

Research Laboratories as a Mechanism for the Quality of Scientific Research in Algerian Universities

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This paper presents the view that the scientific research is considered as the fundamental pillar of building knowledge community and information, it is the major task that characterizes at present universities, universities become more interested besides teaching, and the teaching establishments play a major role in the scientific research system. Through it, universities all over the world pay and dedicate assistance to scientific research and researchers, they create the adequate scientific environment and pay the necessary fund, dedicate laboratories and scientific equipment to produce knowledge and enrich and publish it. Scientific research laboratories are regarded as modern organizational structures within Algerian universities. These laboratories represent newly established entities designed to advance scientific research and generate knowledge, gaining widespread acceptance due to their status as formal institutions. They operate with a clear set of objectives, primarily focused on providing intellectual and scientific services to society, under the supervision of dedicated researchers. Therefore, the integration of research and development laboratories within universities has significantly increased their responsibility toward scientific research and its resulting studies and outcomes. This has placed Algerian universities under greater pressure than ever before to meet these expectations, especially considering the considerable importance Algeria has attached to these scientific structures. Substantial investments have been made in equipping these laboratories and allocating significant budgets, reflecting the recognition of the necessity to prioritize scientific research and establish universities as major hubs of knowledge across various fields and disciplines. We try through this study to shed light on the role of scientific research laboratories in achieving the higher education goals, and the problem they face regarding the university scientific research laboratories in the field of Human and Social Science, and how to make an effective role of these laboratories in the field of scientific research.

Keywords: research laboratories, scientific research, higher education, quality guarantee, Algerian universities

Introduction

Contemporary societies are characterized by dynamism, vitality, and continuous development driven by the technological revolution and the accumulation of knowledge. Because of these significant changes and advancements worldwide, the concept and role of the university have evolved to adapt to these transformations in scientific and technological fields. University education is no longer viewed merely as a service provided by the state to its citizens as a basic right. Instead, society now perceives the university as a hub for science and knowledge, contributing through scientific research in various fields to the informed diagnosis of developmental challenges (Qandilji & Al-Samarrai, 2009, p. 7).

As a research institution, the university plays a vital role in producing and disseminating scientific knowledge through studies and research conducted either individually or within laboratories and research teams. These efforts aim to meet the fundamental needs of society across various fields. University research laboratories, in particular, serve as the foundational and primary entities for research, working to implement the strategies and objectives set by the Ministry of Higher Education and Scientific Research.

These laboratories are tasked with achieving research and development goals, conducting scientific studies, disseminating knowledge, advancing science, enhancing education and training, and creating an environment conducive to productivity, creativity, innovation, and progress for researchers across diverse disciplines (Jalab & Balmouchi, 2018, p. 114).

Arab countries, including Algeria, have placed significant emphasis on scientific research and have made substantial efforts to integrate it into their national development policies. This has been achieved through the establishment of research laboratories within universities, particularly in light of the substantial annual increase in the number of researchers and laboratories. This growing trend necessitates an examination of the status of research laboratories in Algerian universities, as well as an evaluation of the policies behind their establishment and the extent to which their intended objectives have been achieved. Such assessments are crucial for advancing scientific research to become an effective tool for development (Zaidi & Huidi, 2016, pp. 479-480).

In light of this brief overview of the role of scientific research laboratories as a mechanism to ensure the quality of postgraduate studies and scientific research—being formal institutions with a set of objectives focused on providing intellectual and scientific services to society—we will address the research problem, its significance, and objectives. Subsequently, we will outline the methodology adopted for the study, followed by the structure of the study, as detailed below.

The Research Problem

The evolving perspective on university scientific research laboratories as open network organizations producing scientific knowledge for society has fostered a new and robust relationship between universities, society, and scientific research. This relationship links community policy with university policy and scientific research policy. Society relies on universities to shape its developmental policies, while universities depend on scientific research to achieve societal goals. As a result, scientific research has become a genuine and effective tool for comprehensive and sustainable development (Al-Aqab, 2016, p. 215).

Accordingly, the research problem can be summarized as follows:

- What is the status of scientific research laboratories in Algerian universities?
- What challenges do these laboratories face?
- How can the role of university research laboratories be activated to contribute to national development?

The Importance and Objectives of the Study

The significance of this study lies in highlighting the role of university scientific research laboratories as a mechanism for ensuring the quality of postgraduate studies and their impact on societal development. This is achieved through conducting studies and scientific research that address various societal problems to provide effective solutions. The importance of the study can be outlined as follows:

- Understanding the extent to which these laboratories contribute to advancing the research capabilities of the researchers involved in them.

- Identifying the challenges faced by these laboratories to enable supervisors to develop appropriate solutions (Falouh, 2018, p. 12).
- Assessing the extent to which university scientific research laboratories fulfill the roles for which they were established.
- Analyzing the key challenges faced by research laboratories that hinder them from performing their intended role.
- Working on leveraging effective solutions to activate the role of these laboratories, enhance their scientific productivity, and increase their contribution to sustainable development (Ibtisam, 2012, p. 10).

Methodology

This study requires two methodologies to address the distinctive roles of university scientific research laboratories as a mechanism to ensure the quality of graduate studies. Accordingly, the analytical method and the inductive method were used to evaluate the effectiveness of these research laboratories in achieving sustainable development and fulfilling the expectations placed upon them by society. Through analysis and study, and by generalizing the inductive approach in drawing lessons from research, the aim is to standardize and enhance methods and techniques scientifically and practically to ensure the quality of postgraduate studies. This is achieved through the role of scientific research laboratories in advancing scientific research and their contribution to national development.

Study Divisions

This study has been divided, based on the importance and objectives of the role of scientific research laboratories in Algerian universities, into two main sections:

- First Section: An exploration of the concept and nature of scientific research laboratories in Algerian universities.
- Second Section: A dedicated study on the role of university research laboratories in enhancing the quality of graduate studies.

Finally, the study concludes with a comprehensive conclusion that addresses the findings and recommendations derived from the research.

The Nature of Scientific Research Laboratories in Algerian Universities

Scientific research is a cornerstone in the life of nations and societies, constituting a fundamental part of the university's functions and the responsibilities of its academic staff. It serves as the backbone of planning and the engine of development, enabling the formulation of development plans on solid and robust foundations. Through scientific research, mistakes are avoided, funds are saved, losses are mitigated, time is shortened, and quality is improved.

Among the elements contributing to the advancement of knowledge in general are research laboratories. These laboratories, established within universities or their branches, aim to attract the largest number of researchers, including professors and students. Thus, the role of laboratories cannot be confined to activities within the university; instead, they extend to engaging with social, economic, and cultural components.

To define the nature of scientific research laboratories in Algerian universities, we will discuss the following aspects:

- (1) The inception and development of research laboratories in Algerian universities.

- (2) The regulations for establishing and organizing these laboratories.
- (3) Their objectives and functions.

The Inception and Development of Scientific Research Laboratories in Algerian Universities

The scientific research system in Algeria, prior to 1998, was characterized by significant weakness and instability, with only 0.28% of the Gross Domestic Product (GDP) allocated to it. Given the importance of scientific research and development in building a competitive economy, interest in scientific research in Algeria grew towards the end of the 20th century. Algeria adopted a new policy aimed at revitalizing and activating scientific research and disseminating knowledge (Haroun & Hafid, 2005). Consequently, the Ministry of Higher Education and Scientific Research introduced the “Orientation Law” and the five-year program for scientific research and technological development (1998-2002)¹. Article 19 of this program mandated the establishment of university research laboratories, granting them autonomy in management and post-factum financial oversight.

Executive Decree No. 99-244 of 1999, which regulated the establishment of university research laboratories, followed this. The decree specified the objectives of establishing any research laboratory, defined their functions according to their purpose, and addressed the rules for their establishment, affiliation, supervision, internal operations, and management².

The actual establishment and accreditation of research laboratories in various university institutions began in 2000. That year, 269 laboratories across diverse scientific fields were accredited. By 2013, the number of research laboratories had grown to 1,297, and according to 2015 statistics, this number reached 1,324. As of 2023, the number of research laboratories has risen to 1,865, including 20 distinguished laboratories (including joint research laboratories and participating research laboratories) (Ministry of Higher Education and Scientific Research Statistics, 2023).

The outstanding performance and notable cohesion of Algeria’s national research system have infused technological and scientific development with a unique dynamism. This dynamism aligns scientific objectives with the economic and social goals of development, mobilizes and structures the scientific community within research entities defined by law, and enhances the funding mechanism based on specific objectives (Zaidi & Huidi, 2016, p. 487). These factors prompted the Algerian legislator to reconsider the legal framework governing scientific research and technological development, as well as the establishment, organization, and operation of university research laboratories. Consequently, new laws were introduced to align with the advancements in the scientific research sector in Algerian universities. These include:

(1) Law No. 15-21, dated December 30, 2015: This is the Orientation Law on Scientific Research and Technological Development³, which, through its Article 60, repealed the provisions of Law No. 98-11 dated August 22, 1998, as amended and supplemented by Law No. 08-05 dated February 23, 2008.

(2) Executive Decree No. 19-231, dated August 13, 2019: This decree defines the modalities for the creation, organization, and operation of research laboratories. Through its Article 41, it repealed the provisions of Executive Decree No. 99-244, dated October 31, 1999⁴.

¹ Act No. 98-11 of 22 August 1998, containing the Directive Act and the Five-Year Programme on Scientific Research and Technological Development 1998-2002, Official Gazette No. 62 of 1998, amended by Act No. 08-05 of 13 February 2008, Official Gazette No. 10 of 2008.

² Executive Decree No. 99-244 of 31 October 1999 establishes the rules for the establishment, organization and conduct of the research laboratory, Official Gazette No. 77 of 1999.

³ Official Gazette, No. 71 of 2015.

⁴ Official Gazette, No. 51 of 2019.

Rules for the Establishment, Organization, and Operation of Scientific Research Laboratories

University research laboratories, according to Article 2 of Executive Decree No. 19-231, are research structures created to carry out scientific research and generate knowledge. They enable researchers to address related issues to collaborate on one or more research topics or areas in scientific research and technological development. This decree specifies the rules for the establishment, organization, and operation of research laboratories.

Rules for establishing university research laboratories. University research laboratories are established within the framework of a development project for the host institution, based on the following criteria:

- Relevance of research activities to the social, economic, cultural, scientific, and technological development needs of the country.
- Scale and sustainability of the scientific and technological program within which the research activities fall, particularly in the fields of higher education and training.
- Impact of expected results on advancing scientific and technological knowledge.
- Quality and scale of available or potentially recruitable scientific and technical capacities.
- Availability of physical and financial resources or the possibility of acquiring them⁵.

The decree also regulates the establishment of both private and joint research laboratories within higher education institutions and other public institutions as follows:

- Private research laboratories are established within the framework of implementing the research program of the host institution (university)⁶, joint research laboratories are created to implement a unified program between two or more institutions, with the partnership modalities defined by agreement⁷.
- These laboratories are tasked with conducting research activities related to one or more topics in scientific research and technological development.
- Sectoral committees are designated to evaluate the proposed files for establishing laboratories and to formally approve them (Jalab & Balmouchi, 2018, p. 119).
- Laboratories (private, joint, or mixed) may be granted the designation “Distinguished Research Laboratory” by the Permanent Sectoral Committee for Scientific Research and Technological Development under the Ministry of Scientific Research. This designation is formalized through a ministerial decree⁸.

Organization and operation of university research laboratories. Executive Decree No. 19-231 defines the organization and management of research laboratories as follows:

- A director responsible for scientific management and financial administration oversees the laboratory. A Laboratory Council is formed, comprising research team leaders and project heads.
- A laboratory must consist of at least four (4) research teams, each led by a qualified researcher and composed of at least three members (Falouh, 2018, p. 20).
- The director submits laboratory programs and activity reports to the evaluation bodies of the host institution (university) for review.
- Preparing and evaluating research programs and activities, approving research activities and financial expenditures.

⁵ Article 15 of Executive Decree No. 19-231.

⁶ Articles 8 and 9 of Executive Decree No. 19-231.

⁷ Articles 10, 11 and 12 of Executive Decree No. 19-231.

⁸ Article 19 of Executive Decree No. 19-231.

- Laboratories enjoy financial independence but are subject to post-factum financial oversight (Falouh, 2018, p. 20).

The ministry provides mechanisms to cover laboratory expenses, primarily based on estimated revenue and expenditure tables. These tables are prepared by the laboratory director, approved by the council, and submitted to the host institution (university) for validation. Expenditures are categorized into equipment and operational expenses, with detailed financial records maintained by the host institution (Ibtisam, 2012, p. 148).

Functions of University Scientific Research Laboratories

University research laboratories in Algeria play an active and pioneering role in advancing scientific research, generating knowledge, and fostering cultural and pedagogical activity (Maqri & Shannah, 2015, p. 8). They significantly contribute to national development by providing studies, foresight analyses, statistics, and consultations as a foundation for large-scale economic and social projects (Maqri & Warda, 2016, pp. 75-76). Executive Decree No. 19-231 outlines the functions of these laboratories, both within and beyond the university.

Internal functions within the university. University research laboratories are designed to play a critical role in scientific research and provide practical solutions. Their main internal functions include:

- Advancing scientific and technological research, conducting systematic scientific activities aimed at generating knowledge in all fields.
- The laboratory serves as a hub for scientific, cultural, and intellectual activities, organizing conferences, seminars, and symposia through its research teams (Belbekai, 2016, p. 4, 31).
- Pedagogical activation, acting as a mobile research office, the laboratory addresses educational and academic issues to enhance curricula and resolve teaching and scientific challenges.
- Laboratories contribute to assessments, disseminate research findings, and ensure the promotion of their outputs (Al-Aqab, 2016, p. 220).
- Encouraging researchers, by fostering a competitive environment among researchers, laboratories stimulate the development and dissemination of scientific knowledge and enhance participation in national and international research forums.
- Collecting, processing, and valuing scientific and technological data related to their objectives and facilitating access to this information (Karima & Al-Hajj, 2016, p. 15, 218).

External functions beyond the university. As producers of ideas and scientific knowledge, university research laboratories extend their activities beyond the academic environment. Their external functions include:

(1) Proposing Projects

Collaborating with national and international institutions to propose projects in their areas of expertise, including research projects and advanced studies (e.g., master's and doctoral theses).

(2) Contributing to National and International Forums

Organizing and participating in specialized national and international conferences and seminars to enhance the role of research and knowledge production (Siffour, 2015, p. 3, 195).

(3) Providing Topics for Collaborative Conferences

Offering research issues for discussion and resolution in national and international conferences, bringing together research teams and experts to achieve scientifically valuable outcomes.

(4) Participating in Scientific Awards

Engaging in national and international awards, fostering competitiveness among researchers, and promoting scientific output that supports the national economy (Nabil, 2004, p. 142).

The Role of University Scientific Research Laboratories in Enhancing Graduate Studies

The significance of scientific research and its pivotal role in advancing societies have enabled it to attract the attention of policymakers, economists, and financiers, establishing it as a primary concern for nations and governments. Metrics for measuring scientific research have become essential tools for assessing the state of research across various countries. As a result, international organizations have worked to develop unified indicators for measuring scientific research.

These indicators have revealed the extent of the gap between developed nations and third-world countries, reaffirming the critical role of scientific research in the progress and development of societies. Given the tremendous importance of scientific research, countries, including Algeria, have endeavored to enhance their research systems. Universities have increased their focus on scientific research, resulting in the establishment of numerous research institutions. Among these, research laboratories have emerged within universities to assume the responsibility for conducting and advancing research.

However, the current state of university research laboratories in Algeria necessitates an evaluation of their present condition, an assessment of their existing roles, and an identification of the challenges they face. Additionally, it is essential to explore suggestions for developing these laboratories. These aspects will be addressed through analysis and study in the following points.

Contributions of University Research Laboratories to the Development of Scientific Research

Since 1998, Algeria's Ministry of Higher Education and Scientific Research has issued a series of legislative texts aimed at advancing scientific and technological research. These efforts aim to align research with the country's social developments and invigorate research activities to contribute effectively to comprehensive national development. University research laboratories serve as the foundational platforms for conducting scientific research and generating knowledge (Jalab & Balmuchi, 2018, p. 114).

University research laboratories have played a significant role in achieving some of the objectives of higher education. Their primary purpose is to elevate the quality of higher education by conducting studies, producing research, publishing academic work, and supervising postgraduate students (Jalab & Balmuchi, 2018, p. 124). The main contributions of university research laboratories include the following:

- Research laboratories have improved the academic performance of faculty members by involving them in various laboratory activities, including scientific symposia, conferences, study days, training workshops, and scientific articles. This involvement enhances their knowledge and pedagogical skills, positively affecting their teaching, supervision, and interaction with students and the academic community.
- Laboratories offer essential facilities for research, including offices, workshops, and the scientific equipment and tools necessary for conducting field and scientific studies.
- Research laboratories facilitate teamwork by bringing researchers together to collaborate on unified research projects, enabling the exchange of experiences and expertise (Ibtisam, 2012, p. 149).
- These laboratories contribute to scientific advancement by organizing international and national conferences, study days, intellectual seminars, and publishing scientific works. Such initiatives enhance researchers' knowledge and foster collaboration at both national and international levels (Harrouche & Tualbia, 2018, p. 37).

- Researchers and research teams enjoy the freedom to manage their projects without administrative hurdles, fostering a more efficient and innovative research environment.
- Participation in scientific meetings and training courses helps researchers enhance their expertise in their respective fields. Additionally, research laboratories establish links between scientific research and the socio-economic sectors, attracting researchers, academics, and social and economic stakeholders seeking scientific services and knowledge (Ibtisam, 2012, p. 149).
- Research conducted in university laboratories is characterized by objectivity and precision. The findings of these studies are disseminated and published, benefiting society at large (Maqri & Shannah, 2015, p. 27).
- Some university research laboratories have established partnerships with economic institutions to apply their research findings, contributing to the national economy (Maqri & Warda, 2016, p. 82).

Challenges Facing University Scientific Research Laboratories

Recognizing the importance of scientific research and its role in strengthening the connection between society, universities, and research, Algeria's Ministry of Higher Education and Scientific Research has made efforts to advance and develop research. This includes establishing frameworks and institutions to achieve defined goals, enacting legislation to create, organize, and manage research laboratories. The laboratories were intended to fulfill scientific research objectives within a comprehensive developmental policy by conducting studies, executing research projects, contributing to training and capacity building, and disseminating knowledge.

However, university research laboratories have fallen short of achieving these goals. The supervising ministry has acknowledged the weak scientific performance of these laboratories, prompting efforts to inventory, streamline, and classify them according to standardized criteria. Some laboratories have undergone reevaluation, while others have been closed due to their inability to meet objectives. Laboratories are also required to maintain continuous research output, engage doctoral students in their activities, and ensure publication in scientific journals that progressively reach the standards of national and international peer-reviewed journals (Falouh, 2018, p. 11).

In practice, several challenges hinder the effective operation and goal attainment of university research laboratories. These challenges include:

1. There is no clear strategy or planning to identify the community's primary needs on which scientific projects should be based. As a result, the activities of research laboratories often appear fragmented and scattered across different directions, lacking cumulative scientific progress. Additionally, research projects are not aligned with the specializations offered annually in master's and doctoral programs, a widespread issue across Algerian universities (Jalab & Balmouchi, 2018, p. 120).
2. Despite the increasing number of research laboratories, this growth has not been accompanied by qualitative performance improvement. Research output often consists of disconnected projects and fragmented efforts, failing to capitalize on interdisciplinary connections where most innovative discoveries occur (Maamari, 2007, p. 70).
3. There is a lack of coordination between research laboratories and social or economic institutions, leading to weak collaboration with other societal entities. Furthermore, insufficient communication between laboratories limits their contributions to improving researchers' working conditions and opportunities for career advancement (Jafal, 2011, p. 1).

4. Many laboratories operate with objectives unrelated to research. Their activities often revolve around publishing local journals, organizing conferences and seminars that conclude with the distribution of participation certificates, and facilitating internships and travel grants. These activities suffer from poor planning, lack of motivation for researchers, and insufficient basic working conditions (Falouh, 2018, p. 21).

5. Laboratories are heavily dependent on government funding, which remains insufficient to cover research expenses. The level of spending on scientific and technical research in Algeria, is significantly lower than in developed nations (Bolhouche, 2019, p. 440).

6. Researchers face limited or nonexistent financial incentives. The lack of recognition and rewards for their efforts diminishes their motivation to pursue rigorous scientific inquiry (Brika & Samei, 2015, p. 330).

7. Researchers often prioritize academic promotions over addressing societal problems through their studies. This focus limits the practical impact of research on real-world challenges.

8. The overall conditions surrounding research laboratories are not conducive to active research activities. Basic requirements for effective research are often missing (Al-Aqab, 2016, p. 225).

9. Research laboratories suffer from the absence of effective management systems. Laboratory administration lacks clear, standardized mechanisms and strategies to create a scientific environment that fosters creativity and innovation (Jalab & Balmuchi, 2018, p. 120). Administrative shortcomings hinder the ability to activate and optimize research laboratories' roles.

Activating the Role of University Scientific Research Laboratories in Sustainable Development

To advance scientific research in Algeria and align it with global progress, the Ministry of Higher Education and Scientific Research must implement reforms to the regulations governing the creation, management, and development of university research laboratories. Current legislation no longer meets the requirements for achieving excellence and quality, distancing laboratories from their goals of fostering local development and contributing to training efforts (Harrouche & Tualbia, 2018, p. 44).

To outline solutions that could enhance the role of university research laboratories in Algeria, the following proposals have been identified:

1. Separation of University Administration from Research Laboratory Management

Research institutions must gain independence in managing research projects and budgets. Currently, despite the accreditation of numerous laboratories and the allocation of substantial financial resources, researchers are constrained by regulations stipulating that the university president, rather than the laboratory director, holds primary authority over the laboratory's finances and management. It is essential to grant full decision-making authority to laboratory directors, including autonomy in budget management, procurement of equipment, and operational flexibility (Al-Hadi, 2016, p. 23).

2. The Ministry should formulate a national strategy to define the role of research laboratories in both local and broader development. This strategy should leverage the expertise of academic researchers to develop laboratories into leaders of social and economic progress (Mourad, 1980, p. 4).

3. University research laboratories must assume the role of strategic partners with the government and vital institutions in their communities, contributing to sustainable development goals.

4. Funding for laboratory activities must be increased and diversified. Laboratories should seek funding opportunities beyond government support, including partnerships with private entities and international organizations (Karima & Al-Hajj, 2016, p. 218).

5. Establish mandatory collaborations between research laboratories and economic institutions, ensuring that research topics address critical and high-priority societal and economic issues.

6. A transparent and realistic plan for evaluating laboratory performance must be established. Accountability measures should be introduced to ensure the quality and relevance of scientific output.

7. Researchers should receive financial incentives proportional to the significance and impact of their research findings. This would motivate them to focus on producing high-quality, impactful studies.

8. Strong knowledge frameworks must be developed, along with systematic training programs and opportunities for researchers to exchange experiences and expertise, fostering a culture of continuous improvement.

9. The creation, management, and evaluation of research laboratories should be optimized to ensure their efficiency and effectiveness. This includes establishing clear guidelines and best practices to maximize their impact (Al-Aqab, 2016, p. 227).

Conclusion

The university is considered the radiant pole, the foundational nucleus, and the cornerstone of any society striving to develop its capabilities and advance its growth across various fields. It operates as an open system that facilitates exchange and communication. However, it cannot progress without fulfilling its formative functions, which aim to preserve scientific knowledge characterized by independence in achieving its goals.

For the university institution to play this leading role and fulfill its functions, certain factors must be in place. Some of these factors pertain to the structures and organizational systems within the university, while others relate to elements of the formative process, the educational content it provides, and the cultural and social environment in which it operates.

This study aimed to examine the reality of university research laboratories in Algeria by assessing their current status, evaluating their roles, identifying the consequences of laboratory failures, and proposing suggestions for their development. The study also explored the contribution of research laboratories to enhancing faculty members' knowledge, research techniques, and methodologies, as well as fostering direct interaction with society and its various institutions. This indicates that laboratories have played a positive role in meeting the aspirations of Algerian universities, despite certain shortcomings and challenges hindering the achievement of this project.

Based on the above, several results and recommendations can be highlighted from this study.

Findings of the Study

- University research laboratories are cognitive institutions aimed at creating and producing knowledge in its various forms. This is achieved through specialized researchers studying specific phenomena over time using laboratory and scientific methods that align with the nature of the studied phenomena. Consequently, these laboratories primarily benefit economic institutions and the surrounding environment as a whole.
- The current state of scientific research laboratories is unsatisfactory, a finding consistent with the results of other studies and surveys conducted in Algeria. This reinforces the reality faced by research laboratories, which reflect an observable and evident state of affairs.
- Research laboratories have not been able to achieve their expected goals. Their activities have been largely limited to organizing scientific events, publishing, establishing journals, and awarding certifications.

- There are several negative consequences resulting from the weaknesses of research laboratories, the most notable being the decline in scientific research, brain drain, negative impacts on development, and the wastage of financial resources without tangible benefits.

- Discussions about the scientific research sector and universities in Algeria remain of special importance. This sector requires a continuous evaluation system to ensure intellectual activities proceed according to precise and rigorous scientific methodologies. Such a system would direct the activities of scientific research, laboratories, and research competencies to align with the developmental needs across various fields.

Recommendations Derived From the Study

- Consider the findings of field studies and expert opinions in evaluating research laboratories and revisiting their structures and roles.

- Reassess the policy for establishing research laboratories and their distribution across the national level to ensure balance and efficiency.

- Grant financial autonomy to research laboratories while implementing transparent, clear, and precise monitoring mechanisms.

- Evaluate the scientific output of university research laboratories across all disciplines to measure their contributions effectively.

- Assign research laboratories to undertake studies, projects, and tasks that directly contribute to local and economic development.

- Develop a comprehensive database encompassing research laboratories, researchers, and scientific studies to facilitate access for all researchers and stakeholders.

- Establish a specialized system for incentives and rewards for researchers within and outside laboratories who demonstrate exceptional research capabilities.

- Encourage research and studies on higher education systems in the Arab world, with a focus on improving and advancing these systems. This includes examining the role of university research laboratories in enhancing postgraduate studies, organizing dedicated conferences, and implementing the findings and recommendations provided by researchers in practical applications.

References

- Al-Aqab, K. (2016). The reality of Algeria's university research laboratories in the field of economic and commercial sciences and management sciences and ways to activate them: Field study. *Journal of Economic Books*, 7(2), 214-231.
- Al-Hadi, Q. M. (2016). Scientific research laboratories: Their fields, spaces and cognitive and applied roles in the development of scientific research. *Hakma Journal of Philosophical Studies*, 4(8), 84-110.
- Belbekai, J. (2016). Scientific research in Arab universities: Reality, challenges, future directions. *Human and Field Magazine*, 2(4), 8-37.
- Bolhouche, N. (2019). Scientific research in the Arab world: Reality, obstacles and ways of development. *Annals of the University of Algiers*, 33(4), 427-455.
- Brika, A. S., & Samei, S. (2015). Research and development system of Algeria—Historical analysis of the reality of scientific research in Algeria. *Journal of Emir Abd-el-Kader University of Islamic Sciences*, 29(2), 319-342.
- Falouh, A. (2018). The reality and proposals for development of scientific research laboratories at the university (According to a sample of social science professors). *Al-Shamil Journal of Educational and Social Sciences*, 1(1), 9-31.
- Haroun, T., & Hafid, F. (2005). *Problem of innovation and research and development in the Maghreb countries (Tunisia, Morocco, Algeria)*. Algeria: International Forum on Knowledge Economy, Biskra University.
- Harrouche, L., & Tualbia, M. (2018). Scientific research and development in Algeria: Reality and development requirements. *Academic Journal of Social and Humanitarian Studies*, 10(1), 32-46.

- Ibtisam, M. (2012). Relationship between the establishment of scientific research laboratories and the development of scientific production (Master's thesis, University of Constantine, 2012).
- Jafal, A. (2011). *Scientific research in Algeria—Finance and application*. Algeria: International Forum on Scientific Research and Applications in the Arab World, Faculty of Humanities and Social Sciences, Guelma University.
- Jalab, M., & Balmouchi, A. (2018). Contributions of scientific research laboratories to the development of scientific research at the University of Algeria. *Al-Qamil Journal of Educational and Social Sciences*, 1(2).
- Karima, F., & Al-Hajj, M. A. (2016). Scientific research at Algerian Universities: Reality and development proposals. *North African Economics*, 12(15), 207-228.
- Maamari, B. (2007). *Research and studies specializing in psychology* (Part 2). Algeria: El Bahr Publications.
- Maqri, Z., & Shannah, A. (2015). The leading role of university research laboratories in the creation of small enterprises. *Journal of Economic Issue Studies*, 6(2), 7-30.
- Maqri, Z., & Warda, K. (2016). The contracting orientation of university research laboratories and their role in the creation of innovative projects (Field Study at research laboratories at the University of Batna). *Al-Bashair Economic Journal*, 2(3).
- Ministry of Higher Education and Scientific Research (DALILAB). 2024. Retrieved November 26, 2024 from <https://www.mersrs.dz>
- Mourad, B. A. (1980). *Towards the Algerian university: Reflections on the university*. Algiers: Office of Academic Publications.
- Nabil, B. (2004). *The problem of training and education in Africa and the Arab world, series resignation of human resources development* (No. 1). Setif, Algeria: Ferhat Abbas University.
- Qandilji, A., & Al-Samarrai, I. (2009). *Quantitative and qualitative scientific research*. Amman: Dar Al-Yazouri Al-Ilmiyyah.
- Siffour, S. (2015). The problem of financing scientific research in Algeria between resource constraints and sustainable development bets. *Journal of Humanities of Umm Al-Bawaqi University, Algeria*, 2(1), 150-163.
- Zaidi, F., & Huidi, A. (2016). University foundation space for the production of scientific knowledge “status of scientific research laboratories and research competencies at the University of Algeria”. *Journal of Humanities and Social Sciences*, 8(27), 179-188.