

The role of scientific research in developing entrepreneurial culture: A case study of Abbas Laghrour University -Khenchela-

دور البحث العلمي في تنمية الثقافة المقاولاتية دراسة حالة
جامعة عباس لغرور -خنشلة-

*** Baara nadjmeddine**

Djebbari abdeldjalil

Abbas Laghrour University -Khenchela-Algeria

Laboratory of Business Incubators and Local Development - Algeria

Baara.nadjmeddine@univ-khenchela.dz

djebbari.abdeldjalil@univ-khenchela.dz

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Abstract : This study aims to determine the effectiveness of scientific research in developing entrepreneurial culture and to identify the relationship between the study variables, which include scientific research and entrepreneurial culture. The study concluded that education and training in entrepreneurship should start from early academic stages, and there is a need for more tax incentives to support entrepreneurs. It is also necessary to allocate a portion of scientific research budgets to support projects that aim to transform research into marketable products and services.

Key words: Scientific research, entrepreneurial culture, entrepreneurs

JEL classification codes: A2, L26

1. Introduction:

Entrepreneurship is considered the main driver of economic and social growth, contributing to the creation of new job opportunities, providing innovative solutions to complex problems, and promoting sustainable development. However, companies face a number of challenges that hinder growth, including lack of funding, lack of expertise, and difficulty accessing markets. In this context, scientific research plays a role in providing entrepreneurs with the support they need by equipping them with the tools and knowledge necessary to turn their ideas into tangible reality. Scientific research also contributes to fostering an entrepreneurial culture and embedding the values of creativity and innovation among young people by developing new business models, offering consultations, and providing data and information.

1.2 Main issue: The importance of linking scientific research to practical reality and directing it towards solving societal problems is increasing. One of the most important solutions is to encourage the entrepreneurial spirit and work on its development. Based on the above, the main question of the issue can be formulated as follows: **To what extent is scientific research effective in developing the entrepreneurial culture?**

1.3 Sub-questions: In the course of this study, we attempt to answer the main question by posing the following sub-questions:

- Is there a correlation between the dimensions of scientific research and entrepreneurial awareness?
- Is there a correlation between the dimensions of scientific research and entrepreneurial education and training?
- Is there a correlation between the dimensions of scientific research and support and funding?
- Is there a correlation between the dimensions of scientific research and the legal and regulatory framework?

1.4 Study hypotheses: In order to conduct a study that takes into account the aforementioned issue, the main hypothesis of the study has been formulated as follows:

"There is a statistically significant relationship between the effectiveness of scientific research and the development of entrepreneurial culture."

It has been divided into four sub-hypotheses as shown below:

The first sub-hypothesis: There is a correlation between the dimensions of scientific research and awareness of entrepreneurship.

The second sub-hypothesis: There is a correlation between the dimensions of scientific research and entrepreneurial education and training.

The Third sub-hypothesis: There is a correlation between the dimensions of scientific research and support and funding.

The fourth sub-hypothesis: There is a correlation between the dimensions of scientific research and the legal and regulatory framework.

1.5 Study objectives: Through this study, we aim to achieve the following objectives:

- Understanding the theoretical framework of scientific research and entrepreneurial culture;
- Understanding the effectiveness of scientific research in developing entrepreneurial culture;
- Defining the relationship between the study variables that include scientific research and entrepreneurial culture;

1.6 Study Methodology: This study was prepared using the descriptive-analytical method to analyze the dimensions of scientific research as well as entrepreneurial culture. The hypotheses were subjected to a set of statistical methods in data analysis, and correlation coefficients were used to determine the relationship between the study variables. The results were obtained using the SPSS statistical software.

1.7 Previous studies:

- a. Mohamed Samir Taiba (2024) titled:** "Developing Entrepreneurial Culture in the University Environment as a Mechanism for Valuing Scientific Research Results in Algeria within the Framework of Ministerial Decision 1275." This study aimed to highlight the role that Ministerial Decision No. 1275, dated 27.09.2023, can play in scientific

research results by primarily encouraging students and researchers to transform their research outcomes into institutions that contribute to economic development, register their innovations, protect them, and exploit them. The study concluded that there are forms of valuing scientific research results as a result of implementing Decision 127)

- b. Rabih Abdel Rahman, Sarah Al-Zahra (2021) titled:** "Entrepreneurial Culture as a Means to Establish the Entrepreneurial Process." This study aimed to understand the importance of entrepreneurial culture in fostering innovation and achievement and to identify ways to disseminate it to achieve the economic and social goals pursued by entrepreneurship. By analyzing the channels that contribute to spreading entrepreneurial culture, the study reached a fundamental conclusion that entrepreneurship helps utilize dormant energies and achieve economic growth by stimulating the economy.

- 1.8 The position of this study among previous studies:** Our study topic combines the variables of scientific research and entrepreneurial culture, as previous studies have not addressed the relationship between these variables, making it more comprehensive and detailed.

This study is characterized by proposing a scientific guide on the effectiveness of scientific research and entrepreneurial culture.

2. The theoretical aspect of the study:

2.1 Concepts of scientific research and entrepreneurial culture

a. The concept of scientific research:

Scientific research is defined as the systematic investigation of scientific facts using new and specific methods and approaches with the aim of verifying their accuracy, correcting them, and adding new facts. It is also defined as an intellectual endeavor conducted with a research methodology that produces logical and objective results and is used to solve problems related to knowledge, people, and society. (Hijab, 2002, p. 14)

It is also defined as "a systematic scientific activity, a way of thinking, a method of examining facts, an attempt to clarify facts, and reliance on objective methods to understand the connections between these facts, and to derive general principles, general laws, and interpretive laws." (Thalayjiya, 2020, p. 104)

Through these definitions, it becomes clear to us that the goal of scientific research is to reach solutions to cognitive, human, and social problems by considering the elements of the integrated organization of the steps of scientific research.

b. The nature of entrepreneurial culture:

Where entrepreneurial culture is considered a habitual and traditional way of thinking and acting, characterized by sharing and participation among the members of the organization, and is gradually instilled in new members to gain acceptance within the organization. (Rawabih Abdulrahman & Sarar Al-Zahra, 2021, p. 57)

Or it is the sum of skills and knowledge acquired by an individual or a group of individuals, applied to capital investment through the generation of innovative ideas and attempts to benefit from them. In addition to planning, decision-making, organization, and management, it also includes behavior, motivation, and the response of entrepreneurs. This culture is established through three main areas: family, school, and institution. (Oubakhti Nasira, Boujanan Tawfiq, & Marwan Muhammad Al-Nasour, 2020, p. 745)

Entrepreneurial culture can be defined as the skills, knowledge, and achievements possessed by individuals, which are used in investments and projects to develop new and valuable innovations.

2.2 The effectiveness of scientific research in developing entrepreneurial culture:

Entrepreneurship in the university environment is one of the most important fields that require strategic thinking to establish effective mechanisms for achieving sustainable development and innovation. In this section, we will review some of the current mechanisms adopted to develop entrepreneurship in the university setting.

a. Incubation at the university incubator level:

There are several aspects to the process of incubating a project in a university incubator:

- Identifying innovative emerging projects within research institutes and research teams through outreach activities and identifying high-potential projects.
- The most promising projects are selected according to the criteria of scientific and technical feasibility and intellectual property.

Embracing projects in itself consists of:

- Helping organizations in project preparation (project formulation and business planning).
- Providing facilities, access to university equipment and resources.
- Support, advice, and training in entrepreneurship and innovation management.
- Facilitating financing.
- Communicating with industry partners and academics.(ROUBIA, S & MOKHTARI, A, 2023, pp. 284-285)

b. Centers for Technology and Innovation Support in Universities (CATI):

The Technology and Innovation Support Center was established at the university level under an agreement with the National Institute for Industrial Property Protection. Under this agreement, the center collaborates with the National Institute for Industrial Property Protection and, through it, with the World Intellectual Property Organization to protect innovation in preparation for its use. It is responsible for providing services to researchers and university students within the framework of the following main services:

- Helping students and researchers create the registration file and place it at the institute level in preparation for the registration process after its confirmation.
- Enabling access to practical and technical resources online.
- Access to publications related to industrial property rights.

- Assisting in locating information related to technology.(Taiba, 2024, p. 28)

3. The practical aspect of the study:

3.1 Study Population and Sample: Given the impossibility of conducting a field study on all categories of the Faculty of Economic Sciences at Abbas Laghrour University - Khenchela, a sample was randomly selected from the study population due to the inability to cover the entire population. This sample consists of students and professors from the faculty. The number of questionnaires distributed to the sample was 100, of which 86 were retrieved. However, the number of questionnaires valid for statistical analysis was 63, resulting in a response rate of 63%.

3.2 Study tools:

a. Data collection tools: In order to achieve the study's objectives, data was collected through:

- **Observation:** It is a cornerstone of any research as it allows the researcher to examine the institutional environment. In this study, the teaching method and the encouragement style of the college students were observed.

- **The questionnaire:** It is the main tool for collecting data and information regarding the study variables, and it included three main axes, which are:

- ✓ The first axis: Related to the personal data of the study sample.
- ✓ The second axis: related to analyzing the effectiveness of scientific research.
- ✓ The third axis: Related to analyzing the development of entrepreneurial culture.

The answer to each statement according to the five-point Likert scale was as follows:

Table(1): Minimum and maximum limits of the five-point Likert scale.

Classification	Stronglyagree	Agreed	Neutral	Disagree	Stronglydisagree
The points	5	4	3	2	1

Source: Prepared by the researchers

b. Statistical tools used in the study: In order to test the study hypotheses, the data was entered into the SPSS program, in addition to the following statistical tools:

- **The arithmetic mean:** It is one of the measures of central tendency used to determine the level of response to the items.

- **Hypothetical mean:** We assume that the studied sample does not have any bias in the responses, whether towards acceptance or rejection, so the number of choices is averaged to 03 as a hypothetical mean.

- **Standard deviation:** It is used to determine the level of dispersion of the sample members' responses from their arithmetic mean.

- **Pearson's simple linear correlation coefficient:** This is used to detect the strength or degree of the relationship between two variables, and the degree of the relationship between any two variables is expressed by the correlation coefficient, which ranges between [1+, 1-]. The closer the correlation degree is to 1, the stronger the correlation between the two variables, and vice versa.

3.3 Testing the study hypotheses: This is done through analyzing the personal data of the study sample, measuring the reliability of the study questionnaire, leading to the testing of the study hypotheses, as follows:

a. Measuring the reliability of the study questionnaire:

Table(2): Measurement of the study's reliability and questionnaire

The axis	Number of phrases	Alpha Cronbach
Scientific research activity	16	0.921
Development of entrepreneurial culture	16	0.947
The survey as a whole	2	0.976

Source: Prepared by the researchers based on the outputs of the SPSS program.

It is clear from the table above that the Cronbach's alpha coefficient for the entire questionnaire reached 0.976, which are statistically

good values. Additionally, the Cronbach's alpha coefficients for all axes are statistically acceptable, thus confirming the reliability of the study questionnaire and its validity for analyzing the results and answering the study questions.

b. Analysis of the central tendency and dispersion of the study sample response: In order to describe the study in a complete and detailed manner, it is necessary to organize, summarize, and quantitatively describe the data using two tools: the arithmetic mean and the standard deviation. The following table illustrates this:

Table(3): It illustrates the measurement of central tendency and dispersion for the study response (second axis).

The axis	Phrases	The arithmetic mean	Standard deviation
2	Ease of access to the required scientific sources	4,56	0,501
	Scientific publishing develops knowledge according to the specialization.	4,11	0,698
	Group research projects help professors and students conduct excellent scientific research by providing them with a wealth of information.	4,35	0,481
	The presence of support from your supervisor or colleagues at the university in the field of scientific research.	4,65	0,481
	Scientific publishing	4,4175	0,54025
	Legal or administrative obstacles affect the process of obtaining patents.	4,44	0,501
	The need to increase awareness about patents through workshops and awareness days.	4,3	0,463
	The regulatory authorities do not provide sufficient support for filing patent applications.	4,1	0,665

Obtaining patents enhances the value of innovation.	4,06	0,669
Patents	4,225	0,5745
The current financial support is insufficient to conduct your scientific research.	4,57	0,499
Providing sufficient resources (such as libraries, databases, and research labs) supports your scientific research.	4,67	0,475
Spending on scientific research in Algeria aligns with the needs of national development.	4,44	0,501
Increasing spending on scientific research leads to improving the quality of higher education.	4,3	0,463
Spending on scientific research	4,495	0,4845
Awards and honors play a role in motivating individuals towards research and innovation.	4,35	0,481
Educating about intellectual property rights contributes to fostering innovation.	4,65	0,481
Universities and research centers play a sufficient role in supporting innovation.	4,44	0,501
The need for more collaboration between the academic and industrial sectors to enhance innovation.	4,3	0,463
Innovation	4,435	0,4815
Scientific research activity	4,393125	0,5201875

Source: Prepared by the researchers based on the outputs of the SPSS program.

It is evident from the above table related to the second axis of the study that the overall arithmeticmean of scientific research effectiveness is estimated at (4.39) with a standard deviation of (0.52), which is greater than the hypothetical mean (3). This indicates the degree of agreement of the study sample on the effectiveness of scientific research through the ease of access to the required scientific sources, as the arithmetic mean is estimated at (4.56) with a standard deviation of (0.561). The availability of sufficient resources (such as libraries, databases, and research laboratories) supports scientific research with an arithmetic mean of (4.67) and a standard deviation of (0.475).

Table(4): It shows the measurement of central tendency and dispersion for the study response (third axis).

The axis	Phrases	The arithmetic mean	Standard deviation
3	Entrepreneurship plays an important role in economic development.	4,1	0,665
	Universities and educational institutions promote entrepreneurial culture adequately.	4,06	0,669
	The media and society have a role in spreadingthis culture.	4,57	0,499
	Media campaignscontribute to spreading entrepreneurial culture among youth groups.	4,67	0,475
	Awareness of entrepreneurship	4,35	0,577
	Scientific research contributes to the development of an entrepreneurial culture by guiding innovation and continuous improvement.	4,44	0,501
	Scientific research contributes to the development of leadership and management skills among entrepreneurs.	4,3	0,463
	Scientific research contributes to improving management decisions and strategic planning for entrepreneurial projects.	4,35	0,481
	Education and training in entrepreneurship should start from early academic stages.	4,65	0,481
	Entrepreneurial education and training	4,435	0,4815
	The support and funding currently	4,44	0,501

available are sufficient to enhance the entrepreneurial culture in your region.		
Government financial support is essential to promote an entrepreneurial culture.	4,3	0,463
Banks provide sufficient facilities to finance small and medium enterprises.	4,1	0,665
There is a need for more tax incentives to support entrepreneurs.	4,06	0,669
Support and funding	4,225	0,5745
The need for more transparency in legal procedures related to entrepreneurship.	4,06	0,669
Legal or economic obstacles affect the application of entrepreneurial culture principles.	4,57	0,499
The current laws do not adequately support the establishment of startups.	4,67	0,475
The legal procedures related to the establishment of small and medium enterprises should be simplified.	4,44	0,501
The legal and regulatory framework	4,435	0,536
Development of entrepreneurial culture	4,36125	0,54225

Source: Prepared by the researchers based on the outputs of the SPSS program.

- It is evident from the above table related to the third axis of the study that the overall arithmetic mean for the development of entrepreneurial culture is (4.36) with a standard deviation of (0.54), which means that the overall arithmetic mean is greater than the hypothetical arithmetic mean (3). This indicates the degree of agreement of the study sample on the development of entrepreneurial culture through entrepreneurship, which plays an important role in economic development with an arithmetic mean of (4.1) and a standard deviation of (0.665). The legal procedures related to the establishment of small and medium enterprises should be simplified with an arithmetic mean of (4.44) and a standard deviation of (0.536).

c. Testing the study hypotheses:

The first hypothesis:"There is a correlation between the dimensions of scientific research and awareness of entrepreneurship at a significance level of 0.05."

The second hypothesis:"There is a correlation between the dimensions of scientific research and entrepreneurial education and training at a significance level of 0.05."

The third hypothesis:"There is a correlation between the dimensions of scientific research and support and funding at a significance level of 0.05."

The fourth hypothesis:"There is a correlation between the dimensions of scientific research and the legal and regulatory framework at a significance level of 0.05."

Pearson correlation was used to measure the correlation between the dimensions of the study (the second axis with the third axis).

- Dimensions of scientific research and awareness of entrepreneurship:

Table(5): It illustrates the measurement of the correlationbetween the dimensions of scientificresearch and entrepreneurial awareness.

Scientific publishing	Pearson Correlation	0,565**
	Sig. (2-tailed)	0,000
	N	63
Patents	Pearson Correlation	0,906**
	Sig. (2-tailed)	0,000
	N	63
Spending on scientificresearch	Pearson Correlation	0,842**
	Sig. (2-tailed)	0,000
	N	63
Innovation	Pearson Correlation	0,785**
	Sig. (2-tailed)	0,000
	N	63

Source: Prepared by the researchers based on the outputs of the SPSS program.

- Through the table above, it is evident that the degree of correlation between the dimensions of scientific research and entrepreneurial awareness is as follows: the correlation between scientific publishing and entrepreneurial awareness is estimated at (0.565), between patents and entrepreneurial awareness is estimated at (0.906), between spending on scientific research and entrepreneurial awareness is estimated at (0.842), and between innovation and entrepreneurial awareness is estimated at (0.785).
- The results confirmed that there is a strong correlation and a strong direct relationship between the dimensions of scientific research and entrepreneurial awareness, and that the significance level is less than 5%.
- Based on the above, we accept the first study hypothesis, which states that "there is a correlation between the dimensions of scientific research and awareness of entrepreneurship" at a significance level of 5%.

- Dimensions of scientific research and entrepreneurial education and training:

Table (6): Illustrates the measurement of the correlation between the dimensions of scientific research and entrepreneurial education and training.

Scientific publishing	Pearson Correlation	0,719**
	Sig. (2-tailed)	0,000
	N	63
Patents	Pearson Correlation	0,852**
	Sig. (2-tailed)	0,000
	N	63
Spending on scientific research	Pearson Correlation	0,889**
	Sig. (2-tailed)	0,000
	N	63
Innovation	Pearson Correlation	1,000**
	Sig. (2-tailed)	0,000
	N	63

Source: Prepared by the researchers based on the outputs of the SPSS program.

- Through the above table, it is evident that the degree of correlation between the dimensions of scientific research and entrepreneurial education and training is as follows: the correlation between scientific publishing and entrepreneurial education and training is estimated at (0.719), the correlation between patents and entrepreneurial education and training is estimated at (0.852), the correlation between spending on scientific research and entrepreneurial education and training is estimated at (0.889), and the correlation between innovation and entrepreneurial education and training is estimated at (1.000).
- The results confirmed that there is a strong correlation and a strong direct relationship between the dimensions of scientific research and entrepreneurial education and training, with a significance level of less than 5%.
- Based on the above, we accept the second study hypothesis, which states that "there is a correlation between the dimensions of scientific research and entrepreneurial education and training" at a significance level of 5%.

-Dimensions of scientific research, support, and funding:

Table (7): It illustrates the measurement of the correlation between the dimensions of scientific research and support and funding.

Scientific publishing	Pearson Correlation	0,495**
	Sig. (2-tailed)	0,000
	N	63
Patents	Pearson Correlation	1,000**
	Sig. (2-tailed)	0,000
	N	63
Spending on scientific research	Pearson Correlation	0,838**
	Sig. (2-tailed)	0,000
	N	63
Innovation	Pearson Correlation	0,852**
	Sig. (2-tailed)	0,000
	N	63

Source: Prepared by the researchers based on the outputs of the SPSS program.

- Through the table above, it becomes clear that the degree of correlation between the dimensions of scientific research and support and funding is as follows: the correlation between scientific publishing and support and funding is estimated at (0.495), the correlation between patents and support and funding is estimated at (1.000), the expenditure on scientific research and support and funding is estimated at (0.838), and the correlation between innovation and support and funding is estimated at (0.852).
- The results confirmed that there is a strong correlation and a strong direct relationship between the dimensions of scientific research and support and funding, and that the significance level is less than 5%.
- Based on the above, we accept the third study hypothesis, which states that "there is a correlation between the dimensions of scientific research and support and funding" at a significance level of 5%.

- Dimensions of scientific research and the legal and educational framework:

Table (8): It illustrates the measurement of the correlation between the dimensions of scientific research and the legal and educational framework.

Scientific publishing	Pearson Correlation	0,506**
	Sig. (2-tailed)	0,000
	N	63
Patents	Pearson Correlation	0,904**
	Sig. (2-tailed)	0,000
	N	63
Spending on scientific research	Pearson Correlation	0,952**
	Sig. (2-tailed)	0,000
	N	63
Innovation	Pearson Correlation	0,848**
	Sig. (2-tailed)	0,000
	N	63

Source: Prepared by the researchers based on the outputs of the SPSS program.

- Through the above table, it is evident that the degree of correlation between the dimensions of scientific research and the legal and regulatory frame work is as follows: the correlation between scientific publishing and the legal and regulatory framework is estimated at (0.506), the correlation between patents and the legal and regulatory framework is estimated at (0.904), the expenditure on scientific research and the legal and regulatory framework is estimated at (0.952), and the correlation between innovation and the legal and regulatory framework is estimated at (0.848).
- The results confirmed that there is a strong correlation and a strong direct relationship between the dimensions of scientific research and the legal and regulatory frame work, with a significance level of less than 5%.
- Based on the above, we accept the fourth study hypothesis, which states that "there is a correlation between the dimensions of scientific research and the legal and regulatory framework" at a significance level of 5%.

4.Conclusion:

- ✓ Linking scientific research with entrepreneurship represents a strategic investment for the future, as it contributes to creating a knowledge-based and innovation-driven economy. However, more studies are needed to deepen the understanding of the relationship between these two fields. Scientific research can contribute to the development of new tools and technologies to support entrepreneurs, such as artificial intelligence and big data analysis. It can also contribute to the development of innovative business modelsthat help solve global challenges. By investing in scientific research and enhancing cooperation among various stakeholders, we can build a prosperous and sustainable economy.
- ✓ After analyzing and interpreting the data and information and testing the study hypotheses, the results were reached as follows:
- ✓ The data confirmed the interest of professors and students at the Faculty of Economic Sciences in developing

entrepreneurial culture in its dimensions: awareness of entrepreneurship, entrepreneurial education and training, support and financing, and the legal and regulatory framework. The sample agreed that entrepreneurship plays an important role in economic development and that legal procedures related to the establishment of small and medium enterprises should be simplified.

- ✓ The study sample agreed on the effectiveness of scientific research through the ease of access to the required scientific sources, where the arithmetic mean was (4.56), which is an acceptable value. Following the effectiveness of scientific research represented by spending on scientific research, the highest arithmetic mean was (4.495), which serves as a tool to encourage the increase of scientific research effectiveness among the college's professors and students.
- ✓ The sample community was concerned with developing entrepreneurial culture to varying degrees and levels of positivity. The arithmetic mean value of the total dimensions of entrepreneurial culture development was (4.36). The highest value was attributed to the dimension of entrepreneurial education and training with an arithmetic mean of (4.435), followed by the legal and regulatory framework with an arithmetic mean of (4.435). Next was the dimension of entrepreneurial awareness with an arithmetic mean of (4.35), and finally, the dimension of support and financing. (4.225).
- ✓ The results and analyses showed that the entrepreneurial education and training dimension achieved the highest level of alignment, which is due to the fact that education and training in entrepreneurship should start from early educational stages.
- ✓ The results showed that the lowest level of agreement was regarding the support and financing aspect, as there is a need for more tax incentives to support entrepreneurs.
- ✓ Where the results of the statistical analysis confirmed that there is a strong correlation and a strong direct relationship between the dimensions of scientific research and entrepreneurial culture, and that the significance level is less than 5%. Indicating the existence of a statistically significant

relationship between the effectiveness of scientific research and the development of entrepreneurial culture.

The recommendations of this study were summarized as follows:

- Entrepreneurship principles should be integrated into various curricula, starting from undergraduate programs to postgraduate studies.
- The necessity of providing a supportive environment for student entrepreneurs by establishing business incubators that offer them the necessary resources and guidance.
- Guiding researchers towards conducting applied research that contributes to solving community problems and generates ideas for new projects.
- The necessity of allocating a portion of scientific research budgets to support projects aimed at transforming research into marketable products and services.
- It is necessary to simplify bureaucratic procedures and provide tax incentives for startups.

Suggestions related to the topic:

- The impact of scientific research on enhancing innovation.
- Strategies to enhance scientific research in the service of entrepreneurship

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