, the result of the researches was not noticed and there are no supports for the researches. The researches seen like an individual activity and have no sign of group and social activity.

5- The research and technology have not been noticed by policy makers and executors in the main country subjects.

6- Low attention of government to the private sector in entering to the research and technology field.

7- Low trust of industry and service sector toward researchers.

In this part, with respect to table No.1, the comparative corporation of development plans from the view point of research budgets in relation to (GERD) and the number of researchers among 1 million people (FTE) which are the influential factors in countries development were presented.

**Table No.1: Iran's first development plan during 1991-1995**

Years	1991	1992	1993	1994	1995
GERD	0/29%	0/30%	0/44%	0/34%	0/27%
FTE	60	97	91	348 <sup>1</sup>	No rate

**Table No.1: the 2<sup>nd</sup> development plan during 1996-2000**

Years	1996	1997	1998	2000
GERD	0/31%	0/29%	0/30%	0/31%
FTE	258	338	245	390

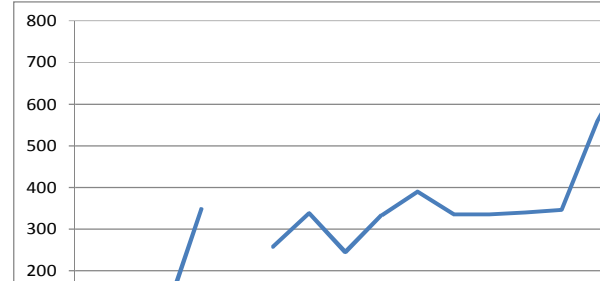
**Table No.1: the 3<sup>rd</sup> development plan during 2001-2005**

Years	2001	2002	2003	2004	2005
GERD	0/38%	0/52%	0/43%	0/54%	0/27%
FTE	336	335	340 <sup>2</sup>	346	560

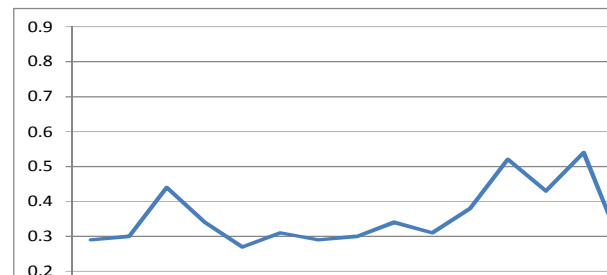
<sup>1</sup> - Since 1994 up to now, the number of researchers among each one million people contains research technicians, too and for the years before 1994, will not contain them.

**Table No.1: the 4<sup>th</sup> development plan during 2006-2008**

Years	2006	2007	2008
GERD	0/46%	0/64%	0/79%
FTE	716	No rate	751



**Chart No 1: The number of researchers between one million people (FTE)**



**Chart No 2: The quota of research and development between GNP (GERD)**

**Table No 2: allotment adjunct accepted GERD & FTE done by UNESCO statistics institution.**

Country situation	the no. of researchers among one million people (FTE)	The quota of research and development among GNP (GERD)
Advanced	More than 10000 peoples	More than 2%
Developed	More than 5000 people	More than 1%
Developing	More than 100 people	More than 0.5%
Backward country	Less than 100 people	less than 0.5%

With regarding to above tables done by UNESCO statistics institution, Iran is regarded as a developing country because of the rate of researches and developments from GNP and the number of researchers among each 1/000/000 persons and this does not suit with its potentials.

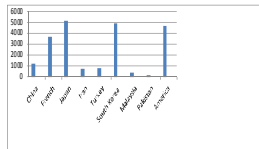
In this case for the 1<sup>st</sup> time for organizing the research and technology management and according to the 5<sup>th</sup> development plan and also for improving research quota to 3% of GDP, the science, research and technology has approved new plans in a force major plan, and assigned some rules for execution

<sup>2</sup> - The rate for year 2003 is the first estimation of macroeconomics office of management organization. And the rate for year 2004 is on the base of growth rate in 2003 relative to 2002.

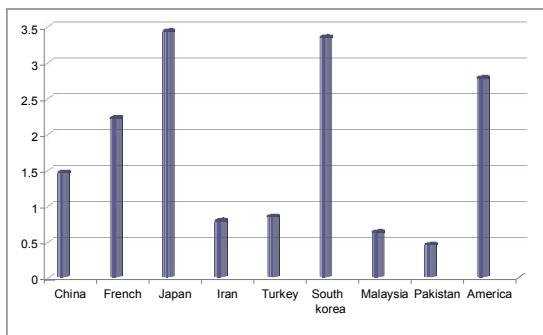
organization to organize the research and technology management up to the end of 2012. And the execution organizations have to develop the research management in some parts in explaining and spending the research budgets.

The influential factors of research and technology in countries development

- 1- The number of researchers among each 1/000/000 persons. (FTE)
- 2- The quota of credits assigned for research and development among GDP. (GERD)
- 3- GDP cost for research and development according to equality in Dollar buying ability.
- 4- GDP cost for research and development according to government operation (Government - business institutions- universities).
- 5- GDP cost for research and development on the basis of capital resource (Government- business institutions- universities).



**Chart No 3: The number of researchers between 1 million people (FTE) in 2008**



**Chart No 4: The quota of research and development between GNP (GERD)**

**2.Conclusion:**

The Iranian research system structure in the past few years have changed the rates of research and development credits quota among GDP, the number of researchers among one million people and the entrance of private sector into research and technology field shows the proper targeting of programmers in the peak of the country programming

pyramid for increasing these indexes for reaching to 2025 target.

But the mismatches of the current situation with pre-determined in Development Plans shows the slow operation of law makers in executing laws.

According to UNESCO statistics in 2008, Iran’s research credit quota among GDP is 0.79% and he index for the number of researchers in one million people is 751, the GDP cost for research and development in commercial is 10.6% and governmental sector is about 56.1% and in universities is 33.3%. These results show:

**Table no.3: effective factors of research and technology on countries development according**

Country	Year	Researchers (FTE)	GERD (%)	Gov. (%)	Private (%)	Univ. (%)	Commercial (%)	Other (%)	Target (%)	
China	2008	1189	1.47%	18.3%	73.3%	8.5%	23.6%	71.7%	6	
Japan	2008	5189	1.48719235	3.43%	8.3%	78.5%	11.4%	15.6%	78.2%	5.1%
Iran	2008	751	643480	0.79%	56.1%	10.6%	33.3%	61.6%	30.9%	7.4%
Turky	2009	804	8679242	0.83%	12.6%	40%	47.4%	34%	41%	20.3%
S. Korea	2008	4947	43904413	3.36%	12.1%	75.4%	11.1%	25.4%	72.9%	1%
Kazakhstan	2008	No rates	417247	0.23%	38.5%	32.7%	15.2%	31.4%	50.7%	14.7%
Malisia	2006	365	2090512	0.63%	5.2%	84.9%	9.9%	2.4%	84.5%	6.6%
Pakistan	2009	162	2045997	0.46%	75%	-	25%	84%	-	12.1%
Tajikistan	2008	No rates	12090	0.09%	86.2%	-	13.8%	82.1%	1.1%	0.6%
France	2008	3690	47942723	2.23%	16.3%	61.9%	20.6%	38.9%	50.7%	1.2%
USA	2007	4673	398194000	2.79%	10.6%	27.6%	12.8%	27.1%	67.3%	2.7%

- 1- Existence of drastic gap in research and technology indexes between 5 year Development Plans and the executors operation, which shows the imperfectness of plans and there on time execution.
- 2- Private sector’s less operation for entering in the research and technology field. While the majority of research investments in the most developed countries are done by private sector and government investment is mostly in the basic science and strategic research, but in Iran, the majority of research credits are paid from government’s budget and private sector’s role is limited.

In the past few years, so many attempts have been done for the private sector by making trust and respect to enter in research and technology field and this can be done by a point for hope in improving this index. So it has been tried in this study to propose empirical comments for empowering the research and technology and removing the weak points and using fortunes in fastening research toward 1404 targets.

**3.Comments:**

There are so many ways for improving researches in the country:

1- Holding research universities-one of the main ways in growing and developing research is holding research universities.

- a) Taking risks for new activities whose result is unidentified.
- b) Competition for using elite professors and students.
- c) Trying to establish Education and research system.
- d) Having active and reliable scientific groups.
- e) Competition for proposing new ideas.

2- Designating research funds.

The researchers can take loans from them and get released from universities and institutions officials' bureaucracy and after finishing their research they can give back the money with a little profit.

3- Increasing the research credits

This increasing is a necessity and their way of using in different kinds of researches (fundamental-empirical and developmental) should be specified.

With respect that producing economic, social (employment) and defense wealth have a premier position in our country, the empirical and developmental researched should be noticed more. And while fundamental researches will change the future, should be noticed more.

4- Spreading the research culture in the society

By Spreading the scientific and written culture on the base of Meritocracy, establishing management culture and cooperative management for improving management and research activities' quality, researches' financial and spiritual supports, establishing and developing the research-oriented thinking among managers and elites and improving connection and interaction between universities and research institutions. On the other hand it seems it should be stated from the primary schools and their books should be written in this way, too.

5- Commercializing the research results or changing the knowledge to wealth.

6- Decreasing the mandatory training time for universities scientific board's members, the decreasing the working hours for researcher in the governmental sector.

7- Simplification of the official laws and decreasing the inflexible severities for publishing books, articles, proposals, inventions and...

8- Using the studying opportunities by simplification the official severities for universities scientific board members.

9- Simplification of the official rules and endowing facilities for promoting the private sector in entering the research field.

10- Connecting the industry necessities and university fields, is a beginning point for more interaction between universities, industry and government. Therefore, the industrial centers should quite their pessimism and believe that the universities could help the country's development and also, the professors should consider the relation between knowledge and empirical necessities.

11- Revising the university fields on the base of social necessities, labor market and scientific evolutions and promoting interdisciplinary fields.

12- Gathering the reliable data on the basis of documents and proposing the increase in the research quota in the GDP and improving the quality and quantity indexes.

13- Noticing the scientific and practical researches in the developed countries.

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#### References

1. Arnold, Erik; Howard Rush; John Bessant and Mike Hobday.1988. Strategic Planning in Research and Technology Institutes. R&D Management. Volume 28, Issue 2, pages 89–100, April 1998.
2. Adboye, Titus; Norman Clark. Methodological Issues in Science and Technology Policy Research: Technological Capability. Science Technology Society March 1997 vol. 2 no. 1 73-98.
3. Howells, Jeremy; 1999.Research and Technology Outsourcing. Technology Analysis & Strategic Management. Volume 11, Issue 1, 1999.
4. K. William Kapp,ECONOMIC DEVELOPMENT IN A NEW PERSPECTIVE: EXISTENTIAL MINIMA AND SUBSTANTIVE RATIONALITY. 1965. Kyklos, Volume 18, Issue 1, pages 49–79, February 1965.
5. Lee, Jinjoo, Zong-tae Bae and Dong-kyu Lee, Jinjoo, Zong-tae Bae and Dong-kyu Choi. 1988.Technology development processes: A model for a developing country with a global perspective. R&D Management. Volume 18, Issue 3, pages. 235-250. ju;y 1988.
6. Rolf Sternberg. Technology centres in Germany: economic justification, effectiveness and impact on high-tech regions. International Journal of Technology Management. Volume 28, Numbers 3-6/2004. 444-469.