

Contribution of the Algerian researcher to support the process of innovation

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ملخص

الهدف من هذه الدراسة هو تحليل واقع و دور الباحث الجزائري و تقييم مدى مساهمته في عملية الابداع من خلال دراسة عدد الباحثين و التقنيين و دراسة مستوى الانفاق على البحث والتطوير ، واعتمدنا على قواعد البيانات المأخوذة من UNESCO United Nations and Cultural Educational, Scientific . Organization (UNESCO) Institute for Statistics.

وهذا خلال الفترة الزمنية (2000-2015) . و اظهرت النتائج هذه الدراسة ان عدد الباحثين و عدد التقنيين و مستوى الانفاق على البحث والتطوير هي اساس الابداع و التفوق العلمي و التقدم وتطور اقتصاديات الدول لهذا ارتأينا دراسة هذا الموضوع لتبيين مدى اهميته .

الكلمات المفتاحية : الابداع ، البحث والتطوير ، الانفاق على البحث والتطوير ، عدد الباحثين ، عدد التقنيين ، الجزائر .

الترميز : O3 ,O15,O39

Abstract

The objective of this study is to analyze the reality and role of the Algerian researcher , Evaluate the extent of its contribution to the innovation process a through the study of the number of researchers and technicians , study the level of expenditure on research and development, We have relied on databases taken from UNESCO United Nations and Cultural Organization (UNESCO) Institute for Statistics. Educational, Scientific . This is during the period 2000-2015. The results showed that the number of researchers

and the number technicians of and the level of expenditure on research and development are the basis of innovation ,scientific excellence, Progress and development of the economies of the countries of this we decided to study this subject to the extent of its importance.

Keywords: innovation , research and development, expenditure on research and development, number of researchers, number of technicians, Algeria.

JEL Code: O3, O15,O39

Introduction

The globalization of the economy has made most States manufactured or in the way of growth is a difficult choice, Necessity to resort to creativity and innovation. states have developed policies adapted to knowledge-based economies.

The University has become one of the pillars of the progress and development , producing scientific knowledge. Most countries provide huge budgets to attract qualified scientific personnel. Provide all possibilities to promote the scientific and technical advancement of the production of scientific knowledge. Human capital is characterized by competence and knowledge, Contributes to motivation and encourages creativity and innovation. Employ knowledge and transform it into applications that achieve excellence and improve competitiveness.

The problem of research is formulated as follows:

- How effective is the Algerian researcher and his influence on the process of innovation?

In order to answer the problem, the research was divided into two parts. The first part includes generalizations about creativity and scientific research. The second part includes a study of the reality of the Algerian researcher in his contribution to the process of innovation through the number of researchers and the number of technicians and percentage of R & D budget in Algeria.

I. The theoretical framework

I. 1.Definition of innovation

Many concepts of innovation and varied by fields, theories, and researchers:

- Schumpeter defines innovation as "the result of the construction of a new method or method of production as well as change in all components of the product or how to design"¹

-Robbins defined it as "a process that leads to the innovation of an idea and its output through a useful product or service or methods of operations".

- Manuel d'Oslo "It is the process that enables the transformation of an idea into a new or improved product or service that is salable and includes all the practical, technical, commercial and financial activities necessary to move towards success in marketing the new product or service".²

-"Any new or small or large improvement in products and methods of production obtained individually or collectively, which proves to be successful in terms of technology and economy",³

It should be noted that innovation can also be pursued radically (i.e, sudden change of *modus operandi*) and incrementally (i.e, incremental with step-by-step improvement) (Soliman, 2011).

I. 2. innovation stages

The innovation is a different stage in which a new idea is generated, which is four stages:

1 - the stage of preparation and at this stage determine the problem and examine where the problem arises in front of the administration and individuals and then must be thought to solve at the earliest times, Small and medium enterprises began to collect the necessary information about the problem.

¹ MADOROR Davier , “ réussirs start up : aorés la start –up mania “, ed .dunod ,paris,2001,p08.

² Marcandella elise, innovation et responsabilité sociale et environnementales : des concepts frères (document internet) ,p06.

³ Okil Mohammed Said, Functions and Activities of the Industrial Corporation, op. Cit., P. 111

2 - Incubation stage The individual feels that there are many new ideas that can solve this problem and begin to interact in order to prepare for choosing the appropriate alternative.

3 - stage of emergence and inspiration at this stage is the choice of the appropriate alternative, which is the correct idea that leads to a solution.

4 - the stage of evaluation is the stage of actual application, ie the embodiment of the idea on the ground, and the results must be compared results achieved at the beginning of the emergence of the problem and detected errors that may be in the implementation and correct.

. I. 3. Innovation theories⁴

1-Theoretical genius: The theory of genius in innovation is one of the oldest trends, and its roots are based on what is written in the book of the Old Testament about the story of how God created Adam with a puff of it. This theory is summed up in that it interprets creative works on the assumption that man is only a creature of divine ideas and divine will, and therefore it is the divine will that intervenes in the process of innovation. The ingenious theory of creativity presupposes that creative works are agreed upon by great people at moments of sudden inspiration, and that the genius of this theory has the ability to transcend current knowledge and produce something new.

2-Psychoanalysis: it is not in his blood. He points out that Freud, the spiritual father of psychoanalytic theory, did not provide an integrated theory in interpreting the innovative phenomenon, but tried to use the general concepts of his theory in interpreting innovative works. For this purpose, a method of studying the lives of a number of leading innovators has been applied in terms of their personal characteristics and attitudes. The main engine of creative work from Freud's point of view is that of the unresolved internal conflicts of the individual that have been suppressed within the individual.

3-Psychometric measurement: Guilford is credited with establishing the scientific and practical bases of this theory in creativity, and dating back to 1950 when Guilford presented his bold ideas on the concept of intelligence, mental functioning, and

⁴ Fathi Abdel-Rahman Jarwan, «innovation», Dar Al-Fikr for printing, publishing and distribution, first edition, 2002, p. 76-96

creativity at the American Psychological Society conference he chaired This theory is an extension of the psychological measurement movement that began with the success of the French scientist Binet in the development of the first test of measuring intelligence in the first decade of the twentieth century, and then flourished after the transfer of the test and its development and codification and use extensively in the United States since 1916, but it represents a sharp reversal in the course of the movement of psychological measurement, which has been dealing with mental abilities and functions from a narrow angle limited to the extraction of a single quantitative index reflects the general as in the Stanford-Bennett test, or three indicators that reflect the proportion Performance intelligence, as in the Wechsler Intelligence Scale. He was one of the first researchers to be associated with the Theory of Psychometry in Creativity, which began in 1951 as head of a research program aimed at pilot training at a US Air Force school on how to cope with emergencies through creative solutions to problems encountered during military operations. Where he moved to the University of Minnesota to continue his studies of creativity since 1958 and was involved in the development of his knowledge about the nature of creativity through the tests of innovation behaviors because he believed a relationship between them and the innovative achievements in life work, the dissemination of its tests to measure the capabilities of innovative thinking in 1966.

4-. Theories of Problem Solving and innovation : number of innovative researchers have tackled the process of problem solving and viewed the innovation as innovative solution to an extraordinary problem. It is known that the interest in problem solving in psychology dates back to the second decade of the 20th century **Thorndike and kohler** were traders on cats and chimpanzees. The prevailing trend at the time was to see "problem solving" as a process of learning through trial and error, or an intellectual process in which an individual uses his or her knowledge and skills to respond to the requirements of an unfamiliar situation by starting work Targeted Solve the ambiguity or ambiguity of the situation.

5. Guildford's theory (1986), a simplified model of problem solving based on his theory of mental structure, was called the "Mental Composition Model for Problem Solving": the individual's memory stock, computer productivity, or perceptions play a vital role in different stages of problem solving, It is this inventory that sustains activities aimed at solving the problem through memory.

6-theory. Osborne is a well-known fact that the Creative Problem Solving model is designed primarily to help individuals, especially in centers, leadership, executives and industry and business practitioners, to develop new products and processes. At a later stage, this model took the attention of educators and appeared to receive increasing interest in educational institutions. **Osborne** had the greatest merit in laying the foundations of this model in its early stages on the basis of optimal use of imagination in dealing with the problem. He also stressed the need to postpone the issuance of any judgments or criticism of ideas during Brainstorming session encourages participants to put forward all their ideas so as not to waste time and enthusiasm if participants are quick to choose and begin to reject immature solutions. **Osborne** believed that the best way to find the best and most successful solutions was to generate as many possible alternatives as possible first and then to evaluate them one by one in the next. This method was based on intensive studies on the nature of process innovative strategies and teaching innovation , To develop educational programs aimed at strengthening the creativity of learners Osborne was convinced that the key to the process of creative solution to any problem lies in learning how to activate the ability to imagine and use.

7-Altshuller theory: of the theories that dealt with the process innovative on the basis that it is merely a process of solving an unusual problem that has no known solution The theory of an creative solution to the problem that has emerged and developed since the 1940s in the former Soviet Union by the Russian engineer **Altshuller Genrich** theory to the West after the collapse of the Soviet Union in the early nineties and became known as the theory of **TRIZ**, the first letters of the Russian name of the theory and translated the theory of the solution of the creative problem (Solving Inventive of Theory), and derived the principles of his theory after a comprehensive survey of more than two hundred thousand patents in the field Manufacturers Technology.

8- Cognitive theories: The research of psychophysics saw a great breakthrough with the new birth of cognitive psychology in the late 1950s and 1960s. This came after the decline of **Gestalt** psychology in Germany and behavior in the United States following the Second Scientific War until the mid-1950s. The seventies and eighties of the last century as a result of the knowledge revolution that resulted from the development of computers and the transition from laboratory experiments on animals to humans, and emerged a large number of psychologists who were able to use experimental scientific methods in the development ,study from an integrative perspective of knowledge.

. I.5. Definition of research and development

. I.5. 1 Definition of scientific research

- The research includes works directed towards the development of scientific and technical knowledge as well as its use in order to obtain new products, materials, equipment, systems and production style.⁵
- These efforts are carried out by converting the approved knowledge into technical solutions that depict methods of production and consumption or investment products. Such activities are carried out either in the universities, the applied research centers, or in the industrial establishments without regard to their size.⁶

. I.5. 2. Definition of development

Development is considered to be a stage of scientific research. This activity focuses on obtaining an economic return, and includes the production of the first model of the product with all relevant experiments. All the studies carried out to maximize its usefulness and use, and all efforts to make the first model ready for mass production and all restrictions on materials, energy, labor and costs.⁷

To answer the problem we have proposed two hypotheses:

H1: Few Algerian researchers and technicians

H2 : The level of research and development expenditure in Algeria is weak

II .Methodology of the study:

Study the role of Algerian researcher in supporting of innovation and its impact on the process of innovation in Algeria through the study and analysis of the number of Algerian researchers and technicians and the assessment of the level of expenditure on

⁵ Pierre caspar et christine afriat , « l'investissement intellectuel essai sur l'economie de l'immatériel » édition economica , France , 1989,p33.

⁶ Okil Mohammed Said, Functions and Activities of the Industrial Corporation, op. Cit., P. 113

⁷ Michel.g. bedard et roger miller , « la gestion des 31 organisations une approche systémique conceptuelle et stratégique » cheneliere/ MC Graw-Hill, canada , 1995 ,p493.

research and development a through UNESCO United Nations and Cultural Organization (UNESCO) Institute for Statistics. Educational, Scientific.

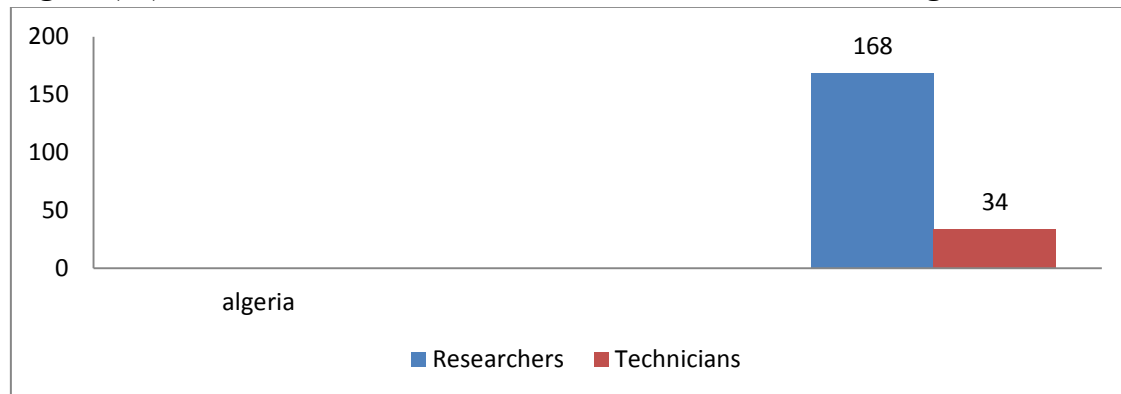
II .1. Study of the number of researchers and technicians in Algeria

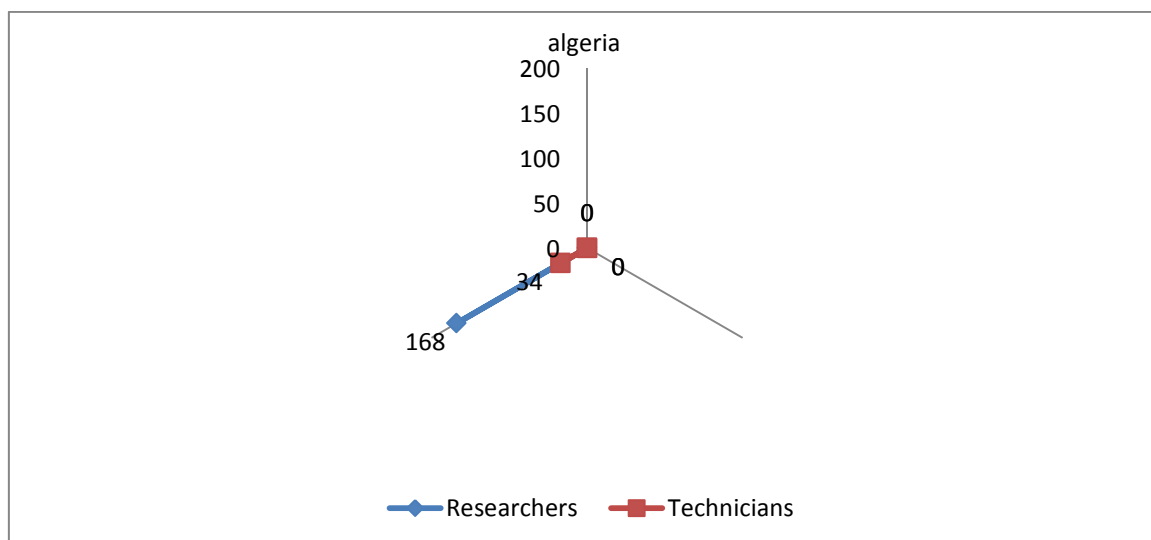
Table (1) shows the number of Algerian researchers and technicians during the period 2005-2015. We note that the number of researchers is greater than the number of technicians ,affects technological innovation.

algeria	Researchers	Technicians
	full-time equivalent per million people	full-time equivalent per million people
	2005-2015	2005-2015
	168	34

Source :United Nations Educational, Science

Figure (01): shows the number of researchers and technicians in Algeria





Source of the researcher

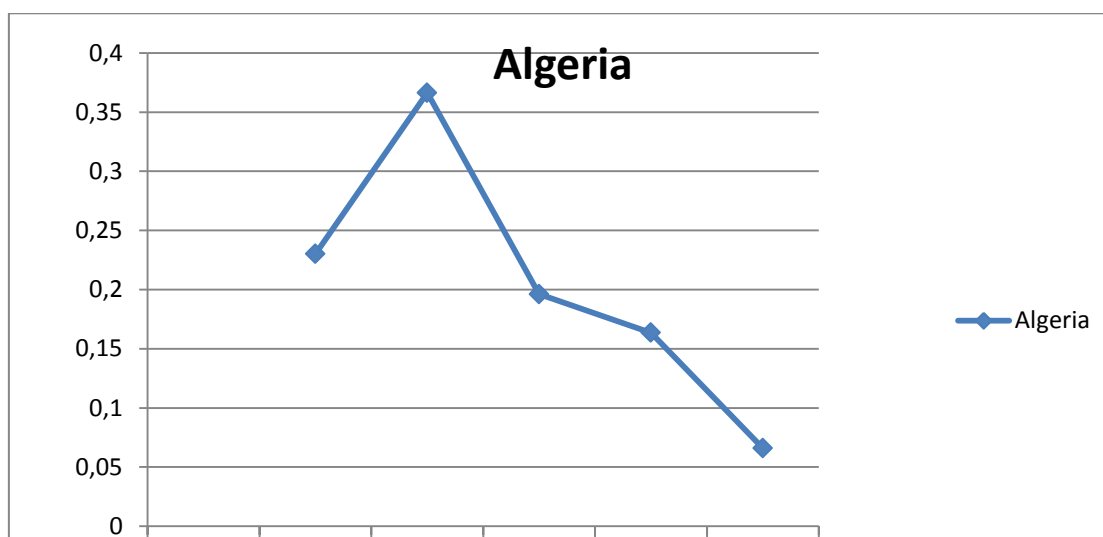
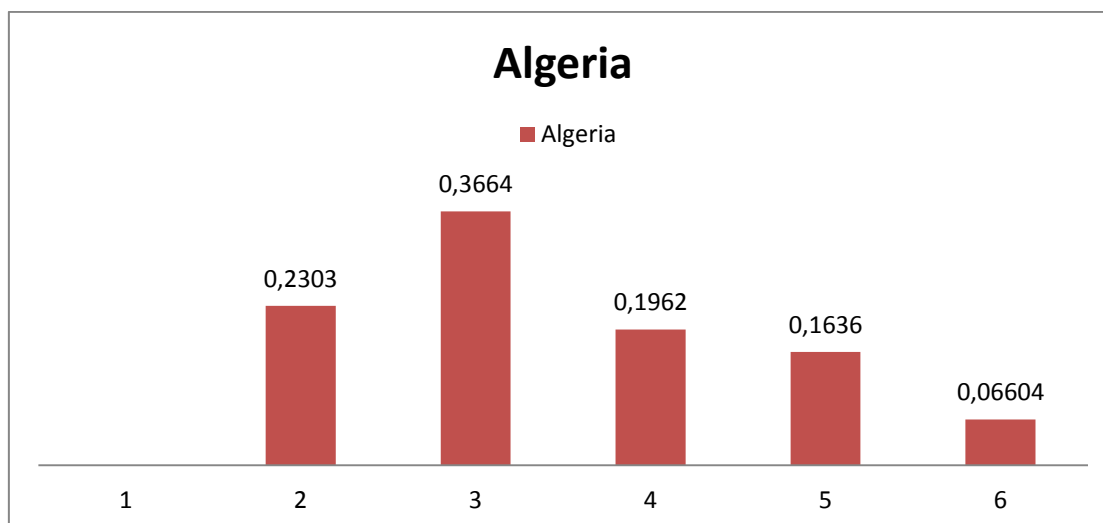
II. 2. Study spending on research and development (R & D)

Table (2): shows the amount of expenditure on research and development (R & D) during the period 2000-2005, from the through UNESCO United Nations and Cultural Organization (UNESCO) Institute for Statistics. Educational, Scientific.

Country Name	2000	2001	2002	2003	2004	2005
Algeria		0,2303	0,3664	0,1962	0,1636	0,06604

Source : United Nations Educational, Science

Figure (02): shows spending on research and development (R & D) the period 2000-2005 in Algeria



Source of the researcher

Commentary

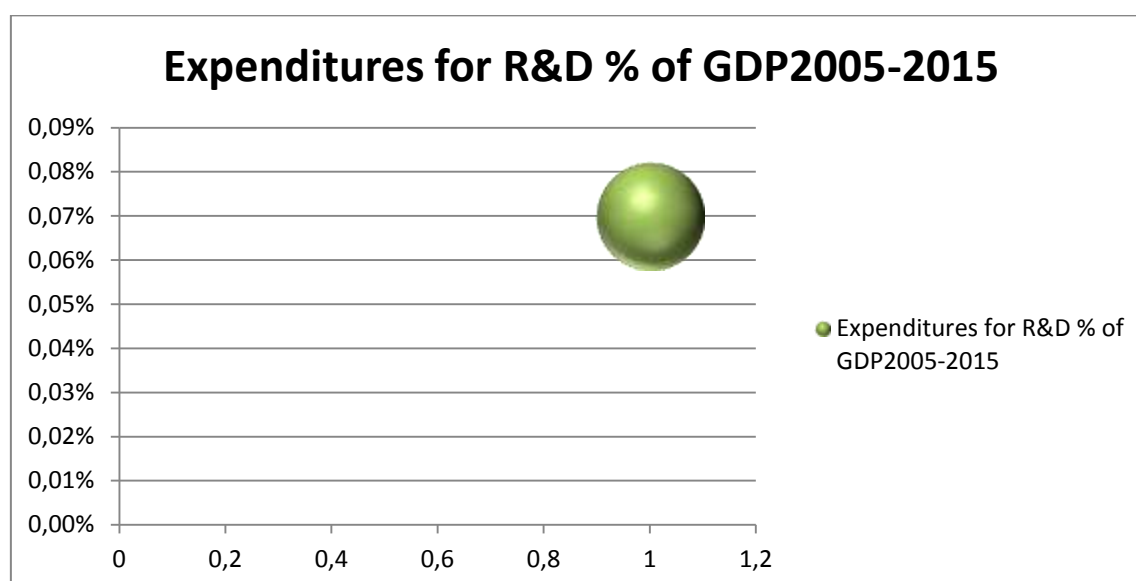
The figure shows that the level of expenditure on research and development in Algeria is low. In 2001, the budget was estimated at 0,2303%. And in 2002, spending on research and development, then began to decline during 2003-2004 and 2005(0,06604%) .

Table (3): shows the amount of expenditure on research and development (R & D) during the period 2005-2015, from the through UNESCO United Nations and Cultural Organization (UNESCO) Institute for Statistics. Educational, Science

	algeria
Expenditures for R&D % of GDP2005-2015	0,07%

Source of the researcher

Figure (03): shows spending on research and development (R & D) the period 2005-2015 in Algeria



Source of the researcher

Commentary

Remark from the figure between 2005-2015 that the amount of expenditure on R & D Fell to 0.07%.

Conclusion

Through this study we conclude that the Algerian researcher contributes a small and weak in the process of innovation, Because the number of Algerian researchers and technicians is small and the level of expenditure on research and development (R & D)is low at 0.07% during the period of time 2005/2015 .

Algeria still suffers from a lack of its adopted policy to support, motivate and encourage its researchers and technicians, especially the budget spending on research and development (R & D) to get innovation.

References

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Appendix Tables and graphs

Table (1) shows the number of Algerian researchers and technicians during the period 2005-2015. We note that the number of researchers is greater than the number of technicians ,affects technological innovation.

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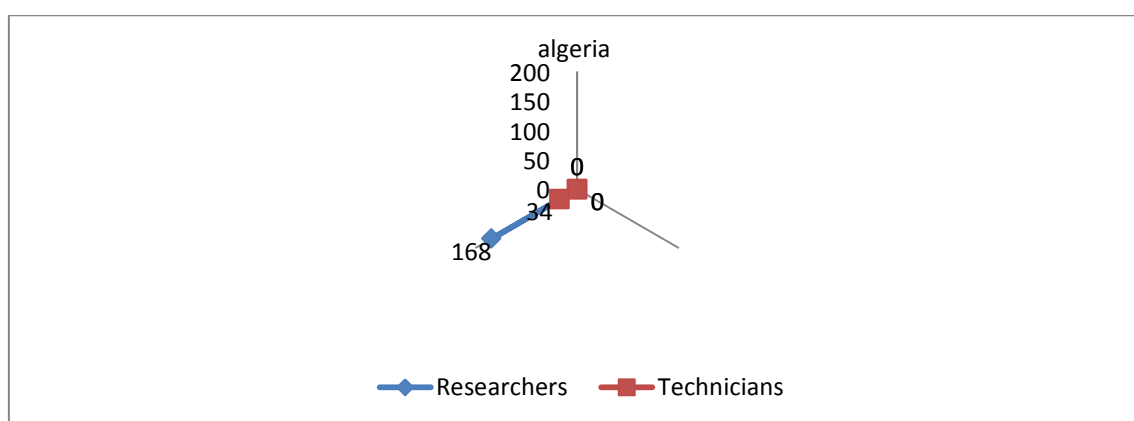
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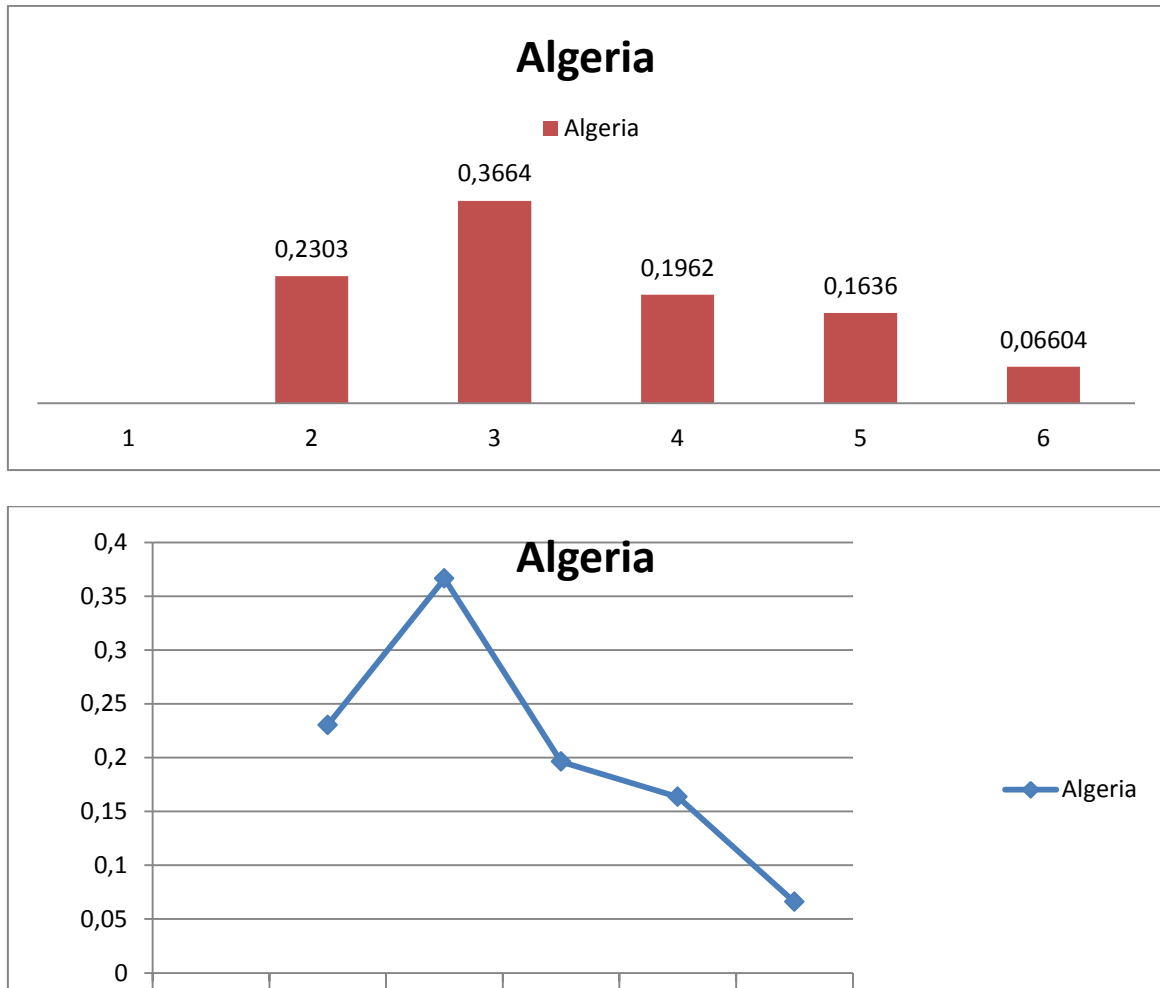
Source of the researcher

Figure (01): shows the number of researchers and technicians in Algeria



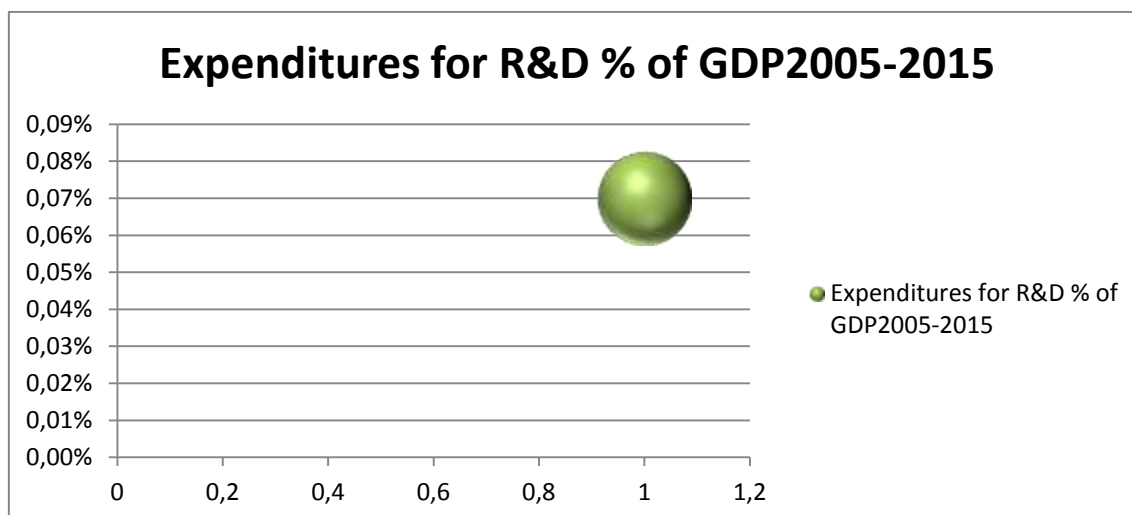
Source of the researcher

Figure (02): shows spending on research and development (R & D) the period 2000-2005 in Algeria



Source of the researcher

Figure (03): shows spending on research and development (R & D) the period 2005-2015 in Algeria



Source of the researcher