Dirassat & Abhath
The Arabic Journal of Human and Social Sciences

مجلة دراسات وأبحاث
المجلة العربية في العلوم الإنسانية والاجتماعية

EISSN: 2253-0363
ISSN : 1112-9751

The Role of Universities in Promoting Sustainable Development Through Supporting Startups

دور الجامعة في تشجيع التنمية المستدامة من خلال دعم المؤسسات الناشئة (الجامعة الألمانية أنموذجا)

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تاريخ الاستلام: 2025/03/14 **تاريخ القبول :** 2025/06/25

Abstract:

Algerian authorities are striving to build a new economic model, moving away from the reliance on rent that has dominated the economy for decades, with a focus on supporting startups as a key driver of economic growth. In this context, Algerian universities are emerging as a strategic player in achieving sustainable development, as their role now extends beyond traditional functions to address social and economic challenges. This research paper aims to explore the role of universities in stimulating national development through supporting emerging projects and their scientific activities, with a focus on the experience of German universities in this field, including support for innovation, scientific research, and the establishment of incubators for startups. The central issue is how Algerian universities can contribute to supporting emerging projects, which is analyzed by studying the current reality of Algerian universities and their tools for supporting these projects, while drawing lessons from the German experience.

Keywords: Algerian universities; sustainable development; startups; innovation; Algerian economy.

الملخص:

تسعى السلطات الجزائرية إلى بناء نموذج اقتصادي جديد بعيدًا عن الاعتماد على الريع الذي دام لعقود، مع التركيز على دعم المؤسسات الناشئة كمحرك رئيسي للنمو الاقتصادي. في هذا السياق، تعد الجامعة الجزائرية فاعلًا استراتيجيًا مهمًا في تحقيق التنمية المستدامة، حيث أصبح دورها يتجاوز وظائفها التقليدية لمواجهة التحديات الاجتماعية والاقتصادية. تهدف الورقة البحثية إلى استكشاف دور الجامعة في تحفيز التنمية الوطنية، من خلال دعم المشاريع الناشئة وأنشطتها العلمية، مع التركيز على تجربة الجامعات الألمانية في هذا المجال، بما في ذلك دعم الابتكار وبحث العلم وإنشاء حاضنات للمؤسسات الناشئة. يتمثل الإشكال الرئيسي في كيفية مساهمة الجامعات الجزائرية في دعم المشاريع الناشئة، وهو ما يتم تحليله من خلال دراسة واقع الجامعة الجزائرية وأدواتها الحالية لدعم هذه المشاريع، مع الاستفادة من التجربة الألمانية كمثال.

الكلمات المفتاحية: الجامعة الجزائرية؛ التنمية المستدامة؛ المؤسسات الناشئة؛ الابتكار؛ الاقتصاد الجزائري.

1. INTRODUCTION

The Algerian authorities are striving to establish a new economic model that moves away from the rent-based economy that has long underpinned the country's financial structure. In this context, investment and support for start-ups have become among the top priorities for economic policymakers, as they seek to stimulate development and reinforce the local production apparatus. Recently, the Algerian government has shown a growing interest in supporting young entrepreneurs aspiring to launch small and medium-sized enterprises—commonly referred to as "start-ups."

With this serious momentum, it has become essential to integrate Algerian universities as strategic actors in achieving sustainable development. The traditional roles of universities are no longer sufficient to address the new social, economic, and environmental challenges.

Therefore, this research paper aims to shed light on the role of universities in driving national development and achieving sustainability through their various academic and scientific activities. The study also highlights the German university model as a reference, particularly in promoting innovation, supporting scientific research, and establishing incubators for start-ups. This model offers a valuable framework for enhancing the role of universities as active and strategic partners in sustainable local economic development.

The analytical method has been adopted in this study, and it revolves around the following central question:

How can universities contribute to encouraging and supporting start-up projects in Algeria?

The research is structured as follows:

1. The core functions of the university in light of the new economic challenges.
2. The current state of Algerian universities and their relationship with start-up companies.
3. The tools and methods used by universities to support start-up projects, with the German university model as a case study.

Conclusion

Algerian Universities: Between Reality and Aspiration

> "A university is an institution established by individuals for practical purposes connected to the society to which they belong." In a country like Algeria, the university is expected to produce technically competent professionals who embody the Algerian identity, are aware of national realities, and are committed to the process of social development.[1]

Given the current state of Algerian universities, numerous studies have been conducted to evaluate their performance, objectives, and effectiveness in fulfilling their intended roles.

1. Study by Taamnia and Al-Bandari (2004)[2]

On the adequacy and actualization of university goals, surveying 156 university professors. The key findings were as follows:

70% of respondents believed that the objectives of university education are adequate and do not require revision.

30% believed these objectives need to be reviewed.

90% stated that the university's goals align with current societal and economic changes, while 10% felt they do not align with these new dynamics.

2. Study by Souhaila Mohsen Kazem Al-Fatlawi[3] (2008, pp. 125–135):

This study aimed to identify the characteristics of university education. The sample consisted of 110 male and female students, and the questionnaire included 60 items distributed across four learning dimensions: learning to know, learning to do, learning to be, and learning to live together.

The findings revealed the following:

1. University students had not achieved the expected outcomes in the dimensions of learning to do, learning to be, and learning to live together, while they had relatively succeeded in the learning to know dimension, with a rate of 67%. This outcome was attributed to the university education system being primarily focused on cognitive knowledge, while neglecting the other essential dimensions.

In addition, numerous studies have concluded that there is widespread dissatisfaction with how universities are performing their fundamental roles. This highlights the need to reassess and enhance their effectiveness by investing more effort in scientific research, striving for academic excellence, and keeping pace with contemporary scientific challenges and developments. Only then can universities fulfill their strategic roles in society and act as essential partners in advancing sustainable development.

Modern societies increasingly rely on universities to contribute to the economic sphere and to serve civil society. Among the most critical responsibilities entrusted to universities today is the support of start-up enterprises.

I. The Core Functions of the University in Light of New Challenges:

Given the growing focus on sustainable development and support for start-ups, institutions of higher education—particularly universities—have gained strategic importance in driving societal progress and development. As incubators of knowledge, universities are responsible for shaping human minds capable of innovation. Scientific research, in this regard, represents the key link between universities and the fulfillment of their societal and developmental missions.

Thus, the university emerges as a dynamic societal actor. Its outputs—human resources—are capable of addressing diverse social challenges in the context of evolving demands. To understand the core functions of universities, we must examine the following aspects:

I.1 Definition of the University:

A university is an institution of higher education that aims to train professionals in various fields and is inherently committed to the creation of knowledge and the empowerment of individuals through learning.

The word “university” derives from the Latin phrase universitas magistrorum et scholarium, which conveys the idea of universality and unity—it literally means “a community of teachers and scholars.”

Another definition views the university as an academic institution that trains individuals in research and equips them with the skills necessary to solve complex problems. It holds sufficient authority and recognition to grant professional qualifications to its graduates.[4]

In brief, the university is an educational institution dedicated to higher learning and research in a specific field, and it is authorized to award academic and professional degrees.[5]

I.2 Objectives of the University:

Universities are expected to fulfill a range of objectives. According to Abdul Salam Abdel Ghafar, specialists have grouped the goals of higher education into three main categories:

1. Cognitive goals: related to the development, advancement, and dissemination of knowledge.
2. Social goals: focused on maintaining societal stability, cohesion, and providing solutions to societal issues.
3. Economic goals: aimed at enhancing the economy by supplying qualified human capital and necessary skills and expertise.[6]

As society evolves, universities have increasingly embraced social and developmental objectives. According to Saudi (2011–2012, p. 90), these include:

1. Identifying the real needs of society and striving to meet them.
2. Recognizing obstacles to development and sources of dysfunction within the community and working toward reform.
3. Helping individuals achieve harmony with themselves and their social environment.[7]

I-3. The Functions of the University

UNESCO defined higher education at the "Higher Education in the Twenty-First Century" conference as follows:

"Higher education refers to all types of studies, training, or research-oriented education conducted after secondary school, offered at a university or other recognized institution of higher learning officially authorized by the state."[8]

Joseph Tussman (1971, p.16) stated that a university is, in essence, an academic institution—an organized body dedicated to the acquisition of knowledge, composed of departments engaged in the battle against ignorance across various fronts. He asserted that it is through these achievements that the world has been transformed. Tussman also emphasized that higher education plays a crucial role in fostering a society of freedom and democracy through teaching, research, innovation, and community service.

Claude Cossette (1991) noted that "as society evolves, the university must evolve with it." Similarly, Cuyracher (1991, p.6) observed the rapid development of universities and higher education over the past fifteen years, noting that many countries have since reassessed their higher education policies to better align with social objectives and the mechanisms required to address developmental challenges.[9]

Based on these conceptual frameworks, the university's primary functions can be summarized in three key areas:

1. The University's Role Toward Students:

The university exists for its students and thrives through them. What does it offer students? Fundamentally, it provides a broad-based education that fosters critical thinking and societal awareness, while also preparing students for professional careers.

2. The University's Role Toward the Scientific Community:

In a knowledge-driven society, intellectual boundaries are constantly expanding. Therefore, the university's core mission includes the transmission of knowledge and the dissemination of ideas.

3. The University's Role Toward Society at Large:

The university holds a responsibility to serve society by advancing scientific and technological knowledge.[10]

Today, the university is no longer confined to teaching and academic research; it has evolved into a dynamic agent of social progress. This transformation reflects a shift from the university's traditional role to one of active contribution through innovation and direct involvement in development. This includes leveraging postgraduate

research and supporting entrepreneurial ventures and startup companies.

Addressing societal problems and developing sustainable solutions has become a critical mission for universities, as such efforts are foundational to a more prosperous future. Universities should therefore prioritize applied and future-oriented research, as foresight and strategic planning are essential steps toward achieving long-term objectives and sustainable growth.[11]

It is worth noting that sustainable development and effective community service cannot be achieved without a high level of institutional performance. Excellence in this regard enables universities to contribute strategically by solving real-world problems and achieving their goals efficiently. In this context, implementing comprehensive quality standards becomes essential. The internal quality of a university is closely linked to its external effectiveness and impact on its community, environment, and stakeholders.

A growing trend today is the transformation of traditional universities into community-engaged universities, which are committed to broadening public participation, enhancing scientific research, and making meaningful contributions to local development. This evolution aligns with labor market needs and supports economic projects and emerging startups.

1. Ways the University Can Support Startups

Universities are no longer mere academic institutions focused solely on education and training; they have assumed a more dynamic and impactful role in society. To fulfill this role, universities must adopt comprehensive quality standards, draw upon best practices from leading global institutions, embrace academic accreditation systems, and integrate sustainability reporting.

The university's role in promoting and supporting startups can be outlined as follows:

1. Integrating Sustainable Development into Vision and Mission Statements:

It is essential that the university's vision and mission align with national development goals. This includes the localization of knowledge, industrial enhancement, and support for public sectors. Research efforts should focus on generating added value and aligning with scientific, practical, and forward-looking objectives, so that graduates develop strong loyalty to their university, nation, and the broader project of renaissance and comprehensive development.

2. Redirecting Knowledge Toward Sustainable Development and Fostering Innovation:

According to UNESCO, education for sustainability is a process that equips individuals with the ability to make decisions that consider the long-term impact on the economy, the environment, and social equity. Education for sustainability entails acquiring and applying knowledge, values, and skills that balance the economic, social, and environmental dimensions of development while supporting individual and societal growth.[12]

To effectively integrate sustainability into academic curricula, the following factors should be considered:[13]

- The target subject matter must be appropriate and widely accepted by all stakeholders in the educational process.
- University leadership must demonstrate commitment to

curriculum integration by allocating necessary resources and support.
- A shared sense of responsibility should exist among departments and faculty members.
- Faculty members must be competent and well-trained.
- The organizational structure must support integration efforts effectively.

Sustainability, along with concepts of economics and innovation, can be incorporated into higher education through various methods, such as introducing new dedicated courses, partially integrating sustainability topics into existing courses, or comprehensively embedding them across the entire curriculum.[14]

3. Utilizing Scientific Research as a Gateway to Promote Startups and Sustainable Development in the Higher Education Sector

Creating an enabling environment and establishing appropriate procedures for conducting scientific research is essential to provide researchers with genuine motivation for achievement, creativity, and innovation. Among the most crucial measures are the following:

1. Formulating a Clear Policy for Scientific Research in Universities: Scientific research must be guided by a well-defined policy, agreed upon and made known to all members of the academic institution. This policy should be built on clear plans aligned with consistent community-based research priorities and integrated with the broader national development strategy. It must emphasize supporting research projects within the university and offering prestigious national awards to stimulate innovation.

2. Developing a Strategic Plan with Defined Objectives for Scientific Research: The strategy should be phased and account for available capacities and resources, with particular attention to the following areas:

• Advancing into more complex research fields once the foundational infrastructure and qualified personnel are in place to carry out research programs.

• Enhancing the foundational and digital infrastructure supporting research in informatics through investment in both traditional and digital libraries and training researchers in modern research methodologies, while building a global knowledge base.

• Introducing new mechanisms to incentivize faculty members to conduct scientific research and innovate, linking academic promotions and financial incentives to research output.

• Ensuring the availability of funding and resources necessary for scientific research and innovation within universities and cultivating a conducive organizational climate.

• Adopting clear mechanisms for marketing innovations, including collaboration with the private sector and the possible establishment of a dedicated body to promote inventions and research outcomes, supported by targeted scientific outreach showcasing university capabilities.

4. Establishing Business Incubators to Support Startups:

University-based business incubators serve as primary platforms for preparing and training young individuals aspiring to pursue entrepreneurial ventures or those with early-stage startup ideas. These incubators offer training programs and workshops delivered by expert mentors in finance, management, marketing, and economic consultancy. Such programs enable entrepreneurs with innovative ideas to refine their concepts, launch

competitive projects, and access market opportunities. [15]

5. Linking Innovations and Applied Research to Entrepreneurship Programs and Startups

This can only be achieved through university-led initiatives that promote entrepreneurship and foster innovation via creative entrepreneurship forums. These events focus on the commercialization of research outputs and highlight international success stories. They provide platforms for students holding patents to present their inventions and receive support for their startup companies. Awareness sessions on intellectual property rights and the importance of patenting are also offered to cultivate a broader understanding of these concepts. Many universities aim to elevate the culture of entrepreneurship and encourage researchers to commercially leverage their research findings by converting them into marketable products and services.

6. Fostering Collaboration Between Universities, Companies, and Various Institutions

Enhancing the quality and effectiveness of scientific research requires the establishment of broad partnerships and collaboration agreements, both nationally and internationally. This includes cooperation with other scientific research institutions to leverage their expertise and setting clear policies that facilitate coordination between universities and public and private sector industries. Such partnerships offer practical implementation opportunities for academic research and promote synergy between research teams, funding bodies, and beneficiaries, thereby consolidating resources and ensuring high-quality research outcomes. [16]

7. Establishing Centers for Innovation and Creativity

These centers offer a range of services, including access to information resources and databases for innovators, support in meeting the necessary requirements for high-level innovation, and safeguarding intellectual property rights through patent registration and documentation. They also facilitate connections with companies to support innovation production and marketing, as well as participation in local, national, and international exhibitions. Moreover, the centers provide scientific and professional consultation to students, preparing them for the labor market through training, qualification programs, entrepreneurial support, and both moral and financial incentives for innovators.

8. Training Students in Self-Investment and Establishment of Small and Medium Enterprises (SMEs)

Key proposals for encouraging students to consider launching SMEs include:[17]

- Introducing elective courses focused on the complete process of creating and managing projects, fostering a culture of self-employment.
- Establishing dedicated offices within each higher education institution to address student inquiries related to SME development, offering guidance on opportunities and legal requirements.
- Conducting diagnostic assessments for students interested in entrepreneurship, particularly in their final academic years, to identify strengths and weaknesses in preparation for future business endeavors.
- Organizing specialized workshops to equip students with essential entrepreneurial skills, such as financial planning, accounting

principles, feasibility studies, and financial modeling, as well as leadership, administrative, and communication skills.

9. Preparing a Specialized Academic Workforce to Support Innovation and Startups

Universities must recruit professors and researchers specialized in innovation and startup support to keep pace with developments in this field. These experts should be capable of transferring knowledge and best practices to students effectively.

The German Experience

1. German Universities and Their Role in Promoting Sustainable Development Through Support for Startups

Many German universities and higher education institutes were founded centuries ago, attesting to the depth and heritage of academic excellence in the country. The principle of unifying science and research has been a foundational pillar for over two centuries and remains in effect today. German universities are not only centers of education but also hubs for scientific research. In fact, the national investment in research and development often surpasses that of the United States and several European countries, reinforcing Germany's commitment to innovation-led sustainable development.

A. Characteristics of Higher Education in German Universities:

The high standard and quality of living in Germany, along with the remarkable success of German industry across various sectors, can largely be attributed to the outstanding level of academic education provided by its universities and institutes. Higher education in Germany is offered through three distinct types of institutions:

- Universities
- Universities of Applied Sciences
- Technical colleges and colleges of arts, film, and music

Germany is home to more than 2 million enrolled students across over 380 universities spread throughout 175 cities, offering more than 15,000 academic programs. German universities stand out not only in terms of infrastructure but also in the diversity and quality of their curricula. They provide modern educational facilities equipped with contemporary technologies and benefit from a diverse academic staff, enhancing the learning experience and ensuring the graduation of future experts across various disciplines.[18]

Germany has also outlined key qualities that a university graduate should possess, including:

- A willingness to adapt, integrate, and communicate effectively with others
- The ability to work collaboratively in teams
- Readiness to engage in global work environments
- Awareness of cultural, political, and social differences between world regions
- Proficiency in utilizing modern information and communication technologies in one's field
- Analytical and planning capabilities, including long-term strategic thinking and self-management
- Linguistic knowledge and the ability to communicate effectively in one's native language
- Competence in scientific research, problem-solving, and applying acquired knowledge in specialized fields
- Leadership skills and the ability to make sound decisions

- Capacity to execute projects successfully while monitoring and controlling outcomes precisely
- A creative mindset, a passion for continuous learning, and a persistent drive for success

B. Germany's Strategy for Developmental Excellence:

German universities have achieved greater excellence and performance by focusing on several key strategies:

1. Internationalization of Higher Education by offering new study programs fully in English
2. Adapting to globalization while maintaining educational quality and fostering interdepartmental and inter-university collaboration
3. Strengthening the university's role as a center for knowledge and research, actively engaging with society
4. Developing efficient scientific and administrative systems, aligning academia with economic and political structures
5. Increasing trust in German expertise, recognizing the growing strength and relevance of the country's education sector
6. Direct funding for research, allowing universities to offer competitive salaries to attract and retain top scholars
7. Balancing theoretical and practical approaches by aligning academic foundations with application-driven orientations, supported by industrial stakeholders
8. Promoting scientific research

For over 200 years, higher education in Germany has been fundamentally tied to the concept of integrating research and teaching—a dual responsibility entrusted to academic staff, ensuring effective university management. This long-standing commitment to research has placed Germany at the forefront of global innovation.[19]

Germany ranked first in Bloomberg's Innovation Index in 2020. Often referred to as the "Land of Ideas", Germany boasts over 80 Nobel Prize laureates. The country's commitment to eco-friendly innovation is flourishing, supported by two major educational and research bodies:

1. The German Academic Exchange Service (DAAD) – a consortium of German higher education institutions that supports international academic collaboration, especially in research
2. The Helmholtz Association – Germany's largest scientific organization, encompassing 15 research centers with an annual structural budget of around €2.2 billion. Its research areas include energy, earth and environment, fundamental technologies, materials science, transportation, and space

Germany is also home to over 750 research units, including laboratories, institutes, and centers—most of which are affiliated with universities. Research and development (R\&D) serve as foundational pillars for Germany's economic future.[20]

Generous public and private funding programs allow researchers worldwide to conduct R\&D in Germany, paving the way for high-tech products "Made in Germany." Both sectors commit nearly 3% of the national GDP annually—approximately €70 billion—toward research and development efforts.

The Federal Government has launched the High-Tech Strategy, an initiative that allocates roughly €4 billion annually to foster technological advancement. The strategy consolidates funding from various ministries, ensuring robust financial support through research grants.

The goal of this strategy is to enhance synergy between industry and institutional research, encouraging partnerships among various stakeholders—particularly research institutes and industry players—to integrate scientific knowledge with practical expertise.[21]

Recent innovations resulting from high-tech research projects include energy-efficient LED bulbs and growth-adaptive heart valves. Initially, the strategy focused on the market potential of specific technological fields. However, since 2010, the emphasis has shifted toward addressing social needs and offering practical, forward-looking solutions.

As a research and innovation framework, the High-Tech Strategy now focuses on major societal challenges, including:

- Digital transformation
- Healthcare
- Climate change
- Energy
- Transportation
- Security
- Social innovation

Conclusion:

The role of the university in promoting sustainable development is clearly evident through its support for emerging enterprises in the economic sector, positioning itself as an effective and strategic partner. It is unreasonable to rely solely on economic institutions to achieve the goals of sustainable development, especially as the world increasingly shifts toward sustainability and economic-driven paradigms.

These goals can only be realized through the collective efforts of all organizations and institutions within the state, regardless of their activities and societal roles. In this context, the university plays a central and vital role in advancing sustainability concepts within the economic field and in encouraging and supporting start-ups in particular.

Based on this study, the most important findings can be summarized as follows:

1. The university is a strategic economic partner in driving the wheels of sustainable development within society.
2. There is a need to focus on quality and the practical and technical dimensions of scientific research, along with consistent follow-up by acting as project incubators and providing field support.
3. The university plays a pivotal role in fostering talents and human capacities; thus, its involvement in development plans is essential to ensure it fulfills its mission in this regard.
4. Scientific research and the support of researchers represent the university's most significant contribution to encouraging the local economy by supporting emerging enterprises—an effort that necessitates both material and moral incentives.
5. The German model should be considered, as its university education system places great emphasis on scientific research and innovation. This is achieved through generous funding for research and the creation of strong coordination between the higher education sector and economic and environmental sectors.

Recommendations:

Based on these findings, a set of recommendations can be proposed to strengthen the university’s role as a key actor in supporting emerging enterprises:

1. Developing university curricula and teaching methodologies to enhance the principles of sustainability and development, while encouraging intellectual potential and readiness through relevant scientific research.
2. Providing an environment conducive to innovation and serious research, which

depends on various factors such as improved governance in universities, participatory decision-making, teamwork-based practices, institutional learning, responsiveness to change, and openness to new ideas.

3. Focusing on applied research that addresses societal problems and the challenges of market economies by emphasizing products, processes, services, and institutional or marketing innovations.

4. Leveraging scientific research to encourage innovation by creating an ecosystem that fosters learning and creativity.

5. Establishing business incubators to support project owners and assist in bringing their ideas to fruition.

6. Fostering collaboration among universities to develop institutional thinking and sustainable projects, as well as collaboration between universities and community institutions and stakeholders to enhance coordination.

7. Promoting the creation of start-ups and small to medium-sized enterprises, and supporting them through regulatory, technical, financial, and marketing means.

8. Establishing centers for creativity and innovation to nurture entrepreneurial ideas and transform them from concepts into fully operational ventures.

9. Drawing lessons from successful international experiences in fostering innovation and supporting local economies and sustainable development, with the German model being a notable and valuable example.

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