Vol.8 Issue.4 2023

RSEP Review of Socio - Economic Perspectives
ISSN: 2149 - 9276
E-ISSN: 2547-9385

Study of entrepreneurial intention and its influencing factors among researchers: A case study of Algerian researchers

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DOI: https://doi.org/10.19275/RSEP168

Article Type: Original/Research Paper

Article History
Received: 25 August 2023 Revised: 25 November 2023 Accepted: 1 December 2023 Available Online: 7 December 2023

Keywords: entrepreneurial intention; researchers; universities; business creation (Spin-Off); scientific research; commercialization (Valorization).
JEL classification: M13; O3

Citation: Amina, M. & Ouali, A. (2023). Study of entrepreneurial intention and its influencing factors among researchers: A case study of Algerian researchers, *Review of Socio-Economic Perspectives*, 8(4), 31-58.

Abstract

This study aimed to assess the entrepreneurial intention of Algerian researchers in creating academic spin-offs. A survey involving 230 researchers from various national universities and research centers, revealed limited interest in entrepreneurship. Key factors influencing this inclination are desirability, feasibility, and opportunity perception, despite their low levels in the sample. To promote the establishment of such ventures, a comprehensive framework covering legislative, cultural, and financial aspects is crucial to enhance universities' capacity in forming spin-offs.

1. Introduction

According to modern economic theories, a nation's development is closely related to its scientific and technological capabilities. The competitiveness of a country is showcased through the excellence of its products in the market, and these products are the direct outcomes of scientific research and technological innovation. As a result, numerous universities are now placing emphasis on transforming their research efforts into profitable enterprises, making substantial contributions to economic growth and development. One notable strategy in this regard is the establishment of subsidiary companies affiliated with the university, which serves as an important mechanism to enhance efficiency in this process.

Therefore, universities aiming to emphasize economic and regional development should concentrate on the valorization and commercialization of the outcomes of scientific research. While creations of enterprises stemming from universities—academic spin-offs—constitute a less frequent phenomenon than other mechanisms such as research contracts, consultations by researchers with businesses, collaborative projects and patent applications, the positive effects of these enterprise creations are recognized as highly significant.

Algeria has a significant number of universities, research centers, and training institutions, producing a wide range of graduates in various scientific and technical fields each year. Nevertheless, it's evident that the effort to turn research outcomes into practical applications remains relatively low and limited. There is a clear political orientation towards enhancing and supporting Start-up enterprises in Algeria, which explains the emphasis on promoting and fostering innovation. This is visible through various initiatives aimed at encouraging innovation within academia, such as activating university-affiliated business incubators and various scientific events and programs that promote entrepreneurship and innovation, such as Resolution 1275 regarding startup certification. Moreover, this orientation extends to the economic sector by incentivizing open innovation strategies that revolve around granting substantial tax exemptions for institutions that exploit scientific research services and benefiting from the innovative solutions it offers to them.

This aspect has led us to genuinely seek to identify the factors influencing entrepreneurial intention among researchers through a sample of researchers from various national universities and research centers affiliated with the Ministry of Higher Education and Scientific Research, focusing on the following problematic:

Is there a strong entrepreneurial intention among university researchers? To address this problem, we will also attempt to identify the factors that may influence the formation of this entrepreneurial intention through the exploration of the following questions:

- Does the entrepreneurial intention of Algerian researchers vary according to their level of entrepreneurial desirability?
- Does the entrepreneurial intention of Algerian researchers vary based on their perception of entrepreneurial feasibility?
- Does the entrepreneurial intention of Algerian researchers vary based on their perception of entrepreneurial opportunities in their environment?
- Does affiliation with a research institution (university, research center, or other) influence entrepreneurial intention?
- Do Socio-demographic variables have an influence on determining the entrepreneurial intention of Algerian researchers?

General Hypothesis and Subsidiary Hypotheses: Our review of multiple studies in this field and the study of well-established theories have led us to develop the following hypotheses:

- The first hypothesis: The main hypothesis: Algerian researchers have a strong entrepreneurial intention.
- The second hypothesis: Entrepreneurial intention among Algerian researchers depends on their perception of the desirability of starting a business.
- The third hypothesis: Entrepreneurial intention among Algerian researchers depends on their perception of the feasibility of starting a business.
- The fourth hypothesis: Entrepreneurial intention among Algerian researchers depends on their perception of opportunities in their environment.
- The fifth hypothesis: Affiliation with a research institution (university, research center, or other) influences entrepreneurial intention.

- The sixth hypothesis: Socio-demographic variables influence the entrepreneurial intention of Algerian researchers.

In this context, our work holds significance in finding ways to encourage entrepreneurship among a group that is not naturally inclined toward it: higher education researchers. Although the link between intention and action may not be immediate or certain, it plays an important role in predicting the potential for entrepreneurship within the academic realm.

Theoretically, the article draws upon social psychology theories, notably Ajzen's Theory of Planned Behavior (1991) and the Entrepreneurial Event Formation Model (Sokol and Shapero, 1982). Empirically, we have opted to employ a questionnaire developed based on the conducted literature review and existing models, targeting a sample of Algerian researchers.

To effectively conduct our study, the present article is structured as follows: firstly, it outlines the theoretical framework within the current state of research on entrepreneurial intention. Secondly, the study outlines the research methodology, presents the findings, offers a discussion, and finally, suggests recommendations to promote the creation of academic spin-offs within the Algerian context.

2. Academic Spin-offs: A Strategy for Enhancing the Worth of Scientific Research Outputs

The valorization of scientific research is not a novel concept; it is an anticipated outcome of scientific research endeavors and one of the three core functions of universities: education, research, and community service. The valorization of scientific research can be conceived in multiple ways, notably through patent registration. The latter can be sold, offered as equity in companies, or licensed to other firms for utilization. Lastly, the exploitation of research findings can extend to the establishment of enterprises by the researchers themselves, which forms the focal point of our study.

Numerous nations have shown a deep interest the domain of scientific research valorization, primarily because of its key role in fostering economic progress. Simultaneously, they acknowledged the need to preserve the intellectual and material rights of researchers. As a result, many countries have introduced legal frameworks over time to facilitate the process of research valorization. These frameworks are designed to enable the economic utilization of research outcomes while at the same time maintaining and securing the rights and responsibilities of all involved parties: researchers, research institutions, and those who benefit from the research.

The United States of America has been a pacesetter in tackling this issue, most notably through the implementation of the Bayh-Dole Act in 1980. This law establishes a framework for collaboration among the research community, industry, and state and local governments, with a strong emphasis on the role of scientific research valorization in driving economic growth and innovation. Later on, this approach has been adopted by numerous countries, echoing the model of France’s Innovation and Research Law which was enacted in 1999 (The Law on Innovation and Research of July 12, 1999).

2.1 The principal of leveraging scientific research outputs for economic gain:

The valorization of scientific research results indicates adding value to research outcomes, creating a value of utilization for these results so that they do not remain solely for academic purposes (social valorization) and also creating exchange value through the commercialization of these results, which means the economic exploitation of these outcomes (economic valorization). Thus, According to Duranton, the concept of research valorization involves "enhancing, transferring, and efficiently managing activities and methods aimed at creating more economic value from academic knowledge and skills, and thus making research outcomes, knowledge, and competencies usable and marketable" (Boukheddimi, 2020).

In essence, valorization strives to effectively present and potentially commercialize the expertise and knowledge of researchers, along with the results of their scientific research projects (Battache et al., 2021). This materialization is achieved through various means such as patents, technology transfer, publications, know-how, licensing, and the establishment of academic spin-offs.

2.2 The importance of valorizing scientific research:

Valorizing the outcomes of scientific research primarily contributes to promoting innovation and consequently entrepreneurship, especially for startup enterprises that rely on them to achieve economic diversification and economic development, as the promotion of research outcomes is an important factor in driving economic dynamism.

- Promotes the transfer of technologies from public research to the economy and the creation of highly innovative companies with significant growth potential, such as startups.

- Numerous scientific research outcomes have made substantial contributions to addressing pressing national issues. For many countries, research conducted in universities plays an exceedingly crucial role in the national development strategy (Minh et al.,2022).
- The adoption of new technologies can enhance productivity, and innovation makes processes more efficient, allowing companies to offer higher-quality goods and services.
- Investments in research and development (R&D) and innovation enhance production capacity and support overall growth. R&D expenditure drives growth through its positive impact on innovation and total factor productivity.
- Establishing effective partnerships between research organizations and companies.
- Encouraging venture capital firms and other supportive institutions to establish themselves in geographical areas where universities are present, and thereby contributing to local economic growth.

2.3 The fundamental essence of spin-offs:

The academic spin-off is a means of economically valorizing work originating from university research. The term "academic spin-off" originated in the United States in the late 1970s, referring to spontaneous and independent companies emerging from universities or university laboratories in California and Boston. Subsequently, from the 1980s onwards, the concept proliferated across Europe and to take root in other countries worldwide (Pilar Pérez-Hernández, 2021).

The academic spin-off is a company that originates from the university and ultimately facilitates the commercialization, valorization, and exploitation of scientific knowledge for commercial and economic purposes. Therefore, it can be agreed upon to outline four criteria for designating a company as an academic spin-off:

- The originality and capability of the entrepreneur should be affiliated with the university research authority.
- Exploiting research results and transitioning them from their academic nature to their economic and industrial potential.
- Involvement of the university in supporting and guiding the spin-off creation process.
- The path of transforming scientific innovation into a business should be directly linked to the university.

Viewed from the researcher's standpoint, the establishment of a company is generally the most distant mode of valorization from their own scientific practice. Indeed, the university entrepreneur must possess a desire to create a business and be capable of reconciling the often disparate dynamics, objectives, and demands of the researcher's life with the business world (Emin, 2003). In simpler terms, the researcher must hold an entrepreneurial intention, a topic to be explored in the succeeding section.

2.4 The Factors Influencing the Valorization of Scientific Research, Especially in Establishing spin-offs

2.4.1 Macro Environment:

Governments of various countries, acknowledging the value and importance of knowledge and the commercialization of research in fueling economic development, have implemented policies in this regard. Changes have been introduced in university regulations, with a greater focus on academic patents and the issuance of licenses. This has created a favorable environment for university entrepreneurship (Hernández et al., 2021). As an example, the Bayh-Dole Act in the United States has been subsequently adopted in more than 20 countries worldwide.

One of the objectives of these laws is to manage the hybrid phase between the researcher's status and the entrepreneur's status. Their primary aim is to provide a legal framework that grants ownership rights of scientific research outcomes to universities, regardless of their source of funding, and simplifies procedures for the commercialization of university technology. This has created a conductive environment for university entrepreneurship and enabled leading universities to develop strategies to connect with their surroundings.

In addition to the legislative factor, numerous decisive factors are involved in the creation and promotion of spin-offs, such as environmental networks and contacts, supportive programs and financial infrastructure, the type of technology, intellectual property, founder characteristics, internal regulations, conflicts of interest, and management skills (Pilar Pérez-Hernández, 2021).

2.4.2 University

Universities play a fundamental role in the advancement of the nation. "Universities are not only agents of scientific progress and knowledge dissemination, but also a driving force for economic development through the exploitation of research outcomes." They are also regarded as a significant and diverse "reservoir" of future entrepreneurs and/or researchers (Jaziri & Paturel, 2010). The research and innovation conducted within universities address technological gaps; it stimulates investment, strengthens international trade and bolsters exports, and contributes to a vibrant economy. These university research activities also train a highly skilled and inventive workforce that forms the foundation of a successful knowledge-based economy.

The valorization of knowledge derived from research is no longer seen as a linear process but rather as a process based on multidirectional interactions among various different parties involved in the regional innovation system, where university incubators can play a role as facilitators of this engagement.

2.4.3 Cooperation Model:

Creating a spin-off is a highly significant endeavor that shifts the university's mindset from academia to enterprise, effectively tackling industry requirements through the transfer of technology from the academic realm to the industrial sector. To foster spin-off initiatives, universities have implemented organizational frameworks and protocols, including facilitating access to laboratory spaces, research equipment, skilled workforce, specialized facilities, and expert guidance. An illustrative example is Stanford University in Silicon Valley (Minh et al., 2022).

2.4.4 Investors

In the beginning, despite the significant growth potential stemming from the exploitation of inventions and technology transfer that generates high profits, spin-offs may encounter challenges in acquiring business capital. Furthermore, obtaining loans from banks and credit institutions proves to be difficult for them due to limited collateral and business documentation. Venture capital funds have invested in numerous manufacturing industries and achieved remarkable business outcomes in developed countries. Venture capital has established a business partnership model with SMEs. In addition to capital investment, these funds offer mentoring, industry networking, and business growth support. This model has actively contributed to providing capital for the development of highly profitable technology enterprises in the United States, such as Apple, Amazon, Alphabet (Google), Microsoft, Facebook,…etc.

2.5 Current Status of Research Valorization and Spin-off Creation in Algeria:

Algeria has approximately 54 universities and over 40 national schools. In the scientific research network, there are 6 agencies, 19 centers, 12 units, 124 National Research Program (PNR) projects, 28 State Public Scientific and Technological Establishment (EPST) projects, 4 research subsidiaries, 1661 laboratories, and around 40,500 educators (as of 2021), with nearly 47% holding the rank of professors (MESRS, 2022).

Recently, Algeria has shown an increasing interest in the valorization of scientific research, as part of the promotion of emerging institutions, which must inevitably be founded on enhancing innovation and scientific research. This has led to the economic valorization of public research results being perceived as a measure of prudent and responsible management of the nation's collective heritage.

2.5.1 The Legal Framework for Establishing Spin-offs

Currently, there is no specific legal framework for establishing incubators and accelerators, despite Algeria's overall efforts in research valorization. In this context, we can mention the following possibilities:

- A government employee can be affiliated with a company (up to a maximum of 30% ownership) without being its manager.
- Furthermore, a teacher can pursue a profitable activity within their area of expertise (as per executive decree 11-397 dated December 4, 2011).
- However, a new law exists concerning workers in a general manner. This is the law no. 22-16 amending the law no. 90-11 of April 21, 1990, regarding labor relations, signed on July 20, 2022 (Official Gazette no. 49, 2022, pp. 10-11), which now grants workers the right to an unpaid leave for entrepreneurial activities once during their professional career. They also have the option to opt for part-time work (for a period of up to one year, which can exceptionally be extended by an additional 6 months).
- While this law seems motivating, it doesn't necessarily adapt well to the specific case of a researcher who requires more support in managing the overlapping phase between their role as a government employee and that of an entrepreneur. They need to maintain a continuous connection with both the academic and

economic spheres to continue their research valorization process. Moreover, we believe that a duration ranging from one year to two and a half years might not be sufficient to adequately assess the success or failure of a spin-off, and to ultimately decide whether to return to the academic environment or not.

2.5.2 Challenges and Obstacles in Establishing Spin-offs in Algeria

- Limited budget allocated to scientific research, not exceeding 0.53% of the GDP (in 2017), of which approximately 90% of this budget is allocated to salaries (World Bank, 2021). In fact, 57 billion Algerian Dinar (DZD) was spent between 2015 and 2021, averaging over 8 billion DZD per year, whereas global R&D expenses amounted to around 7 billion dollars, with about ten countries concentrating 80% of the expenditures (UNESCO, 2022).
- Another notable observation arising from the level and averages of new high school graduates is the predominance of fields in the humanities and social sciences, to the detriment of fields in science and technology which could potentially be sources of innovation and research patents for commercialization. In fact, the humanities and social sciences (HSS) account for about 60% of the 1.6 million students in Algeria (2021) (Le Soir d'Algérie newspaper, 2022). These fields are not able to produce research outcomes for commercialization to the same extent as other domains (such as computer science, engineering, natural sciences, agriculture … etc), which are better aligned with the conditions for the emergence of the knowledge-based economy.
- Additionally, we can highlight the limited synergy between universities and businesses, where the government seeks to compensate through tax exemptions for economic enterprises that embrace open innovation strategies in collaboration with the research milieu.
- **Limited entrepreneurial culture among researchers:** In this context, the government relies on university incubators to support project initiators, including researchers, in successfully executing their endeavors. This approach also simplifies their interactions with diverse entities such as funding sources and administrative bodies.
- When it comes to funding the establishment of spin-offs, there are no dedicated mechanisms for direct financing of research valorization, particularly for spin-off creation, unlike in other types of businesses such as micro, small, and medium-sized enterprises, like the ANADE (formerly ANSEJ 1996). For these reasons, the FNR (National Fund for Scientific Research and Technological Development) operates within university incubators to provide funding for certain services, such as patenting fees and prototyping.
- **Ministerial Decree No. 1275:** Designed to outline the process for students, educators, and universities, facilitated through incubators, to simplify the establishment of startups. This facilitates the acquisition of a secondary startup degree or innovation patent following the feasibility study of their business projects. This follows a series of attentive training and guidance provided by university incubators. This decree has ignited a notable shift towards entrepreneurial pathways within the university setting.

3. Entrepreneurial Intention

Intention is often regarded as a strong predictor of activity. In entrepreneurship, intention pertains to an individual's judgments regarding the probability of establishing their own business.

3.1 Definition of Entrepreneurial Intention

Intention can be understood as a gauge of the effort an individual is prepared to invest in carrying out an observed behavior. Bird (1988, 1989, 1992) defines intention as "a cognitive state that guides attention (which, in turn, influences both experience and action) towards a specific objective, such as the creation of a new enterprise, and the means to achieve it." In this light, intention marks the transition from a mere recognition of entrepreneurship as a potential action to a mental representation of setting up a business as a desirable but as a pending future endeavor. In a similar vein, Ajzen suggests that "intentions serve as indicators of one's willingness to try, reflecting the effort one is willing to invest in adopting a particular behavior" (Emin, 2003).

Indeed, intentions are indicative of a mental state oriented towards action to achieve a specific goal (such as starting a business in the case of entrepreneurial intention). Thus, intentions reflect a genuine motivation for action, a psychological drive towards action, and even a determination that can propel an individual from contemplation to concrete implementation.

3.2 Factors Influencing Entrepreneurial Intention

Intention arises from the needs, values, habits, and beliefs of the individual (the entrepreneur). Therefore, entrepreneurial intention is the outcome of various diverse external and/or internal forces that stimulate incentives towards pursuing alternative actions (the choice between an entrepreneurial career and being an

employee in a public service position). These forces either reinforce or weaken the intention to establish a business.

- **Personality Traits:** For instance, an individual inclined towards action is more likely to actualize their intentions compared to someone with a contemplative orientation. The former focuses on actions that can transition the present state into a future one. Furthermore, traits like initiative, risk-taking, and adaptability contribute to a higher likelihood of entrepreneurial intention, as opposed to individuals drawn to stability.
- **Timing:** Beyond personal qualities, intentions might not materialize due to changes over time. The longer it takes between expressing an intention and acting on it, the more likely unforeseen events can alter intentions, increasing the risk of not following through. Age and job status play a significant role in entrepreneurial intentions.
- **External Forces:** External factors can alter entrepreneurial intentions, like the emergence of a new business opportunity or the establishment of a new legal framework, for instance.

3.3 Universally Acknowledged Concepts of Entrepreneurial Intent

Several approaches have followed one another in explaining entrepreneurial intention. However, two main theories are prominent in this context:

Shapero and Sokol's (1982) Entrepreneurial Event Theory: It explains entrepreneurial intention through two primary variables - perceived desirability and perceived feasibility.

Ajzen's (1991) Theory of Planned Behavior: It explains intention through three key variables - attitudes toward the behavior, subjective norms, and perceptions of behavioral control.

3.3.1 The Entrepreneurial Event Model (Shapero, 1982)

Shapero's model is undoubtedly one of the most well-known entrepreneurship models. Its purpose is to explain the entrepreneurial event, which means studying the factors that explain the choice of entrepreneurship over other career paths. This model highlights the significance of the social system and cultural values in perceiving the desirability and feasibility of entrepreneurship. In essence, the entrepreneurial event results from four categories of factors (Koubaa & Sahib Eddine, 2012).

- Firstly, an explanatory context of entrepreneurial action refers to negative shifts (such as job loss, divorce...), intermediate situations (like obtaining a degree...), and positive shifts (such as inheritance...).
- Next, the factors of perceived desirability stem from an individual's value system, shaped by the influence of social and cultural variables, notably those within the family and from parents, even from close acquaintances. Previous experiences, failures, or even successes in various endeavors are factors that amplify perceptions of desirability.
- Then, the factors of perceived feasibility of entrepreneurial action (based on the perception of supportive resources and assistance, such as availability of funding, information, training, education, etc) arise from the cultural, political, economic, and social environment.
- Lastly, the formation of entrepreneurial intention involves the psychological disposition of the individual towards entrepreneurship (the propensity for action).

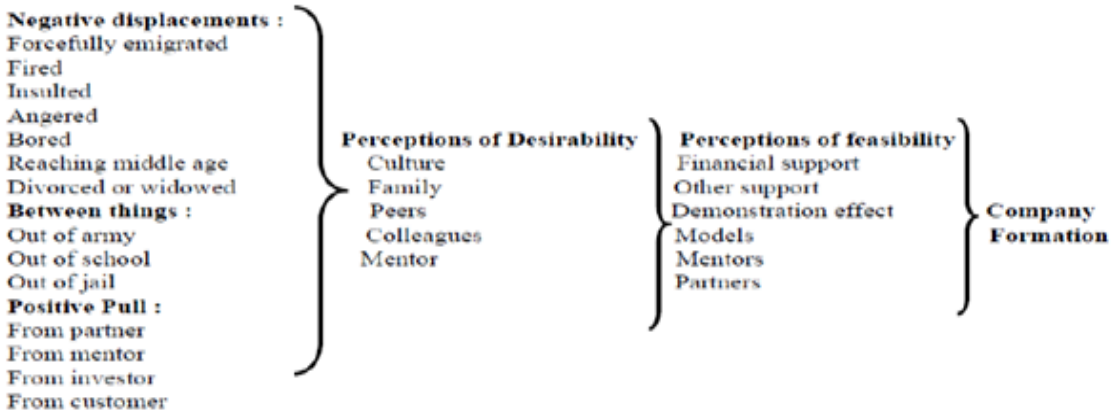

Figure 1. Entrepreneurial Event Formation Model (Shapero, 1982)

Source: (Koubaa & Sahib Eddine, 2012, p. 4).

These variables must work together and interact with each other to lead to the entrepreneurial event.

3.3.2 Theory of Planned Behavior (Ajzen, 1991)

According to this model, any intentional behavior can be predicted by the intention to engage in a specific behavior.

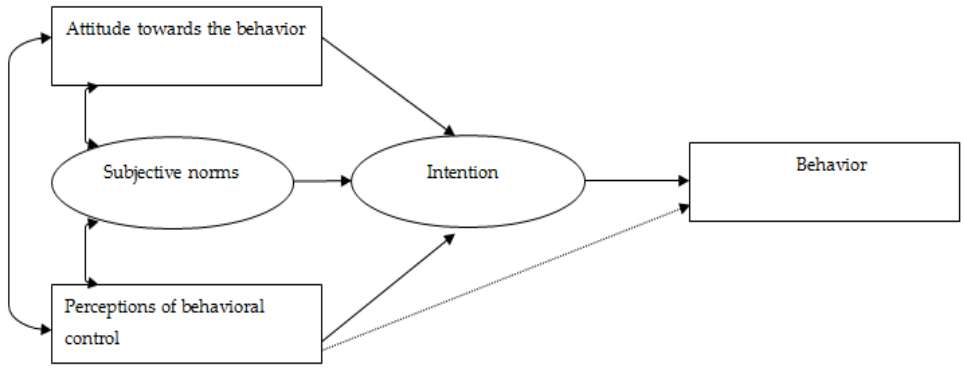

Figure 2: Planned Behavior Model (Ajzen, 1991)

Source: (Boisson, Chollet, & Emin, Determinants of Entrepreneurial Intention Among Students: An Empirical Test, 2009, p. 31)

In Ajzen's (1991) Theory of Planned Behavior model, intention is at the core of the reasoning and explains behavior through three key variables influencing intention:

- Attitudes toward the behavior refer to the extent of favorable or unfavorable evaluation that an individual holds regarding the desired behavior.
- Subjective norms arise from the individual's perceptions of their social context and the influences exerted by people close to them (family and friends).
- Perceived behavioral control highlights the significance of constraints and challenges in translating intention into actual behavior, such as perceptions of resource availability, opportunities, anticipated obstacles, and required skills.

Our findings reveal that attitudes toward the behavior and perceptions of social norms contribute to the appeal of the behavior and can be related to the concept of desirability used by Shapero and Sokol (1982). As for the perception of targeted behavioral control, it can be aligned with the concepts of feasibility by Shapero and Sokol metioned earlier (Boisson et al., 2009).

3.3.3 Synthesis of Intentions Models by Krueger and Carsrud (1993):

Krueger and Carsrud (1993) were the first to apply Ajzen's model to the field of entrepreneurship by combining it with Shapero and Sokol's model. The model proposed by Krueger and Carsrud essentially consists of the following (Wang, 2010):

- **Perceptions of desirability of the action:** Formed through the influence of social and cultural factors (the individual's value system). This variable encompasses both the attitude towards the action and the perceived social norm as proposed by Ajzen (1991).
- **Perceptions of feasibility of the action:** This pertains to the availability of financial, human, and technical resources. This concept is akin to Ajzen's (1991) notion of perceived control.
- **Propensity for action:** This element is related to the notion of external trigger (shifts) in the model by Shapero and Sokol. This perception of action reflects the psychological component of intentions, assumed to have a moderating effect on the relationships between desirability and feasibility, and intention (Shapero, 1984, cited by Krueger, 1993).

3.3.4 Constructing Our Model of Entrepreneurial Intent Among Higher Education Researchers in Algeria

Based on the various theories and models mentioned earlier, the intention to start a business is assumed to depend on three fundamental elements: the perceived appeal of entrepreneurship and the degree of incentive perceived in the social environment, which we will consolidate into a single variable referred to as "desirability to undertake"; the individual's confidence in their ability to successfully navigate the entrepreneurial process, reflecting our second variable, "feasibility to undertake"; and finally, we introduce the variable of perceived business opportunity, as in practice, the first two variables will only influence intention if the individual perceives a business opportunity worthy of pursuit by creating a new entity: a company.

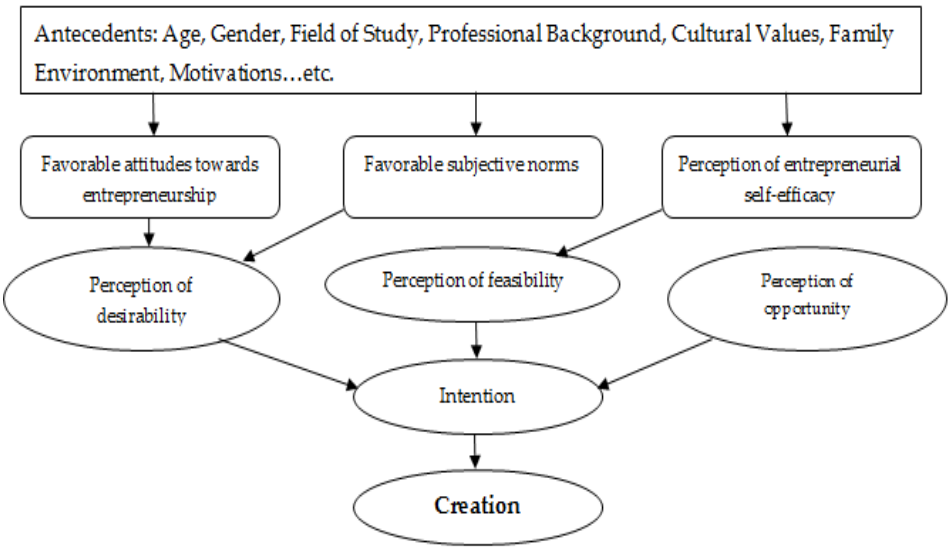

Figure 3: Adapted Intention Model for Researchers

Source: Adapted by the author from (Branche, 2009, p. 05)

3.3.5 Variables Employed for Assessing Entrepreneurial Aspiration Among Algerian Higher Education Researchers:

We have chosen three primary variables that are related to the intention to initiate a business based on the outcomes of scientific research. These variables include the assessment of desirability, the evaluation of feasibility, and the recognition of a business opportunity.

- **Views on Desirability:** Desirability indicates the level of attraction an individual feels toward initiating a business. This aspect comprises of three key dimensions:

Affirmative mindsets for Entrepreneurial Endeavors: It reflects the extent to which an individual evaluates this creation positively or negatively. It involves the belief that the results of entrepreneurial actions will be looked upon as desirable. In fact, this outlook on entrepreneurship is largely influenced by one's personality traits.

Competencies: This relates to the degree to which an individual is ready to utilize their resources, including knowledge, skills, and attitudes, in order to successfully complete a task or handle a complex or unfamiliar situation (De Miribel J., Sido X., 2019).

Affirmative Social Expectations: This concept pertains to the belief that the outputs of entrepreneurial actions will be seen as socially favorable. It is associated with how an individual views the level of acceptance of this behavior within their surroundings.

- **Perceptions of Feasibility:** Feasibility refers to an individual's recognition of their confidence in effectively executing the establishment of an enterprise. Put differently, it concerns the individual's assessment of the obstacles they must surmount, the essential and necessary competencies, and the accessibility of resources needed to translate their intentions into concrete action.

Indeed, the perception of feasibility is interconnected with various elements, most notably, the concept of entrepreneurial self-efficacy which encompasses an individual's self-perception, convictions, and evaluations of their competencies and motivations to successfully engage in the actions required for creating an enterprise. (Verzat, 2012). It is not about their skills, but rather their beliefs that can foster their interest in entrepreneurship, motivating them to set goals, take action, pursue performance, and determine their learning needs.

- **Perceptions of Opportunity:** The desirability and feasibility of initiating a business are fundamental elements, although they alone are insufficient. To initiate entrepreneurial endeavors, potential entrepreneurs must secure the necessary resources at the right time and in the right location (Chortani, 2011). Environments that provide unconstrained access to these resources and facilitate their acquisition offer significant advantages when contemplating engagement and embarking on their projects. In this particular setting, the backing provided by public and semi-public institutions through their administrative, fiscal, legislative, and regulatory actions, including the operations of academic institutions, personnel management guidelines, and intellectual property rights regulations, can either ease or impede the practicality of launching a business.

- **Sociodemographic Dimension:** In addition to the variables mentioned above, we will also take into account the following elements for our empirical study: family and immediate environment, level of education and skills, academic fields of study, professional and entrepreneurial experiences, psychological profile, gender, experience, and age.

4. Methodological Framework and results of the Practical Study

This empirical study is based on the variables derived from the models presented in our theoretical section, highlighting the antecedents of entrepreneurial intention: perceived entrepreneurial desirability, perceived entrepreneurial feasibility, and perception of business opportunities.

4.1 Choice of Research Methodology

We have chosen an analytical methodology to analyze the perceptions of researchers, focusing on the following elements:

- **Population and Study Sample:** Our population comprises researchers from various universities and research centers at the national level, excluding those from the Humanities and Social Sciences fields. We limited the category of 'researchers' to include professors, doctoral students, PhD holders and researchers in research centers. To access the research sample, we opted for sending emails to the researchers' professional email addresses, as well as through social media.

- The representativeness of our sample will be evaluated at two levels: representativeness in relation to the study population and representativeness in relation to the sampling frame. For the first level, we believe it has been achieved. There are no official statistics that determine the number of researchers in Algeria holding a doctorate, as well as professors and researchers in research centers. According to the available data, the total number of university professors in Algeria exceeds 57,000 professors of all categories. Based on these estimates and according to (Krejcie & Morgan, 1970), for a known population size of 1000000 observations, a representative sample would be 384 observations (Bukhari, 2022). As for the second level, we will ensure the diversification of our sample in terms of the variety of scientific disciplines and the status of respondents, as detailed in the descriptive analysis of the sample.

- **Data Collection:** The data collection process relied on a questionnaire constructed based on the literature review and existing models. Initially, the questionnaire was administered to two experts to validate its content. Subsequently, we employed various methods to administer the questionnaire to researchers at the national level. This included face-to-face interactions, as well as sending the questionnaire via email and through social media platforms like Messenger, where we created a URL link to the questionnaire using Google Forms. In total, over 350 questionnaires were distributed or administered between October and December 2022. However, we selected and deemed 230 responses as usable for analysis to address our research problem, resulting in a response rate of 65.71%, which we find quite satisfactory.

- **Analytical Method:** We carefully examined, encoded, and transformed the gathered questionnaires into a database, using the responses obtained via the Google Forms questionnaire link (questionnaire link, 2023). Following this, we carried out statistical analyses with SPSS software (Statistical Package for the Social Sciences) version 25. Our analytical procedures encompassed the computation of frequencies, means, the execution of the Friedman analysis of variance test, as well as correlation examinations among variables and mean comparison tests (ANOVA). These analytical techniques enabled us to extract meaningful insights and draw conclusions from the data we collected.

4.2 Survey Preparation and Evaluation**:**

We created our questionnaire with a set of 16 questions encompassing various formats, such as closed-ended single-choice and multiple-choice questions. This comprehensive approach was chosen to investigate the aspirations of researchers in regard to entrepreneurship and their inclination to embark on business ventures.

- **The sections and aspects of the survey:** The survey encompasses six fundamental axes.

- **First axis:** Researchers' socio-demographic information: This primary axis is focused on gaining insights into the background of researchers. It encompasses personal attributes (such as gender and age), and their professional trajectory (including position and years dedicated to research), in addition to their prior engagement with entrepreneurship.

- **Second axis:** The entrepreneurial aspirations of researchers: This serves as the dependent variable in our study and is gauged by the researcher's decision to apply their research findings or the skills acquired from their research in entrepreneurial pursuits.

- **Third axis:** Attraction to entrepreneurship: To assess this aspect, we examined the researcher's personality traits, entrepreneurial skills, and their favorable subjective views on entrepreneurship. This axis was quantified and evaluated using a set of 17 items that required “yes/no” responses.

- **Fourth axis:** Practicality of entrepreneurship: To evaluate this dimension, we examined the indicators associated with the researcher's belief in their entrepreneurial self-efficacy, covering entrepreneurial, managerial, commercial, and marketing skills. A total of 10 items were provided for respondents to answer with a ‘’yes’’ or ‘’no’’.

- **Fifth axis:** This dimension examines how the researcher perceives the presence of certain elements in their surroundings that could support the process of initiating a business. These elements encompass financial resources, training opportunities, government policies, in addition to support mechanisms. Respondents were given a series of 15 items to express their responses as either “yes” or “no”.

- **Content Integrity and Dependability:** We carried out a pre-survey evaluation of our questionnaires, presenting them for evaluation by experts in the field of entrepreneurship. This was imperative to guarantee that the questions were comprehensible to the respondents, which will lead to meaningful and valuable responses, and to ascertain that the questions encompassed all the aspects of the research. Moreover, the questionnaires went through multiple revisions before arriving at their final form.

According to (Perrien et al., 1984), reliability can be defined as "the extent to which the research instruments consistently assess the construct under investigation" (Labair et al., 2017). We calculated Cronbach's Alpha Coefficient, which assesses the internal consistency of a multi-item scale by examining the correlations among its items, and obtained a value of 0.881. This result surpasses the 0.6 threshold, affirming the dependability of our research tool, which gives us certainty that respondents in this study not only understood the questions but made sense of them and responded coherently.

Table 1: Reliability Statistics

	Cronbach's Alpha	Number of items
Axis of desirability	0,774	17
Axis of feasibility	0.801	10
Axis of opportunity perception	0.835	15
All the axes	0.881	42

Source: Results obtained from the empirical data analysis using SPSS Version 25

4.3 Descriptive analysis of the sample and data collection

In this section, we present the results obtained during our empirical study:

4.3.1 **Respondents' Profile:**

The following figure and table summarize the socio-demographic characteristics of our sample:

Table 2: Socio-demographic Characteristics of the Sample

Gender	N	%	**Age**	N	%	**Field of Research**	N	%
Male	119	51,7	Under 25 years old	14	6,1	Physics	38	16,5
Female	111	48,3	From 26 to 30 years old	47	20,4	Chemistry	22	9,6
Total	**230**	**100,0**	From 31 to 35 years old	40	17,4	Life Sciences	37	16,1
Professional Status	N	%	From 36 to 40 years old	48	20,9	Earth Sciences	19	8,3
Teacher-Researcher	97	42,2	From 41 to 45 years old	35	15,2	Agricultural Sciences	19	8,3
PhD holder without permanent employment	9	3,9	From 46 to 50 years old	21	9,1	Medical Sciences	5	2,2
PhD Student	82	35,7	51 years and older	25	10,9	Technical Sciences	66	28,7
Researcher	42	18,3				Economic and Management Sciences	21	9,1
Total	**230**	**100,0**	**Total**	**230**	**100,0**	others	3	1,3
						Total	**230**	**100,0**

Source: Results obtained from the empirical data analysis using SPSS Version 25

Institution of Affiliation: We can see that our sample is diverse in terms of individuals' affiliation, with 79.13% of individuals belonging to a university and 20.87% belonging to research centers. We find this distribution logical, as the community of researchers in universities is much larger than that in research centers. Meanwhile,

we note that the largest percentage of sample individuals belongs to the University of Boumerdes, given our work in this university, which encouraged us to obtain as many responses as possible compared to other institutions. However, we consider the sample to be diverse, as it included several universities and research centers at the national level:

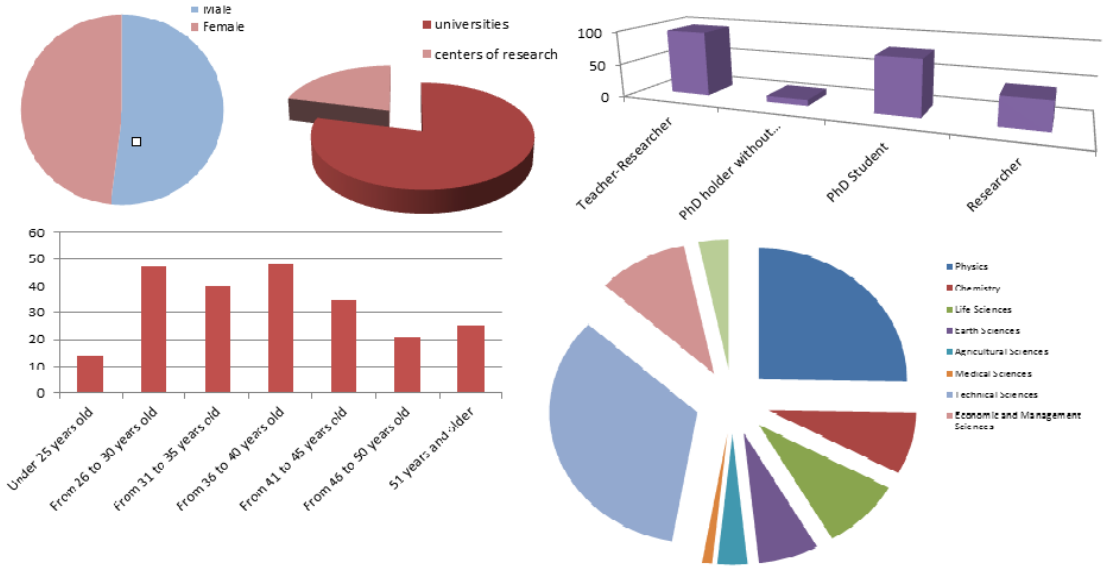

Figure 4: Sociodemographic Characteristics of the Sample

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **Gender distribution analysis:** Our sample is distributed between 51.7% males and 48.3% females. This distribution is somewhat balanced between genders.
- **Age group assessment:** As indicated in the table above, our sample exhibits a notable range of age groups. Nevertheless, it is evident that the majority falls within the younger demographic, with an approximation of 80% of respondents under the age of 45. This observation implies that our sample has a high likelihood of considering entrepreneurial pursuits.
- **As per research area:** The sample under scrutiny exhibits a considerable diversity, allowing for an effective representation of our study population. The data indicate significant representation in the fields of technological sciences (28.7%), physical sciences (16.5%), and life sciences (16.1%), with economic sciences contributing 9.1%. This broad range of diversity will provides us with the opportunity to investigate whether affiliation with a particular research field influences decisions related to research valorization, mainly in the context of spin-off creation.
- **As per occupational position:** The examined sample characterized by a substantial representation of teacher-researchers, making up 42.2% of the sample. They are followed by doctoral students at 35.7% and researchers at 18.3%, with unemployed PhD holders comprising only 5.7%. The distribution mirrors the profile of our population, which is mainly concentrated in university environments and research institutions.

4.3.2 Entrepreneurial experience of the respondents:

Considering that 70.4% of the participants are in permanent positions, among which more than half (59.6%) belong to the same sector as their scientific research, and possess an average of 4 years of experience. Nonetheless, only 42.2% of the respondents affirm having expertise in business management, and merely 23.5% have practical experience in initiating or overseeing a company. This comprises: Role in company administration; Role in the creation of a business; Engaging in one-on-one consulting or expert roles.

Table 3: Entrepreneurial Experience of the Respondents

Knowledge in business management			**Experience in company creation/management**		
	Frequency	Percentage		Frequency	Percentage
Yes	97	42,2	Yes	54	23,5
No	133	57,8	No	176	76,5

Source: Results obtained from the empirical data analysis using SPSS Version 25

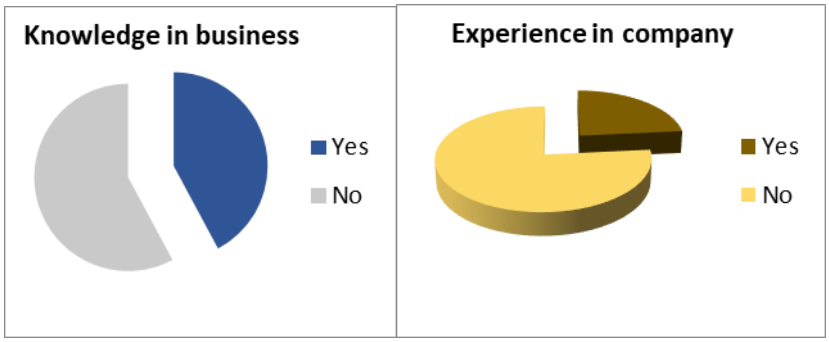

Figure 5: Entrepreneurial Experience of the Respondents

Source: Results obtained from the empirical data analysis using SPSS Version 25

These results demonstrate a certain weakness in terms of research collaborations between scientific research and the socio-economic sector.

4.3.3 Presence of Entrepreneurs in the Respondents' Circle:

In order to gauge the presence of entrepreneurs within the researchers' networks, including self-employed professionals, freelancers, corporate executives, and business initiators whom they seek to emulate, approximately 50.4% of the respondents answered in the affirmative. The next agenda is to investigate and understand whether this factor might shape researchers' motivation for entrepreneurship.

Table 4: Presence of Entrepreneurs in the Respondents' Circles

	Frequency	Percentage
Yes	116	50,4
No	114	49,6
Total	230	100,0

Source: Results obtained from the empirical data analysis using SPSS Version 25

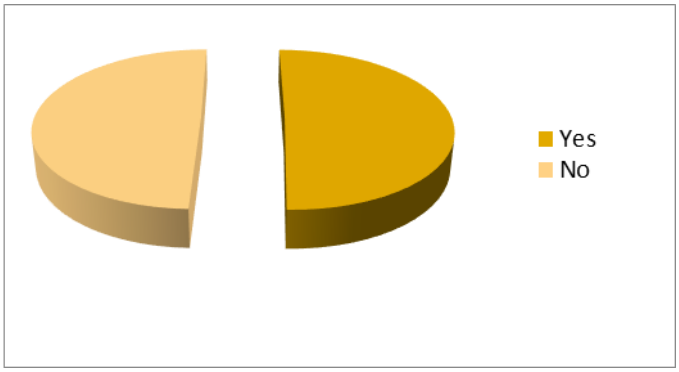

Figure 6: Presence of Entrepreneurs in the Respondents' Circles

Source: Results obtained from the empirical data analysis using SPSS Version 25

4.3.4 Research Valorization:

Before determining the presence of entrepreneurial intention among researchers, we inquired with the respondents about their decision-making if the outcomes of their research lead to commercial exploitation. According to the obtained responses, %15.65 of the sample indicated that they would take no action (36 out of 230 observations). As for the remaining respondents, they provided multiple options, the most frequently mentioned ones are as follows:

- Establish a business to capitalize on their research findings
- Proceed with filing a patent for the invention
- Contact other companies to leverage their research results (mentioned 27 times).

And to a lesser degree:

- Contact research valorization mechanisms such as CATI.

In this regard, we can conclude that the desire for research valorization within our sample is moderately high.

4.3.5 Measurement of Entrepreneurial Intention:

To assess the intention of individuals to create a research-based venture (a spin-off), we employed a 7-point Likert scale to measure how respondents feel about the possibility of establishing their own organization to commercialize their research findings. The scale ranges from 1 (indicating low likelihood) to 7 (indicating high likelihood). The table below provides a summary of the various responses received. The following table summarizes the various responses obtained:

Table 5: Measurement of Entrepreneurial Intention among Algerian Researchers

	1	2	3	4	5	6	7	Total
Frequency	10	41	22	123	19	6	9	230
Percentage	4,3	17,8	9,6	53,5	8,3	2,6	3,9	100

Source: Results obtained from the empirical data analysis using SPSS Version 25

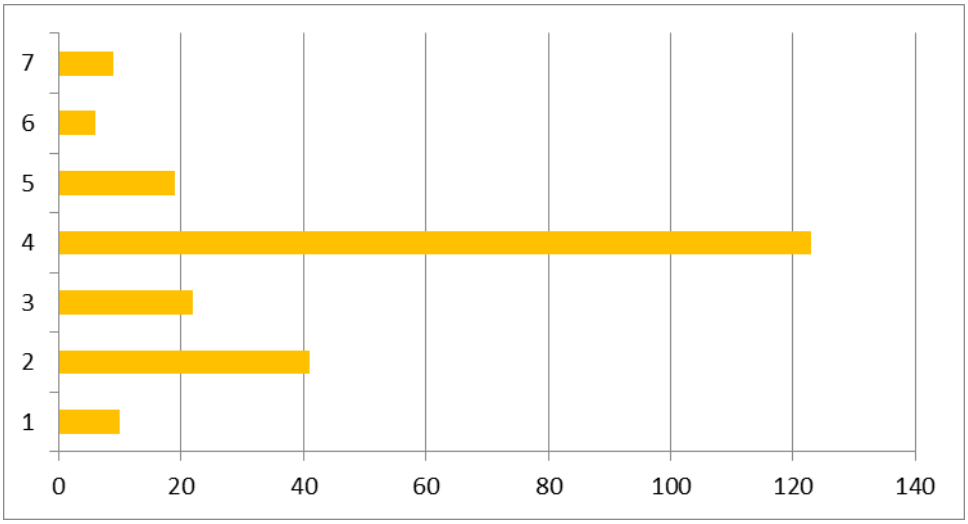

Figure 7: Measurement of Entrepreneurial Intention among Algerian Researchers **Source**: Results obtained from the empirical data analysis using SPSS Version 25

The results obtained are unexpected, especially when comparing them to the results from the previous question. While the sample appeared to lean towards valuing the results of their scientific research in various possible ways, for this sample, there seems to be some hesitation. More than half of the sample, 53.5%, appears neutral by choosing a rating of 4, indicating a moderate likelihood. However, 4.3% unequivocally deny having any entrepreneurial inclination. Based on the cumulative percentages, 31.7% are considered to have no entrepreneurial inclination, while only 14.8% confirm that they have an entrepreneurial inclination.

4.3.6 Measurement of Desirability Perception:

The measurement of the desirability to create a spin-off is based on favorable attitudes towards creation, including researchers' personality traits and professional aspirations (their abilities to take action to start a business), as well as subjective norms favoring entrepreneurship. The analysis of the selected responses yields a low average score of 1.28 (A score less than 1.5 indicates NO, a score above 1.5 indicates YES), indicating a low desirability for spin-off creation. The factors believed to potentially influence the desire to start a business are as follows:

Table 6: Descriptive Statistics of Desirability Perception to Create a Spin-Off

	N	Minimum (No)	Maximum (Yes)	**Average**	**Standard Deviation**	**Result**
desirability	230	1,00	2,00	**1,2826**	**,45125**	**No**
N valid (list)	230					

	Average	Standard deviation	Result
I would be willing to accept the disruption in my professional career that would result from starting a business.	1,66	,474	YES
The fear of failure does not prevent me from undertaking new activities.	1,42	,494	NO
The idea of taking risks does not prevent me from undertaking new activities.	1,40	,491	NO
In general, I prefer to change work habits rather than sticking to a routine.	1,26	,440	NO
I prefer to rely on my intuition when making a significant decision rather than relying on facts.	1,47	,500	NO

I prefer to take initiatives, lead, motivate, and influence others.	1,26	,438	NO
I prefer to be my own boss (to be autonomous and independent).	1,26	,440	NO
I would have preferred to create a company that brings my creativity to life.	1,23	,425	NO
I would have preferred to create a company that values and implements my expertise for the benefit of society.	1,20	,404	NO
I would have preferred to create a company to have compensation based on my commitment.	1,34	,476	NO
I would have preferred to establish a company to broaden my professional experience and/or pursue my research project.	1,20	,401	NO
Personality traits	**1,47**	**,268**	**NO**
Subjective norms favorable to business creation	**1,40**	**,490**	**NO**

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **For personality traits:** Based on the chosen responses, only one out of 11 items yielded an average score greater than 1.50. This is: acceptance of a career change involving a disruption to the professional career due to business creation, with an average of 1.66 and a high standard deviation of 0.474.
- **For favorable subjective norms:** these are the social beliefs related to the perceived degree of encouragement for entrepreneurship in the researcher's social environment. This measurement yielded an average score of 1.40, indicating that the researcher's social environment has little influence on their entrepreneurial orientation.
- **In regard to capabilities for establishing a spin-off**: the outcomes of this assessment similarly indicate a below-average performance, as elaborated in the following table:

Table 7: Descriptive Statistics for the Variable: Spin-Off Creation Aptitudes

	Average	Standard deviation	Result
Opting for an unpaid leave/ time off	1,57	,496	YES
Dedicating a significant portion of your personal savings or contributions from family members and friends	1,44	,497	NO
Seeking financing from savings and financial institutions.	1,50	,501	Neutral
Joining an incubation	1,40	,490	NO
Seeking support and guidance structures (such as ANADE, formerly ANSEJ)	1,44	,497	NO
Aptitudes	**1.46**	**0.295**	**NO**

Source: Results obtained from the empirical data analysis using SPSS Version 25

The highest scoring element relates to taking an unpaid leave, while the one with the lowest score is associated with joining an incubator program. The results suggest that the respondents have personality traits that are less conducive to entrepreneurship, and their capabilities to initiate a business are quite limited, the thing that explains their diminished interest in pursuing an entrepreneurial career. It is evident that Algerian researchers prioritize their perceived professional commitments and show little inclination to shift their focus towards the business dimension of their research.

4.3.6 Measurement of Entrepreneurial Feasibility Perception

The main factor impacting perceived feasibility is shaped by internal factors, particularly individual competencies. This encompasses how researchers view their own effectiveness in the context of entrepreneurship. The findings acquired are presented in the following table:

Table 8: Descriptive Statistics of Perceived Feasibility to Create a Spin-off

	Average	Standard deviation	Result
Entrepreneurial Competencies: Successfully executing, either independently or as part of a team, a business venture creation project.	1,24	,427	NO
Identifying a potential business opportunity	1,32	,466	NO
Developing partnerships, cultivating one's network	1,35	,477	NO
Developing a strategic vision	1,20	,398	NO
Being able to identify potential clients or suppliers	1,33	,470	NO
Managerial competencies (planning, organizing, coordinating, controlling...)	1,23	,419	NO
Human resource management skills	1,41	,493	NO
Commercial and marketing skills (Adapting products to customer demand, Conducting market research, Engaging in negotiations, …)	1,40	,492	NO
Financial management skills and access to funding	1,49	,501	NO
Communication and partnership with various stakeholders	1,34	,474	NO
Feasibility	**1,2587**	**,41193**	**NO**

Source: Results obtained from the empirical data analysis using SPSS Version 25

After assessing this parameter, it became apparent that the mean score across all self-efficacy items was 1.258, failing to reach the 1.5 threshold. To elaborate, the scores were as follows: The scores for strategic vision development (1.20), managerial skills (1.23), and entrepreneurial skills (1.24). The results highlight a prevalent pessimism among the interviewed researchers regarding their abilities to initiate and manage their business endeavors.

4.3.8 **Measurement of opportunity perception:**

The presence of a creation opportunity might act as a pivotal element when it comes to predicting the inclination to launch a spin-off. In accordance with findings from earlier studies, it is apparent that researchers perceive the opportunities in their environment in a pessimistic way, as evidenced by an average score of 1.42 across most items.

Table 9: Descriptive statistics of business opportunity perception

	Average	Standard Deviation	result
In general, the business environment is rather favorable for the establishment of enterprises (legal, fiscal, administrative framework...).	1,59	,493	YES
The resources at your disposal and the opportunities in the environment seem favorable for the success of a business creation project.	1,60	,491	YES
Financial assistance and support are available.	1,69	,463	YES
Having access to support structures and guidance for business creation (e.g. ANADE, formerly ANSEJ, CNAC...).	1,47	,500	NO
Having access to specialized support structures for research valorization (e.g. INAPI, ANVREDET, university incubator...).	1,36	,480	NO
Having an efficient valorization or industrial relations service within my research institution (e.g. CATI).	1,43	,496	NO
Obtaining support from your research organization on industrial property rules and invention patents.	1,34	,476	NO
Obtaining from your research organization intellectual and/or industrial property exploitation contracts.	1,38	,487	NO
The possibility of identifying networks of expertise that can contribute to the successful execution of my projects...	1,29	,453	NO
Identifying and connecting businesses and partners relevant to my project.	1,23	,422	NO
Being encouraged by my laboratory to pursue the economic valorization of my research activities.	1,34	,476	NO
Being supported by my institution (being relieved of certain administrative, pedagogical, and/or scientific tasks; having access to equipment; receiving technical assistance and financial aid...)	1,37	,485	NO
Having access to training programs on business creation and management.	1,24	,430	NO
Having a salary guarantee during the start-up phase of the business until it achieves self-sufficiency.	1,38	,487	NO
Having an unpaid leave to focus on the business creation with the possibility of returning to my position in case of failure.	1,45	,498	NO
Perception of opportunity.	**1,3565**	**,48002**	**NO**

Source: Results obtained from the empirical data analysis using SPSS Version 25

- For items that stand out with high scores, we take into account:
  - Monetary support and assistance are within reach.
  - Entrepreneurial milieu (encompassing legal, fiscal, and administrative aspects).
  - Assets that facilitate the success of a business establishment.
- On the flip side, the least favorable scores are associated with:

- Recognizing and engaging with businesses and partners that are pertinent to my project.
- Having the opportunity to partake in educational initiatives related to business startup and administration.
- The capability to establish links with expertise networks that facilitate the successful completion of my projects..

4.4 Discussion of the results and verification of the hypotheses

- Our analysis was conducted to identify the predictors of entrepreneurial intention among researchers and to examine the differences in entrepreneurial intention based on age, gender, status, research field, and the nature of the organization they are affiliated with (be it a university or research center).
- **The first hypothesis:** The main hypothesis is that Algerian researchers have a strong entrepreneurial intention. Considering the formulation of this hypothesis, which contains only one variable, the entrepreneurial intention, we used univariate analysis based on measures of descriptive statistics, particularly the average, which yielded a score of **3,67** that corresponds to the fourth category of the Likert scale, which means neutral, as illustrated below:

(1) The possibility is not considered.	(2) The probability is extremely weak.	(3) The probability is weak	(4) Neutral	(5) A possible probability	(6) a highly possible probability	(7) I am actively working on it
1-1.85	1.86-2.71	2.72-3.57	3.58-4.43	4.44-5.29	5.30-6.15	6.15-7

This result leads us to conclude that researchers in our sample do not have a strong entrepreneurial intention in the near future. This hesitation among researchers shows that they do not have a strong entrepreneurial orientation, and therefore, we will reject the main hypothesis of our study.

The value of T test is negative (-3,917) and its statistical significance value sig = 0.000, which is greater than the set significance level of 0.1, confirms our result, as shown in the table:

Table 10: One-Sample Test Results

	Average	Standard Deviation
What is the probability that you will create your own enterprise in the near future to capitalize on the outcomes of your scientific research, on a scale from 1 (least likely) to 7 (most likely)?	3,67	1,279

Entrepreneurial intention	Test value = 4					
	t	ddl	Sig. (bilateral)	Average difference	95% Confidence Interval for the Difference	
					Inferior	Superior
	-3,917	229	**,000**	-,330	-,50	-,16

Source: Results obtained from the empirical data analysis using SPSS Version 25

The limited penchant for entrepreneurship among Algerian researchers can be explained by a range of factors, predominantly associated with the pragmatic orientation of their research activities. In this particular context, it is apparent that:

- Divergent values lead to conflicts, as the logic of the academic world contradicts that of the business world.
- Research, in its very essence, leans towards stability and prudence, which are at odds with the dynamic and risk-loving nature of entrepreneurship.

- The decision to leave one's job in favor of launching a business now demands a higher sacrifice, highlighting the complexities associated with being an intermediary. (Emin, 2004).
- A conflict of interest comes to the forefront when there is a lack of career growth opportunities for individuals dedicated to technology transfer. This challenge is particularly striking, especially given that once an invention or innovation is published as an article, it becomes part of the public domain and loses eligibility for patenting by INAPI, the thing that potentially limits the researcher's chances for career progression.

- **The second hypothesis:** This hypothesis argues that the entrepreneurial intent of Algerian researchers is influenced by how they perceive the attractiveness and appeal of starting or venturing into a business. Within this hypothesis, there are two variables, making it necessary to perform a bivariate analysis using the ANOVA test, as it involves both a qualitative and a quantitative variable. A Sig. value of 0.005 was produced, which is below the 0.1 threshold. Given that result, we dismiss the null hypothesis (which suggests no correlation between the two variables) and affirm this hypothesis, revealing that desirability exerts a significant influence on researchers' intentions.

Table 11: ANOVA Test Results Between Desirability and Entrepreneurial Intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	12,895	1	12,895	8,122	,005
Intragroups	361,992	228	1,588		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **The third hypothesis:** Entrepreneurial intention among Algerian researchers depends on their perception of the feasibility of business creation. Much like the hypothesis discussed earlier, we used the ANOVA test, which yielded a Sig. value of 0.006, which is less than 0.1. This leads us to confirm this hypothesis, showing that feasibility has a significant impact on entrepreneurial intention among researchers.

Table 12: ANOVA Test Results Between Feasibility and Entrepreneurial Intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	16,310	2	8,155	5,163	,006
Intragroups	358,577	227	1,580		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

In fact, the limited interest shown by Algerian researchers in pursuing entrepreneurship can be attributed to their lack of inclination toward entrepreneurship rather than a sense of incapability to achieve it.

- **The fourth hypothesis**: Entrepreneurial intention among Algerian researchers depends on their perception of opportunities in their environment. We also used the ANOVA test, which yielded a Sig. value of 0.069, which is less than 0.1. This leads us to confirm this hypothesis, meaning that the perception of opportunities has a significant effect on entrepreneurial intention among researchers.

Table 13: ANOVA Analysis of Business Opportunity Perception and Its Impact on Entrepreneurial Intention

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	5,416	1	5,416	3,342	,069
Intragroups	369,471	228	1,620		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

These findings show that personal traits, skills, abilities, self-efficacy perceptions, and perceptions of opportunities have a more significant impact on entrepreneurial intentions. These results align with the theoretical model we proposed regarding the factors that affect researchers' entrepreneurial orientation.

- The fifth hypothesis, which suggests that affiliation with a research institution (university, research center, or the like) influences entrepreneurial orientation, was analyzed using the ANOVA test, which yielded a value of 0.187. This value is greater than the statistical significance threshold of 0.1, indicating the rejection of the hypothesis. Consequently, we conclude that affiliation with a university or research institution does not have a significant impact on entrepreneurial orientation.

Table 13: ANOVA Test Results between the Nature of the Affiliated Institution and Entrepreneurial Intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	7,863	3	2,621	1,614	,187
Intragroups	367,024	226	1,624		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

- The sixth hypothesis examines the influence of socio-demographic variables on the entrepreneurial orientation of Algerian researchers. Investigating this hypothesis necessitates an examination based on each demographic variable as follows:

    - **Gender-related distinctions in entrepreneurial intent:** Based on our findings, the statistical analysis reveals no significant variation in entrepreneurial intentions among researchers with respect to gender, as indicated by a sig value of 0.159 > 0.1, which affirms that gender does not play a role in influencing entrepreneurial intention.

Table 14: ANOVA Test Results between gender and entrepreneurial intention

ANOVA					
	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	3,258	1	3,258	1,999	,159
Intragroups	371,629	228	1,630		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

    - **Age-related distinctions in entrepreneurial intention**: With a significance level of 0.483 which is greater than 0.1, it can be inferred that age is not a statistically significant factor in shaping entrepreneurial intention.

Table 15: ANOVA Test Results between age and entrepreneurial intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	9,031	6	1,505	,917	,483
Intragroups	365,856	223	1,641		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **Experience-related distinctions are noteworthy:** In our quest to understand whether entrepreneurial intention can be impacted by the number of years a researcher spends at university, we employed an ANOVA test. The results revealed a sig value of 0.096, which is below the 0.1 threshold. This implies a statistically significant variation in entrepreneurial intention across individuals with diverse professional backgrounds and career experiences in our sample.

Table 16: ANOVA Test Results between Professional Experience and Entrepreneurial Intention.

	Sums of squares	ddl	Mean square	F	Sig.
Intergroups	7,672	2	3,836	2,371	,096
Intragroups	367,215	227	1,618		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **Familiarity with enterprises:** Although being involved in entrepreneurial activities is favorable for developing entrepreneurial awareness, the results show that entrepreneurial experience have a statistically significant effect (sig value is $0.030 < 0.1$).

Table 17: ANOVA Test Results between Entrepreneurial Experience and Entrepreneurial Intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	7,705	1	7,705	4,784	,030
Intragroups	367,182	228	1,610		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **The professional standing of researchers:** Within this framework, it is apparent that unemployed young PhD holders and doctoral students stand out as a population that holds promise for spin-off initiation and development. Taking into account that the academic futures of these researchers are still uncertain, they could be more inclined to explore entrepreneurship in contrast to teaching. Nonetheless, the sig value is 0.187, surpassing the 0.1 threshold, indicating the lack of a statistically significant association between professional status and entrepreneurial intention.

Table 18: ANOVA Test Results between Professional Status and Entrepreneurial Intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	7,863	3	2,621	1,614	,187
Intragroups	367,024	226	1,624		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

- **The influence of family environment and social context:** The presence of an entrepreneurial role model to imitate could have a more significant impact on researchers. This result is statistically not significant for our sample, confirmed by the sig value of 0.288, which is higher than 0.1.

Table 19: ANOVA Test Results between the Influence of the Environment and Entrepreneurial Intention.

	Sum of squares	ddl	Mean square	F	Sig.
Intergroups	1,856	1	1,856	1,134	,288
Intragroups	373,031	228	1,636		
Total	374,887	229			

Source: Results obtained from the empirical data analysis using SPSS Version 25

These contrasting results show that only professional experience and entrepreneurial expertise have a statistically significant impact on determining the entrepreneurial orientation of Algerian researchers, unlike other variables such as age, gender, and the researcher's nature. This leads us to reject the sixth hypothesis.

In conclusion, Algerian researchers do not display a strong desire to engage in entrepreneurship. Their likelihood of considering entrepreneurship is largely influenced by their perceptions of how feasible and desirable it is, in addition to the available opportunities. Those researchers who are more inclined toward entrepreneurship tend to be younger, male, early in their careers, and do not have stable jobs.

It seems that the researchers in our sample lack entrepreneurial orientation, and rather, they tend to maintain a neutral position when considering such a decision. This can be explained by the low levels across all three dimensions: feasibility, desirability, and perception of opportunity. Interestingly, all three of these dimensions have statistically significant effects on determining entrepreneurial orientation, regardless of age, gender, or the researcher's role (e.g., professor, doctoral student, etc.). It seems that both professional experience in research and entrepreneurial experience are the most influential factors in determining entrepreneurial orientation.

In this context, it becomes apparent how the nature of scientific research contradicts the entrepreneurial nature. And therefore, it is challenging for researchers who are deeply immersed in the research field to transition towards business and entrepreneurship.

5. Conclusion:

To recapitulate, Algeria is committed and highly focused on diminishing economic reliance and attain economic variety. We assert that Algeria is wholeheartedly making determined efforts to reduce its economic dependence and enhance economic variation. The government’s efforts are directed at these goals and are pursued through fostering innovation, entrepreneurship, and most notably, emerging businesses in recent years. This is founded on the belief that the accumulation of wealth in a society is a reflection of the dynamism and competitiveness of its industrial foundation.

However, it is important to note that any act of creation starts with a preexisting intention or desire to create. Our study initially examined whether researchers hold this intention, followed by an exploration of the potential determinants that could impact it. The reason we are interested in this group is the heightened economic significance of creating businesses through scientific research, which has led to government support and incentive measures, particularly in the past three years, notably since the inception of the Ministry of Knowledge Economy, Startups and Micro-enterprises.

In this particular setting, our investigation was focused on assessing the level of conviction and enthusiasm among researchers in academic institutions, spanning various universities and research centers to adopted this new approach. We aimed to measure their inclination for venturing into entrepreneurship and their emerging tendency toward starting their own businesses. To reach this goal we carried out an empirical investigation that involved 230 researchers, employing a questionnaire to compile diverse data. The compiled data was subjected to analysis through SPSS (Statistical Package for the Social Sciences) software, version 25.

- **Results of the theoretical study:** In light of the discussions presented in the preceding sections, we can draw the following theoretical findings:

- Intention serves as a predictor of behaviors and factors motivating a researcher's engagement in the entrepreneurial process.
- Moreover, the exploitation of scientific research findings can contribute to the development of new solutions for economic sector challenges, thereby presenting potential business opportunities for researchers.
- Research valorization involves researchers in the economic sector, helping them build personal connections that lead to the establishment of contracts for research outcome exploitation. Ultimately, this facilitates involvement in the creation and management of enterprises.
- Therefore, research valorization directs researchers towards a business and market-oriented approach, rather than solely a technical approach.
- Despite the significant role of Algerian universities in generating and disseminating knowledge, their role in research valorization remains mitigated. Therefore, the government is increasing its engagement in the entrepreneurial ecosystem and its support for entrepreneurship within academia.

- **Empirical Study Results:**

- The key finding from our study of the sample consisting of 230 Algerian researchers is that Algerian researchers exhibit a low level of entrepreneurial inclination. This necessitates a redirection of efforts towards alternative approaches for valorizing and leveraging the outcomes of scientific research. Moreover, to foster the growth of the startup sector, particularly enterprises emerging from it, it is advisable to concentrate on other groups besides researchers, particularly graduate students who may possess a higher entrepreneurial inclination since they do not yet have a clear professional future.
- Algerian researchers show a modest interest in transforming their research findings into entrepreneurial projects. Notably, their eagerness to embark on entrepreneurial ventures seems reserved, as they seem to consider the availability of favorable conditions when making this choice. This implies that they may not be particularly enthusiastic about commencing a business in the immediate or near future.

The limited interest among researchers in pursuing entrepreneurship can be attributed to their lack of attraction to this avenue (low desirability) and a perceived lack of capability to undertake such endeavors (low feasibility), rather than the absence of perceived business opportunities. In other words, the researchers in our sample do not possess the necessary personality traits, skills, and competencies commonly associated with an entrepreneurial profile.

In fact, it appears that many researchers assign significant importance to their profession, which they perceive as a vocation. Their primary focus lies in enhancing their scientific and pedagogical achievements, even at the expense of commercial applications. However, research valorization activities are becoming more widespread, with an increasing emphasis on prioritizing innovation patenting as a primary avenue of focus.

- **Modest participation within the economic sphere:** Industrial relationships are primarily manifested through collaborations between researchers and the business world. Additionally, being engaged in technology transfer activities (less extreme than starting a business) is supposed to be conducive to the development of entrepreneurial awareness. However, fewer than half of our sample have knowledge about businesses (42.2%), and only about 23.5% actually have experience in starting or managing a company.
- **Limited Socio-demographic Impact on Entrepreneurial Aspirations Diversity:** It seems that only knowledge in the field of business and entrepreneurial experience have a statistically significant impact on affecting entrepreneurial intentions among Algerian researchers. Men are more inclined than women to start a business. Meanwhile, gender, age, research field, professional status, do not have a statistically significant effect.
- **Positive Influence of Success Stories:** This refers to the existence of an entrepreneurial role model to be emulated, which has a favorable influence on researchers' entrepreneurial intentions.

- **Recommendations:**

The state of academic spin-off creation in Algeria is underdeveloped and unfulfilled, as it is yet to fully realize its potential. It is evident that the government is committed to propelling entrepreneurship and supporting the emergence of startups within academia. In light of this, we suggest the following measures to fortify and to strengthen the vital role of Algerian universities and the various parties engaged in the advancement and commercialization of research output and academic spin-off formation. The analysis provided above highlights the fact that desirability and feasibility are the chief impediments to researchers' entrepreneurial interest. Consequently, two strategies are recommended to enhance entrepreneurial orientation.

- **In the short term:** it is imperative for the government to create a more efficient national innovation system that ensures the continuous collaboration among universities, research centers, intellectual property protection agencies, valorization agencies, and businesses.
- Encourage the economic sector to collaborate with academia and research centers, this entails bringing entrepreneurs closer to the realms of scientific research. Entrepreneurs have long been recognized as the intermediaries between ideas and clients, in other words, between scientific research and the practical implementation of its outcomes. This can be achieved through fostering activities related to intellectual property protection, raising awareness about its presence and significance, as well as the importance of its material and immaterial exploitation. This can be facilitated through activities such as licensing, selling patents, or personal utilization by researchers themselves.
- Furthermore, it might be worthwhile to broaden the discussion of successful researcher-entrepreneur stories, enhance their dissemination, and to better inform researchers about the fact that starting a business is a means of valorizing research endeavors.
- It is not only necessary to amend the intellectual property law in accordance with the requirements of integration but also to ensure the harmonization of interests among stakeholders in exploiting research results funded by the budget. Furthermore, identifying tax incentives in scientific research, new products, and issuing policies to attract venture capital are essential.
- Considering the difficulty in changing the culture of an environment, it could be relevant to direct efforts towards emphasizing research valorization among individuals who exhibit a more "entrepreneurial" mindset. This particularly applies to young PhD holders, doctoral students, and students at different educational levels.

- **Promote access to entrepreneurship training:** This training should encompass the unique aspects of business creation by a researcher in a formal position, aiming to instill the required skills successfully carry out a company creation project.

- Delving into novel alternative approaches to promote and recompense patent rights, with a particular emphasis on avoiding conflicts between career advancement goals and the commercialization of inventive concepts. This is to render research and involvement in company creation activities compatible in a manner that reduces potential contradictions perceived by researchers between teaching and research endeavors and entrepreneurial activities.
- **In the medium and long term**: Promoting an entrepreneurial culture within the academic environment, emphasizing that the tangible utilization of scientific research is feasible and commendable, fostering initiative, highlighting the role and functions of university interface entities such as incubators, entrepreneurship centers (CATI, career centers, and blue office).
- However, it is evident that the new national regulations, as well as those within each academic institution, will necessitate organizational and institutional modifications that explicitly integrate the culture of entrepreneurship and innovation. This also involves explicit management strategies, alongside adaptations to public policies that foster technological entrepreneurship originating from academia. These measures will solidify the culture of entrepreneurship and innovation, concurrently demanding adjustments to public policies and the creation of a robust industry and markets for technology-based enterprises.
- University administrators should devise a growth plan for their institutions that corresponds with the national development strategy for the innovation system.

- It is important to augment the allocation of budgets for scientific research within universities and to identify pivotal technologies to be pursued in alignment with national competitiveness. This entails establishing units with robust scientific research capabilities.

- Universities should strengthen and reinforce their connections with industry associations to promptly understand innovation requirements. They should also regularly organize thematic activities with industries to collaboratively address challenges emerging from enterprises.
- Creating a legal structure that is well-suited to the distinct shift from being a teacher-researcher to adopting an entrepreneurial role.
- Establish support, guidance, and dedicated funding mechanisms for academic spin-offs.
- Actively raise awareness, motivation, willingness, and skills of researchers to valorize the outcomes of their work and persuade them towards the entrepreneurial path.
- In conclusion, it is vital to steer the Algerian academic community toward embracing the notion of an entrepreneurial university. It is crucial for universities to view scientific research not only as a means of enhancing their reputation but also as a secondary source of income. To achieve this, universities should broaden their connections with businesses, industry associations, provinces, cities, ministries, national programs and projects, in order to address the developmental needs of society.

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