Higher education policies' role in developing innovative high-tech projects at universities – a study of sample of Algerian universities-

دور سياسات التعليم العالي في تنمية المشاريع المبتكرة ذات التكنولوجيا العالية بالجامعة

دراسة عينة من الجامعات الجزائرية

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Abstract:
The purpose of the study is to highlight the role of higher education policies in the development of innovative projects with high technology, as a fundamental and essential component of the university. This has been investigated through a field study in which a questionnaire was administered to a sample of Algerian universities. In order to accomplish this, we attempted to address the subject's dimensions, beginning with a clarification of the conceptual framework of the study, exposing the policies of higher education at the university as well as innovative high-tech projects, and concluding with the study of a sample of Algerian universities.
After statistical analysis of the primary data collected via this questionnaire using statistical tools and tests such as the correlation coefficient, Cronbach's alpha coefficient, the hypothetical mean test, and multiple variance with the SPSS 22 program, the following results were determined: Despite the statistically significant effect of higher education policies on the development and establishment of high-tech innovative projects at the Algerian University, we concluded that higher education policies do not contribute sufficiently to the development and establishment of high-tech innovative projects.
Key words: *Higher Education Policies, High Technological, Innovative Projects, University, Algerian University.*

ملخص:
تهدف الدراسة الى ابراز دور سياسات التعليم العالي في تنمية المشاريع المبتكرة ذات التكنولوجيا العالية، بصفته عنصر اساسي ورئيسي بالجامعة، وقد تم دراسة ذلك من خلال القيام بدراسة ميدانية، حيث قمنا بتصميم استبيان طبّق على عينة من الجامعات الجزائرية. من اجل تحقيق ذلك حاولنا تناول ابعاد الموضوع بدءا بتبيان الاطار المفاهيمي للدراسة، بالتعرض لسياسات للتعليم العالي بالجامعة وكذا المشاريع الابتكارية ذات التكنولوجيا العالية، لنتناول في الاخير الجزء الاهم من الدراسة وهو دراسة عينة من الجامعات الجزائرية.
وبعد التحليل الاحصائي للبيانات الأولية المجمّعة من خلال هذا الاستبيان باستعمال أدوات واختبارات إحصائية مثل معامل الارتباط، معامل ألفا كرونباخ، اختبار المتوسط الفرضي والتباين المتعدد، بالإستعانة ببرنامج SPSS 22، توصلنا إلى أن سياسات التعليم العالي بالجامعة الجزائرية لا تساهم بالشكل الكافي في تنمية وإنشاء مشاريع ابتكارية ذات تكنولوجيا عالية، رغم تواجد التأثير ذو دلالة إحصائية لسياسات التعليم العالي في تنمية وإنشاء مشاريع ابتكارية ذات تكنولوجيا عالية بالجامعة الجزائرية.
الكلمات المفتاحية: سياسات التعليم العالي، مشاريع ابتكارية، تكنولوجية عالية، جامعة، جامعة جزائرية.

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1. Introduction

Higher education policies are one of the fundamental criteria used to assess the progress of a country's university system. This is because university policies on higher education are the main engine for all political, economic, social, and cultural sectors, and no country in the world can have a regional and international presence in all fields without paying attention to its policies on higher education and scientific research.

On this basis, the research sheds light on the reality of the university's high educational policies and the extent of their effectiveness in scientific research outputs, which are primarily represented in production and creation, as well as the evaluation of innovative projects with high technology.

Study problem:

The problem of this study can be formulated in the following main question:

What role may higher education policies play in the creation of creative high-tech ventures at universities?

To address this issue, we addressed the following fundamental aspects:

- University higher education policies.
- Innovative high-tech projects at the university.
- Higher education policies' contribution to the creation of innovative high-tech projects at Algerian universities.

Study importance:

The study is significant because it looks for the actual contribution made by university higher education policies to the development of creative ventures, particularly those with great technological potential.

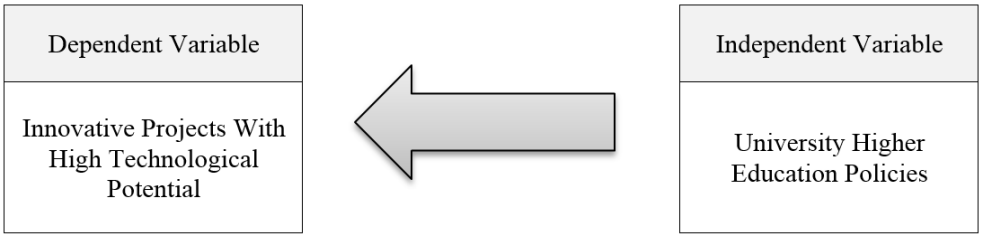
Study objectives:

The study's aims are mostly manifested in addressing the study's primary problem, which is primarily reflected in determining the impact of higher education policies in the university on the development of innovative projects with high technological potential. The study also attempted to connect this to the field element, therefore a sample of Algerian institutions was researched, as well as the respondents' knowledge of the extent of their establishment and development of creative projects with high technology.

Study Model:

We constructed a study model by assessing the opinions of a sample of university researchers concerning applied sciences and technology, utilizing the survey method via a questionnaire, and answering the study problem, as shown in Figure 1:

Figure 1. Study Model



Source: *Prepared by researchers*

As a result, the model variables were divided into two variables:

- independent variable: represented by higher education policies at the university, which affect the dependent variable.
- dependent variable: represented in innovative high-tech projects.

Thus, the following hypothesis can be presented using the study model:

- **The first hypothesis:** is that higher education policies have an impact on the development and establishment of innovative high-tech ventures at universities.
- **The second hypothesis:** is that human characteristics and their interactions cause significant variances in the development and establishment of high-tech innovative ventures in Algerian universities.

2. University higher education policies

2.1. Higher education policies

University education is defined as "providing students with information, imparting knowledge, refining their talents, building their personality, developing their capabilities, and assisting them in investing all of their potentials in innovation and development, resulting in their adaptation to contemporary life and confident interaction with it" (Ben Aishi, 2010, p. 398).

It is also "any form of teaching, training, or qualification for research taught at the post-secondary level by a university institution or other educational institution recognized by the state's competent authorities" (Breish, 2002, p. 122).

According to (Napoleon Bruna), higher education is the path that leads from high school to practical life, passing through higher education that immediately follows the secondary education stage in order to join higher positions and prestigious status such as doctors, engineers, accountants, jurists, and teachers (Al-Dawi & Benzerga, 2015, p. 11).

We can define higher education as a stage of scientific specialization that includes all formal education provided by scientific institutions such as the university, which primarily undertakes the process of comprehensive community development.

2.2. The importance of higher education

Higher education institutions are among the most important institutions in society, with the responsibility of achieving educational system goals. Where this importance is growing, particularly in light of the current circumstances, which are characterized by the era's rapid changes, and the

importance of continuous development and compliance at the level of all aspects of the educational system, including its administrations, structures, and media in its institutions, as well as training and scientific research (Dehaimi, 2011, p. 192).

As a result, interest in higher education in the modern era is one of the most important indicators of a country's progress and advancement for the following reasons (Al-Dawi & Benzerga, 2015, pp. 11-12):

- Higher education is the initial investment that serves as the foundation for all subsequent investments. It is the primary pillar of national security and the essence of global competition because of its ability to graduate specialists capable of comprehending and comprehending tremendous scientific progress and technological achievements, as well as accepting tremendous changes in various fields of life.
- Higher education enables the acquisition of information, its use and application, and thus how to gain knowledge, accept the new, and acquire various mental and manual skills through the use of scientific thinking and the ability to innovate.

2.3. Higher education assignments

According to a group of experts, one of the tasks of higher education is to push for the establishment of strong companies on a national and international scale, especially because modern industry is much more demanding of intelligence than it was in the past, when the focus was primarily on raw materials. As a result, laws and administrative procedures should be developed to allow major universities and institutes to establish contracting companies and companies for scientific research and the technological industry, and to compete in recording innovations and preparing skills in various sciences and arts (Breish, 2002, p. 134).

In general, focusing on the contents of higher education programs, methodologies, approaches, practices, and means of knowledge transfer to achieve the following goals (Ben Omara, 2011, pp. 6-7):

- Providing graduates with specific knowledge, skills, and attitudes that will enable them to engage in society and actively participate in various sectors of human activity.
- Formation of educated citizens with communication and free-thinking skills, as well as higher intellectual abilities.
- To develop citizens who are committed to issues affecting people, society, and the world, who enjoy the spirit of criticism, and who can work in a team to analyze social, environmental, and other problems and provide solutions, particularly to those confronting developing countries.
- Strengthening ties with the workplace, forming alliances with those involved, analyzing societal needs and working to meet them, taking into account scientific, technological, and economic developments on the one hand, and providing in-service training and contributing to the creation of new job opportunities on the other.

3. Innovative high-tech projects at the university

3.1. Innovation concept

3.1.1. Definition of innovation:

According to De Ramecourt & Pons, "Innovate today, you will live tomorrow," which falls under the category of creative development (N'Doli Guilloume, 2008, p. 14).

The economist Joseph Elio Schumpeter defined innovation as the implementation of new combinations of means of production (the launch of new products, a new product method, the conquest of a new market, a new source of raw materials, or a new organization) (Laperche, 2003, p. 7).

Innovation is also the application of new ideas that result in a significant improvement in products, production methods, organization, and marketing within the organization, with the goal of having a positive and successful impact on the organization's performance and results (Bin Nazir, 2010, p. 227).

Innovation is also defined as anything new and different that distinguishes an organization from others and helps it maintain or improve its competitive position and performance, whether it is product innovation or administrative, financial, marketing, or production performance innovation (Al-Gayashi, 2003, p. 69). As the Chairman of the Board of Directors of Procter & Gamble believes that "the essence of business is innovation, and that any institution that innovates in a good way will win in the end," the previous definition provided a comprehensive consensus on everything that can provide the organization with support in its competitive position and improve its performance (Al-Taie, 2008, p. 53).

Innovation is also defined as the ability to generate a demand for new combinations of ideas, topics, information, energies, or a combination of two or more (Ajila, 2005, p. 8). It is also defined as "the way of thinking that is always oriented toward growth and renewal" (Qandil, 2009, p. 123).

We can see from the two previous definitions that they separated the true nature of innovation, as they saw it as good thinking aimed at the advancement of the institution, and thus innovation is a new approach that is seen first as coming from research laboratories to be exploited by an institution or society (European Commission, 2007, p. 3).

Some translators used the term renewal when translating the word innovation, such as Peter Drucker's book (innovation and entrepreneurship), which was translated into Arabic as contracting and renewal, whereas innovation was used more in its broad, radical, and improvement sense than in its renewal sense. In addition, another definition of innovation refers to it as "a change in resource output, a change in the value and satisfaction resulting from the resource used by the consumer".

There are also those who translate the term innovation into the word creativity, whereas the correct synonym for this term in Arabic is the word innovation (Najm, 2003, p. 17), so we will rely on the word innovation throughout the research, and its translation into English and French is Innovation. According to the French dictionary Le Petit Robert, its meaning in French is the result of the verb Innover, which means (Introduire dans une chose établie, quelque chose de nouveau, d'encore inconnu.) That is, presenting something novel and previously unknown (Bin Antar, 2008, p.

148).

Everything that is new in a product (good, service, or idea), process, or function is referred to as innovation (Souissi, 2012, p. 17). It aims to distinguish the institution and give it a competitive position in markets, and it contributes significantly to societal progress because it is a comprehensive development method (Fernez-Walch & Romon, 2010, p. 12).

From the foregoing, we can point out that the difference between innovation and creativity is what Garand and Carrrier indicated through that "creativity is about exploring a good and distinct idea. If creativity is associated with people, then innovation is associated with the institution and its production and marketing activities (Bin Yacoub & Habash, 2014, p. 4).

3.1.2. The importance of innovation:

The significance of innovation can be seen in several ways, the most important of which are as follows: - Innovation promotes continuous development.

- Innovation leads to the discovery of new methods and methods of production or products that distinguish institutions in their offerings.
- Innovation promotes economic and social development by identifying appropriate technological methods and technologies (Ghayat & Bouqoum, 2009, pp. 57-58).

Innovation is extremely important, particularly in terms of its outcomes, because the return on investment from innovation has become significant, and its outcomes are frequently impressive in the event of its success. As it has become a temptation for many institutions seeking to achieve large profits and high growth rates, we find in the American company M3 that about 32% of its total sales amounting to ten billion dollars annually as a result of its innovation of new goods and services (Soleimani, 2007, p. 32).

Among the reasons for innovation, we can mention (Lendrevie & Lévylindon, 2003, pp. 327-238):

- Innovation stimulates demand.
- Innovation allows for increased supply and the creation of new sources of ownership (profit).
- Innovation enables the most effective response to competition.

3.2. Technological innovation and its characteristics

3.2.1. Technological innovation:

Technological innovations are those that result from technological and technological development, as well as the advancement of science and knowledge (also known as technology-driven innovations) (Malikiah, 2006, p. 13).

Technological innovation can be defined precisely as any new process that affects various types of production (Oukilm, 1995, p. 17). Technological innovation is also defined as an enhancement to an already existing product, because technology provides science with tools that contribute to achieving a significant breakthrough in its strength, and new sciences have also contributed to technological development (Araba & Amari, 2007, p. 3).

The previous definition focused on technological innovation as any technological innovation. J. Morin in 1986 defined technological innovation as "the putting into practice or exploitation of an existing technology, which takes place under new conditions and is translated into an industrial

result" (Bouquet, 1995, p. 56).

When a technological innovation is complete, it is introduced to the market (product innovation) or used in manufacturing methods (method innovation), with the participation of all forms of scientific, technological, organizational, financial, and commercial activities (Aljuzi, 2011, p. 276).

Technological innovation is defined as "those processes that relate to positive developments in products of all kinds as well as production methods (Hajjaj, 2007, p. 70)." It is defined as "a process whose outcome is uncertain but whose investigation is unique, and which contains technological characteristics that create value in the product or process" by Jean Paul Flipo (Jean, 2001, p. 17).

Based on the foregoing, we can conclude that the term technological innovation is made up of two parts: innovation and technology. That is, every new application of technology, which is dependent on equipment, tools, techniques, methods, and rules, leads to changes in the product, production methods, and organization, and is completed by releasing it to the market.

3.2.2. Technological innovation characteristics:

The following are some of the most important characteristics that characterize technological innovation:

- Technological innovation is the application of recognized, i.e. market-accepted, new technical knowledge. It refers to anything new that is based on incorrect information and produces ineffective results, regardless of its attractiveness in terms of beauty or otherwise. It does not qualify as technological innovation.
- Technological innovation is a complex interaction process. At the first level, information circulates between various departments of research and development, production, and marketing. The second level is a process that connects the organization to its external environment, including existing and potential competitors, customers and suppliers, and science and technology production centers.
- Technological innovation necessitates the provision of significant resources, whether financial resources in R&D laboratories and effective marketing organizations, or human resources, as it necessitates a significant group of specialized competencies in terms of their formation and technical knowledge (Bouslami, 2013, p. 6).
- It should not have a market spread, which means that its effectiveness and efficiency are limitless, because it is regarded as an essential factor in competition (Hajjaj, 2015, p. 23).

3.3. High-Tech Enterprises

3.3.1. The concept of high-tech enterprises:

Several researchers have presented various definitions of high-technology institutions. We will attempt to review the most important ones over successive time periods (Candido & Borges, 2003, p. 5):

Among the most important definitions presented in 1997 is that of Jones-Evans, who defined it as "the small and medium enterprises that have received the government's Award of Merit in the field of research and development." Tesfaye also defined it as "institutions founded by individuals with academic education and intensive research, with the intensity of research and development

referring to the ratio of resources transferred to research activities during the establishment process." We can see from the previous two definitions that the researchers agreed that they are institutions primarily focused on research and development.

Markman, Baron, and Balkin defined high-tech enterprises as "innovators who develop patents" in 2000. The French Agency for Business Creation, APCE, introduces the concept of "innovative enterprises, in the field of activity, commercial, or still in development mode" the same year. It is worth noting that the two definitions have focused on high-technology institutions as innovative institutions, with innovators developing patents.

A group of researchers presented several definitions of the concept of high-tech enterprises in 2001. Among them is the definition of Colombo and Delmastro, who agreed to consider "institutions operating in the information technology sector (Internet, software, and multimedia), as well as the production of technological equipment (communication equipment and electronic equipment)". While Audretsch defined it as the "biotechnology sector" and Shane as "patents created," Christensen, Ulhoi, and Neergaard defined it as "the totality of ICT, life sciences, and biotechnology institutions" the same year. We can see from the preceding definitions that all previous definitions agreed to consider high-technology institutions to be active institutions in the sectors of information technology and biotechnology, owing to the growth of the two sectors in the 2000s, particularly in 2001, as they constitute two vital sectors that rely primarily on innovation and technology.

With the advancement of technology, the definition of high-tech enterprises is evolving and expanding. Gasse defined them briefly in 2002 as "entrepreneur-researcher." That is, it combined the professional aspect of the field, which is entrepreneurship, with the scientific aspect, which is (academic) research. In 2003, the researcher Autio presented a modern, concise, and comprehensive concept for high-tech enterprises, which includes "entrepreneurship with high potentials that are compatible with technological innovation," which is the comprehensive definition that considers that these institutions are the ones that adopt entrepreneurship with high potentials that are inextricably linked to the employment of technological innovation. As a result, we can provide the following comprehensive definition of high-tech enterprises: It is the result of the combination of employment, entrepreneurship, research, high potential, and technological innovation.

3.3.2. The development of the establishment of high-tech enterprises:

We can say that high technology institutions have always existed and in every era where technological innovations have been proposed by innovative and enterprising individuals, as was the case during the seventeenth and eighteenth centuries in Great Britain. As is also the case in the United States of America since the nineteenth century, for example, the preservation of Edison's first institution, which yielded incandescent lamps in 1878. Here we are discussing (spin-off) the establishment of an institution by researchers at the Massachusetts Institute of Technology in America, until research related to technological projects became more important in the 1960s. For the first time, Babson College's frontiers of research in entrepreneurship and entrepreneurship included a section entirely dedicated to high-tech enterprises in 1984.

The majority of high-tech institutions are founded through (spin-off), that is, the establishment of an institution by researchers, which means that the majority of contractors are from universities or academic research centers. From another angle, the concept of entrepreneurship in business includes

the aunts of emerging enterprises that do not receive direct support from an incubating institution, because the employee - in this case, the researcher - bases his work on the knowledge and skills acquired in the organization. Typically, the project's owner discovers a new product while working at a university or in an institution, and he capitalizes on this new idea (Candido & Borges, 2003, pp. 3-6).

4. Higher education policies' contribution to the creation of innovative high-tech projects at Algerian universities

4.1. Community and study sample

Because of the presence of innovative high-tech projects in their scientific disciplines, all university researchers within the walls of the Algerian university, within the technical and applied disciplines, represent the study community. As a result, the number of researchers was calculated using data from the General Directorate of Scientific Research and Technological Development, which used the classification of the global scientific database SCOPUS in the distribution of scientific disciplines, as shown in the table below:

Table 1. Study community

Major fields	**Rank-based professors and researchers**						**Total**
	Doc	MAB	MAA	MCB	MCA	Pr	
Chemistry	1,474	151	831	543	377	464	3,840
Engineering sciences	7,933	770	4,400	2,046	1,601	1,687	18,437
Mathematical sciences and their interactions	575	191	842	347	332	243	2,530
Physics	594	55	323	220	167	233	1,592
Nature and life sciences	2,085	340	2,361	644	735	859	7,024
Total							33,423

Source: Prepared by the researcher, based on Documents of the General Directorate of Scientific Research and Technological Development 2018.

In terms of the study sample representing the study population, the Stephen Thompson equation was used with an estimated error rate of 5% (95% confidence interval), indicating that 380 researchers out of 33423 researchers are the appropriate sample size. The study was conducted on a random sample of the study population, and approximately 2000 researchers with scientific and technical specializations from all Algerian universities were accredited. The electronic addresses of the researchers were obtained from the General Directorate of Scientific Research and Technological Development (DGRSDT) on the basis of retrieving a sufficient sample for the study, which was not done because the retrieving process was ineffective. We encountered a problem with respondent cooperation, and we only received responses on 80 electronic questionnaires, prompting us to use a paper questionnaire, which was distributed using the previous criteria, and enumerated the universities of the southeast of Algeria in each of the states of Ouargla, Laghouat, El Oued,

Biskra, and Ghardaia. In addition to the responses from each of the universities in the states of Guelma and Mila, the sample size was 440 people, as shown in the table below:

Table 2. Study sample

Electronic questionnaire	**Distributed**	**Returned**	**Rejected**	**Unreturned**	**Accepted**
(all universities of the country)	2000	119	0	1881	119
Ouargla province	90	47	5	43	42
Laghouat province	90	55	2	35	53
El oued province	90	21	5	69	16
Biskra province	90	63	21	27	42
Ghardaia province	40	0	0	40	0
Guelma province	30	0	0	30	0
Mila province	10	8	0	2	8
Total	2440	313	33	2127	280

Source: Prepared by the researcher.

The sample's responses were evaluated using a three-point Likert scale. To facilitate statistical processing, each degree of the scale was assigned a number (agree: 3, neutral: 2, disagree: 1), and the weighted arithmetic mean for the three domains was calculated as shown in Table 3.

Table 3. The weights of the variables according to the triangular Likert - the weighted arithmetic mean of the triangular range

Domain	**Range**
Weak	From 1 to 1.66
Average	From 1.67 to 2.33
Strong	From 2.34 to 3

Source: Prepared by the researcher, based on (Ezz Abdel-Fattah, 2008, p. 538)

4.2. Data collection method

Questionnaire (survey): In this study, we also used the survey method to collect primary data via a questionnaire, which was designed and divided into two parts. A section containing the respondents' personal information in terms of (gender, age, scientific level, fields of scientific research, researcher membership in a laboratory or research group inside the university, researcher membership in a laboratory or research group outside the university, the number of high-tech research projects achieved by researchers). Another section contains the independent variable represented in higher education policies, which is made up of a collection of phrases that implicitly contain the dependent variable represented in innovative high-tech projects.

4.3. Data analysis methods

The SPSS (22) program was used in the process of unloading and statistical analysis of the data and testing the hypotheses of the study, as it included the following statistical methods:

- Correlation coefficient to test the validity of internal consistency.

- Cronbach's Alpha coefficient for testing the stability of the study tool.
- Kolmogorov-Smirnov coefficient for a normal distribution test.
- Hypothetical average calculations to test the first, second and third hypothesis.
- Multiple variance test to test the fourth hypothesis.

4.4. Study tool stability test

The validity and reliability of the statements included in the questionnaire were confirmed before proceeding with the analysis and drawing conclusions. To make the results more credible and realistic, they were presented to a panel of arbitrators with experience and specialization in a variety of fields (management and management sciences, applied and technical sciences, psychology, statistics). In order to determine the clarity of the phrases and the extent to which they belong to the study's axes, it was modified in its final form.

To determine the consistency and validity of the questionnaire statements, the Pearson correlation coefficient was calculated using the SPSS 22 program between the score of each statement and the total score of the axis to which it belongs, as shown in Table 4:

Table 4. The validity of the structural consistency of the questionnaire axis

Axis number	Axis	Correlation coefficient R	Significance level	Sig
1	Higher education policies	0.88	0	Sig

Source: Prepared by the researcher, based on SPSS 22 out-puts

This demonstrates that the correlation coefficient of each study axis with the total score of the questionnaire is positive and statistically significant, indicating that the questionnaire axis has a high degree of validity, and the results obtained demonstrate the sincerity and consistency of the statements of the study tool axis, as well as their validity for analysis.

In order to assess the level of stability of the questionnaire, the Cronbach alpha test was used, and the results are shown in Table 5:

Table 5. Stability coefficient (Cronbach's alpha coefficient) for the axis of the study tool

Number	**Axis**	**Cronbach's alpha**
1	Higher education policies	0.75
2	Total phrases	0.84

Source: Prepared by the researcher, based on SPSS 22 out-puts

The previous table shows that the value of Cronbach's alpha for the entire form is high (0.84), indicating that the form and its axis are stable and can be relied on in the study.

To test the study's hypotheses, it must first be determined whether the data follow a normal distribution or not, using the Kolmogorov-Smirnov test, as shown in table 6:

Table 6. Kolmogorov-Smirnov test for normal distribution

Sample	**Arithmetic average**	**Standard deviation**	**Z kolmogorov-smirnov**	**Sig**
280	56.3	10.45	0.854	0.46

Source: Prepared by the researcher, based on SPSS 22 out-puts

According to the previous table, the value of z is (0.854) at a level of statistical significance equal to (0.460), which is greater than $\alpha = 0.05$ and thus statistically significant, indicating that the data follows a normal distribution.

4.5. Sample characteristics

The SPSS 22 program produced the following results, which are shown in Table 7:

Table 7. Sample characteristics

Variable	Variable categories	Repetition	Ratio
Gender	Males	190	67.90%
	Females	90	32.10%
	The total	280	100%
Age	Less than 30 years old	78	27.90%
	From 30 years to 40 years	91	32.50%
	From 40 years old to 50 years old	38	13.60%
	More than 50 years old	73	26.10%
	Total	280	100%
Educational level	Phd researcher	142	50.70%
	Postdoctoral researcher	111	39.60%
	Other	27	9.60%
	Total	280	100%
Scientific research fields	Science and technology	128	47.50%
	Material sciences	70	25.00%
	Mathematics and computer science	16	5.70%
	Nature and life sciences	66	23.60%
	Total	280	100%
A member of a laboratory or research team within the university	Yes	243	86.80%
	No	37	13.20%
	Total	280	100%
A member of a laboratory or research team outside the university	Yes	74	26.40%
	No	206	73.60%
	Total	280	100%
Number of high-tech research projects completed	One project	149	53.20%
	Two projects	45	16.10%
	Three projects	13	4.60%
	More than three projects	73	26.10%
	Total	280	100%
Number of high-tech innovative projects completed	Without a project	190	67.90%
	One project	61	21.80%
	Two projects	16	5.70%
	More than two projects	13	4.60%
	Total	280	100%

Source: Prepared by the researcher, based on SPSS 22 out-puts

We defined the characteristics of the study sample as follows:

With regard to the gender variable, we noticed that the number of males in the study sample was 190 individuals out of a total of 280 individuals, which represents a rate of 67%. As for the number of females, it was 90 individuals out of a total of 280 individuals, which represents a rate of 32%.

As for the age groups, the high category in the sample was from (30 years to less than 40 years) with a size of 91 individuals out of a total of 280 individuals , which represents 32%. As for the category least represented in the sample, it is the category (from 40 years to less than 50 years) with a size of 38 individuals out of a group of 280 individuals, which represents 13%.

With regard to the educational level, the predominant category in the sample was the category

of (PhD researcher), with a size of 142 individuals out of a total of 280 individuals , which represents 50%. As for the category that is least represented in the sample, it is the other categories (such as masters) with a size of 27 individuals out of a total of 280 individuals , which represents 9%. As for the fields of scientific research, the predominant category in the sample was the category (science and technology), with its various scientific disciplines, with a sample size of 128 out of a total of 280, representing 47%. As for the least represented category, it is the field of (mathematics and computerized information), with a volume of 16 individuals , one out of a total of 280 individuals , which represents 5%.

With regard to the membership of researchers in a laboratory or a research group within the university, the number of individuals joining constituted the size of 243 individuals out of a total of 280 individuals , which represents 86%. As for the unorganized individuals in the sample, their number constituted 37 individuals out of a total of 280 individuals , which represents 13%. As for the researcher's membership in a laboratory or research group outside the university, the number of unorganized individuals constituted the largest number, with a size of 206 individuals out of a total of 280 individuals , which represents 73%. As for the number of organized individuals, their number formed 74 individuals out of a total of 280 individuals , which represents 26%.

Regarding the number of high-tech research projects completed by them, the high category in the sample was the (single project) category with a size of 149 individuals out of a total of 280 individuals , representing 53%. As for the category that is least represented in the sample, it is the category (three projects) with a size of 13 individuals out of a total of 280 individuals , which represents 4%. As for the number of completed high-tech innovative projects, the predominant category was (without a project) with 190 individuals out of a total of 280 individuals , representing 67%. As for the category that is least represented in the sample, it is the category (more than two projects) with a size of 13 individuals out of a total of 280 individuals , which represents 4%.

4.6. Presentation and testing of study results

The study's findings were presented and tested using the hypothetical mean method and the multiple variance method:

4.6.1. First Hypothesis:

- **H0:** There is no statistically significant effect of the determinant of higher education policies in the development and establishment of innovative high-tech projects in the Algerian university at the level of significance of 5%.
- **H1:** There is a statistically significant effect of the determinant of higher education policies in the development and creation of high-tech innovative projects in the Algerian University at the level of significance of 5%.

To test this hypothesis, the hypothesis mean method and the (t) test for one sample were used, as shown in Table 8:

Table 8. First hypothesis test

Variables	Sample	Hypothetical average	SMA	standard deviatio	T Value	Sig Value	Sig level	Sig

			n					
V 1	208	22	20.40	5.21	5.10	0.000	0.05	Sig

SMA = Arithmetic average, Sig = significance

Source: Prepared by the researcher, based on SPSS 22 out-puts

The hypothetical average represents the number of statements in the lowest value added to the number of statements in the highest value, all divided by the number 2. Of which 11 x 1 + 11 x 3 = 44/2 = 22 (see taple 8)

It is noted from Table 8 that the value of (T) for one sample is (T = 5.10), which is statistically significant, because the value of significance calculated is equal to (0.000), which is smaller than the level of significance adopted by us (0.05). This means that there are statistically significant differences between the hypothetical mean (22) and the arithmetic mean (20.40) for the impact of the determinant of higher education policies on the development and establishment of high-tech innovative projects, and the differences are in favor of the arithmetic mean. This indicates that there is a statistically significant effect of specific higher education policies on the development and establishment of innovative high-tech projects.

Thus, we notice that the probability value Sig is less than or equal to the value of α. Where: (Sig = 0,000 ≤ 0.05), thus we reject the null hypothesis H0 and accept the alternative hypothesis H1. So: There is a statistically significant effect of the determinant of higher education policies in the development and establishment of innovative high-tech projects in the Algerian University at the level of significance of 5%.

4.6.2. Second Hypothesis:

- **H0:** There are no significant differences for higher education policies in the development and creation of high-tech innovative projects in the Algerian university due to personal variables at the level of significance of 5%.
- **H1:** There are significant differences in the policies of higher education in the development and establishment of innovative high-tech projects in the Algerian university due to personal variables at the level of significance of 5%.

To test this hypothesis, the multiple analysis of variance method was used, as shown in Table9:

Table 9. Second hypothesis test

Variable	Squares	Freedom degrees	Mean of squares	F value	Sig	Statistical significance
Gender	8.901	49	0.182	0.18	0.82	not Sig

				1	2	
Age	80.913	49	1.651	1.324	0.09	not Sig
Educational level	26.525	49	0.541	1.307	0.1	not Sig
Scientific research fields	90.24	49	1.841	1.339	0.081	not Sig
A member of a laboratory or research team within the university	5.547	49	0.113	0.98	0.517	not Sig
A member of a laboratory or research team outside the university	9.892	49	0.202	1.042	0.407	not Sig
Number of high-tech research projects completed	59.323	49	1.211	0.706	0.927	not Sig
Number of high-tech innovative projects completed	27.415	49	0.559	0.845	0.757	not Sig

Source: Prepared by the researcher, based on SPSS 22 out-puts

According to Table 9 above, we noticed that the mean of the squares for the gender variable was estimated at (0.182) with one degree of freedom (49), while the mean of the squares for the age variable was (1.324) with a degree of freedom (49). The mean squares for the educational level variable was (1.307) with a degree of freedom (49), while the mean squares for the principles of scientific research variable was (1.339) with a degree of freedom (49). The mean of squares for the variable of a member of a laboratory or research group inside the university was (0.980) with one degree of freedom (49), and the mean of squares for the variable of a member of a laboratory or research group outside the university was (1.042) with one degree of freedom (49). While the mean squares for the variable of the number of completed high-technology research projects was (0.706) with a degree of freedom (49), while the mean squares for the variable of the number of innovative high-technology projects completed was (0.845) with a degree of freedom (49).

The statistical significance was the values of (f) in relation to the status of gender, age, educational level, fields of scientific research, a member of a laboratory or research team inside the university, a member of a laboratory or research group outside the university, the number of completed high-tech research projects, the number of completed innovative high-tech projects and the interaction between them, respectively as follows: (0.181, 1.324, 1.307, 1.339, 0.980, 1.042, 0.706, 0.845), all of which are non-significant at the significance level of 0.05. Thus, we say that there are no essential differences for the development and establishment of high-tech innovative projects in the Algerian University due to personal variables at the level of significance of 5%.

Note that all Sig values are greater than or equal to α. where: (Sig = 0,000 ≥ 0.05), thus we

reject the alternative hypothesis H1 and accept the null hypothesis H0. So: There are no significant differences for higher education policies in the development and creation of high-tech innovative projects in the Algerian university due to personal variables at the level of significance of 5%.

4.7. Study results discussion

The results of the field study indicated that:

- According to the study sample, higher education policies hinder scientific advancement (the first hypothesis' arithmetic mean is 20.40), failing to fulfill their intended purpose, particularly when it comes to the development and inception of high-tech innovative projects at Algerian universities.
- According to the study sample, we conclude from the study's earlier findings that the policies for higher education pursued by the Ministry of Higher Education and Scientific Research and implemented at the university act as a barrier to the creation and establishment of creative high-tech projects in Algerian universities.
- It should be noted that the development and establishment of novel high-tech projects in the Algerian University are influenced by the determinant of higher education policies in a statistically significant way; the findings also revealed that:
    - The solution to the study problem is that higher education policies have a statistically significant impact on the creation and implementation of creative high-tech projects at the Algerian University.
    - It was discovered that there are no significant differences in the development and establishment of high-tech innovative projects at the Algerian University due to the personal data variable.

5. Results analysis

We concluded that higher education policies in Algerian universities constitute the inhibitory element in the development of innovative projects with high technology, so that the main result was the presence of a statistically significant effect of higher education policies in the development and establishment of innovative projects with high technology in the Algerian university, and we also concluded a set of results, the most important are :

1- The Algerian university is not interested in implementing higher education policies within its walls. Especially when it comes to its financial policies (financial contributions made by institutions to it, the system of wages and salaries approved by the university, material, moral and financial incentives such as gifts, certificates of thanks and gratitude, bonuses and competencies, medals...etc). Which constitutes a non-motivating factor for the researcher to develop innovative high-tech projects.
2- There is a statistically significant effect of higher education policies on the development of innovative high-tech projects at the 5% level of significance.
3- There are no significant differences for higher education policies in the development and creation of high-tech innovative projects in the Algerian university due to personal variables at the level of significance of 5%.

Some recommendations can be made based on the foregoing to officials in the higher education sector in general, and the university in particular, who can benefit from them, namely:

1- the need for the Algerian university to pay attention to higher education policies implemented within its walls, by reviewing its financial policies, and by activating its wages

and salaries system. In addition to providing financial incentives (such as gifts, competencies, bonuses, and so on), which motivate and encourage the researcher to compete scientifically, thus contributing to the development of innovative high-tech projects.

2- It is necessary to consider reducing professors' hourly workload in order to ensure their commitment to scientific research and technological innovation.
3- Pay premium bonuses to researchers and professors to show appreciation for their efforts.

5. Conclusion

Since independence until today, higher education policies at Algerian universities have undergone significant change and development. The Ministry of Higher Education and Scientific Research attempted to enact several laws in order to attract scientific researchers and give the Algerian university the role it deserves in the country and abroad, but it was insufficient and even served as an impediment.

Through our examination of the topic of higher education policies' contribution to the development of innovative high-tech projects. We came to the conclusion that the various higher education policies and strategies followed by the Ministry concerned with the Algerian University needed to be reconsidered in order to motivate and encourage university researchers to produce, create, and value scientific projects in general, and technological projects with high technological potential in particular.

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