

managing public budget program to improve Algerian faculty member's productivity within Scopus database

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Received:02/06/2025 Accepted: 08/01/2026 published: 31/01/2026

Abstract:

This study uses ordinary least squares (OLS) regression analysis to look at the impact of financial resources and pedagogical support on the productivity of faculty members at Algerian universities.

Data for the year 2022 for 22 Algerian universities were analyzed using Eviews software in line with the reference year of Algeria's recent medium-term planning initiative for the higher education and scientific research sector (2022-2025). The results revealed that there is a positive correlation between the scientific faculty's productivity (as measured by Scopus publications) and both the level of pedagogical supervision and the operational expenses. The study recommend opening research regarding the use of software and ministerial portfolios as a mechanism for governing the higher education sector **Keywords:** Scientific productivity, financial appropriations, higher education, faculty members, budget program

Jel Classification Codes:

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I. INTRODUCTION

In order to become more visible and improve educational quality, Algerian institutions of higher education are currently undergoing a major transition, the universities have moved toward governance with managerial logic of financial and pedagogical management and efficient use of resources.

The recent medium-term plan for the sector of higher education and scientific research in Algeria (2022-2025) is a plan that gives highlighted strategic importance, where resource allocation is placed targeting specific objectives and key performance indicators include pedagogical supervision.

Research at all academic levels has recently focused on teaching methods to improve faculty productivity at scientific output higher education institutions.

Nicoletta Vada, Ludovico Marino, Gianfranco Pischedda, and Alberto Izza conducted a study in 2022.

This study had aimed to examine the impact of performance-oriented funding on Italian higher education and investigated the potential effects of this funding model on the competitive allocation of staffing budgets and the results highlighted the influence of external factors, beyond the control of university management, on institutional performance,

Also, the study suggests that policymakers should carefully balance the pursuit of higher performance with equitable resource allocation ((Nicoletta et al., 2022)

On the other hand, Oguniran Musa Oladele (2019) carried out another study on the factors of budget, institutional vision and objectives as determining the performance of staff at the University of Ibadan Nigeria found:

- Faculty's budget involvement is positively related to staff performance.
- Budget success in the middle range has a direct impact.
- There is a significant joint influence of budget, institutional vision and objectives on staff performance.

In general, this finding has provided a reasonable explanation of relationship existing between these factors and performance of staff at the university. (Oladele & Longlong, 2019, pp. 1–17)

A study of Alaa Jamil and Abdul Rahman Ahmed (2020) on the factors affecting the relative research productivity of the faculty members within the Iraqi higher education system was conducted and the results defined that:

Funding is perhaps the most significant but not the only influence on research productivity.

Universities should focus on research-funding prospects, create opportunities for researchers to work together, enhance investment in information and communication technology, and improve job satisfaction; all geared toward increasing faculty research productivity.

The study suggested exploring the mediating effects of variables and increasing sample to include university faculty of other universities for higher generalizability. (Jameel & Ahmad, 2020, pp. 108–126)

Accordingly, taking into account the above literature review, we have comprised our research question as follows:

Could pedagogical supervision and operational expenses serve as a governance mechanism to promote faculty productivity?

In order to answer this main question, the study aims to explore the following sub-questions:

1- Is there any statistical relationship between the Scopus database productivity of faculty members and the pedagogical supervision?

2- Is there any relationship between faculty productivity in the Scopus database and operating expenses at 0.1% significance level?

Study objectives:

This study seeks to verify the extent of the effectiveness of this new governance mechanism of government funding aimed at the sector of higher education and scientific research in Algeria, and the impact of the same in the productivity of faculties in Scopus international database.

Importance of the study:

This study could be significant in that it has the potential to show that tying public monies to behavioral expectations is indeed an effective governance tool.

Limits of the study in time and space:

The research is in terms of location confined to Algeria and in terms of time it is confined to the fiscal year 2022, as this period provides us with final reports.

The reasons that led us to stick to this period are related to the difficulties of obtaining financial data of Algerian universities, as the financial data of universities are classified and are highly confidential data.

Study method:

The study employs a descriptive analytical approach for comprehensively examine the research topic.

Eviews software was used to analyze relevant data and draw conclusions.

Study structure:

After introduces the research topic, the first section explores the concept and factors influencing faculty scientific productivity, the financial appropriations allocated to Algerian universities within the context of the general budget, the second section presents a standard analytical study of the variables, and finally, we concluded with a discussion of the key findings and recommendations.

1. The scientific productivity of faculty members

Faculty scientific productivity is an essential term in height education institution, this is why, it is important to define and explore the factors that influence it.

1.1. Productivity of faculty members description

The scientific productivity is the result of efforts performed by faculty members in fields and functions of the university, this is right but this part of definition is limited to university traditional function.

We have to recognize that the faculty members today presents themselves to society by bring solution to socioeconomic and advancement technological problem and lead the society development in an economic of knowledge.

The pointe is to illuminate that the scientific productivity of faculty members is not limited to the effort performed just in fields and function of university but also in economic, social, political, and in the contribution of faculty member to the public strategic vision and administration.

Scientific productivity means the results of the efforts performed by faculty members in the fields and functions of the university, including teaching, scientific research, and community services, all the scientific and academic activities of a faculty member since obtaining his doctorate degree, including scientific books, published research, and supervision of master's and doctoral theses

stimulated personal satisfaction, desire, or pleasure can be an entry point to ameliorate scientific productivity of faculty members, and create a motivation for university professor to presents himself to society through his scientific ideas, which he uses to contribute to solving the problems of his society (Jalal, 2020, p. 3).

Teaching performs a pivotal function in schooling destiny generations of researchers. It equips college students with the competencies to behavior studies, increase theories, and follow expertise to cope with societal challenges.

1.2. Productivity of faculty members Motivation

The faculty productiveness may be motivated via way of means of type of factors, consisting of:

1.1.1 Psychological factors

While enjoy is an effective thing in faculty productiveness, it's miles vital to bear in mind the function of preference.

When school individuals are influenced via way of means of a sturdy preference for achievement, their enjoy may be leveraged effectively, however, in instances of saturation or burnout, school individuals might also additionally are seeking outside possibilities, inclusive of consulting, to advantage private economic benefits.

This factor might be used to devise college body law creating a effective earnings for each branch and member's school via way of means of permitting the usage of outside economic possibilities to school individuals however in circumstance to be orientated and coping with via way of means of the branch of school.

This method will encourage individuals for agreeing approximately being combine to control staff.

Effective communication, consisting of staying knowledgeable approximately current trends and taking part with different researchers, can substantially beautify a school member's highbrow boom and productiveness(Manongsong et al., 2020, pp. 274–280)

1.1.2 Financing elements and regulatory contexts

Institutional incentives can substantially affect faculty productivity, however their effectiveness relies upon on numerous elements.

These elements consist of clean goals, a supportive culture, wonderful institution dynamics, robust administrative involvement, a decentralized organizational structure, powerful communication, good enough resources, suitable rewards, range withinside the studies institution, and a clean focus.

The pleasant of management choice performs a critical function in developing a conducive surroundings for college studies.

Funding stays a sizable undertaking for universities, so, the diversifying and growing investment reassets can stimulate productivity, however confined hobby from capitalists in college studies and its effects frequently hinders investment efforts. .(Nachadi, 2023, pp. 592, 593)

To address challenges and enhance faculty scientific productivity, universities must invest in infrastructure that supports both high-quality teaching and effective executive management.

Diversifying funding sources in the knowledge economy requires from faculty members to actively marketing their scientific research.(Yuliana, 2021, pp. 10–18)

1.1.3 Technological and virtual factors:

Technology has significantly motivated studies methods in better training institutions.

The integration of virtual technology into better training has converted studies practices, and now, researchers need to accumulate a fixed of virtual abilities, programming languages and synthetic intelligence, optimizing studies processes, automating tasks, studying massive datasets.

Faculty contributors need to be ready with the vital abilities to make use of on line getting to know systems and combine virtual gear into their coaching, thereby improving pupil getting to know reports and growing normal instructional productivity.(Balyer & Öz, 2018, p. 809,830)

Universities need to put money into ongoing instructor schooling and improvement through remaining expertise gaps and staying up to date on rising trends, instructors can higher meet the wishes in their students.

Universities need to adapt to those modifications through optimizing human resources, constructing sturdy virtual infrastructure, fostering studies in technology, and selling collaboration and participation(Bygstad et al., 2022, pp. 182, 104463).

Proficiency in English is important for college contributors to completely get admission to and enjoy the full-size literature posted in English and different overseas languages It additionally gives a wonderful gain whilst interacting with synthetic intelligence software program and harnessing the ability of AI and command engineering for extra particular interactions. (<https://www.almentor.net/courses/English-Writing-for-AI-Usage-Prompt-Engineering>, n.d.)

2. The delegated financial appropriations in Algeria

Delegate financial resources within Algerian framework is that have been assigned by a government is delegate to one or more persons for their administration or control decision, and that's will be expose as following

2.1. Algerian's budgetary reform description

Algeria's budgetary reform prioritizes a results-oriented approach to enhance performance control and focus is on measurable outcomes defined by clear objectives.

This framework is embodied in the performance contract, which outlines the operator's mission, activities, objectives, performance indicators, target values, and consequences for non-achievement.

After that an annual performance report is make to evaluates the results achieved under the contract(abd elaziz djarrad, n.d.-a, p. 12,13),

Individuals at various levels, including the financial director, program

manager, activity manager or branch activity manager, typically manage financial appropriations (abd elaziz djarrad, n.d.-b, p. 21).

The finance Law provides a framework for budget development and implementation, it aligns with a results-oriented approach, emphasizing clear and measurable objectives that contribute to public interest goals and are subject to evaluation.

This approach involves a portfolio of programs that contribute to the implementation of specific public policies, these programs have clear and consistent objectives and they are funded through allocated financial appropriations and each program focuses on achieving specific mission objectives within one or more departments of the relevant ministries or institutions.

Open financial appropriations consist of commitment authorizations and payment credits, which can extend across multiple financial years, where, commitment authorizations may be carried over to the following year, and payment credits that represent the maximum amount that can be ordered, transferred, or paid during the year to fulfill obligations incurred under commitment authorizations. (abdelaziz bouteflika, 2018, pp. 9–20)

2.2. Financial appropriations delegated under the general budget

The process of managing financial appropriations revolves around four main axes as follows:

2.2.1 Financial appropriation's distribution operations

The registered financial appropriations are distributed according to programs, subprograms, activities and sub-activities according to the performance approach presented in the program.

The availability of credits is verified at the lowest level of the operational division according to the activity or sub-activity.

2.2.2 Financial credit programming operations

The commitment needs are determined annually, and a financial appropriation programming document is prepared according to a practical classification with the aim of reconciling the activity of the departments and the allocated appropriations,

It is accompanied by an estimate of the main operations and the year's expenditures, and each practical official must submit a report to the direct supervisor on the implementation of the financial appropriation programming during the fiscal year.

2.2.3 Expense operations

It is the sum of the commitment, liquidation, payment order and payment operations through which the public debt is discharged.

2.2.4 Delegation of management

Preparing a contractual document through which the authority to implement expenditure operations can be delegated from the commissioner to the commissioned and the latter have to includes, the following:

- a. Subject and duration of the mandate
- b. Expected financial appropriations
- c. Duties of the parties,
- d. Appointing the authorized authority that undertakes the function of ordering disbursements, and in this capacity, it undertakes the obligation to pay expenses, liquidate them, and order their disbursement.
- e. Conditions under which reports on the implementation of the mandate are submitted
- f. How to compensate for the burdens and expenses resulting from this delegation
- g. -methods of budgetary control.(abd elaziz djarrad, n.d.-b, p. 19 to 21)

II. Methods and Materials:

This study uses ordinary least squares regression analysis (OLS) to analyze the relationship between the variables identified in the text according to the coding shown in the following table:

Table (1) : variables identified

Source	Coding	variable
Scopus database	UPSCOP	Faculty Productivity in Scopus
Ministry of Higher Education and Scientific Research data	FS	Operating expenses
University websites	EN	level of pedagogue rate: The percentage of the number of university students to the number of university professors

The source : by authors

To analyze the relationship between the variables "UPSCOP" as the dependent variable and the independent variables "FS", "EN" The data were collected from a sample of 22 observations, each observation containing measurements of the variables.

The data were collected from the "Scopus" database, from the Ministry of Finance data, and from the universities' websites.

Table (2) : Descriptive statistics

	UPSCOP	DFS	PEDAGOGIC_ENCARD_RATE
Mean	377.2727	5.26E+08	0.048268
Median	330.5000	4.86E+08	0.045455
Maximum	961.0000	8.09E+08	0.083333
Minimum	52.00000	2.00E+08	0.033333
Std. Dev.	219.0856	1.78E+08	0.013018
Skewness	0.815568	-0.006225	1.096470
Kurtosis	3.377206	2.158559	3.627190
Jarque-Bera	2.569315	0.649163	4.768826
Probability	0.276745	0.722830	0.092143
Sum	8300.000	1.16E+10	1.061904
Sum Sq. Dev.	1007968.	6.64E+17	0.003559

The source : by authors using Eviews software

The OLS regression model was determined as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

Where it represents Y is the dependent variable, and X1, X2 are the independent variables, β_0 is the objector, β_1 and β_2 are transactions, and ϵ is an error term. And the results were as follows:

Table (3) : Regression coefficients

Dependent Variable: SCOP				
Method: Least Squares				
Date: 06/08/24 Time: 23:49				
Sample: 1 22				
Included observations: 22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FS	8.60E-07	1.79E-07	4.794328	0.0001

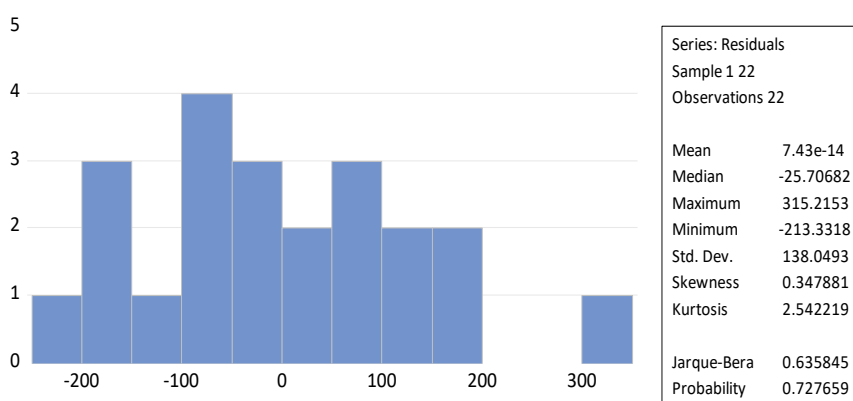
Managing public budget to improve Algerian faculty member's productivity within Scopus database (pp: 242- 254)

EN	4449.537	2451.406	1.815096	0.0853
C	-290.0021	145.3370	-1.995377	0.0605
R-squared	0.602954	Mean dependent variable		377.2727
Adjusted R-squared	0.561160	SD dependent var		219.0856
SE of regression	145.1333	Akaike info criterion		12.91931
Sum squared resid	400209.8	Black Criterion		13.06808
Log likelihood	-139.1124	Hannan-Quinn criter.		12.95435
F-statistic	14.42670	Durbin-Watson stat		2.568948
Prob(F-statistic)	0.000155			

The source : by authors using Eviews software

The result of normality test was as the following figure:

Figure (1): Normal distribution



The source : by authors using Eviews software

We used Heteroscedasticity Test for testing contrast stability as following in this table

Table (4) : Contrast stability

Contrast stability			
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.325246	Prob. F(2,19)	0.7263
Obs*R-squared	0.728268	Prob. Chi-Square(2)	0.6948
Scaled explained SS	0.418860	Prob. Chi-Square(2)	0.8110

The source: by authors using Eviews software

III. Results and discussion :

R-squared (0.602954): Indicates that the model explains 29.60% of the variance in the dependent variable, this high value indicates a strong fit.

Adjusted R-squared (0.561160): Adjusted for the number of predictors in the model, this value is slightly less than the R-squared, indicating a strong fit.

Standard error of regression (0.000155): A low standard error indicates that the predictions made by the model are close to the actual observed values.

Statistics F (14.42670): This high value indicates that the model is statistically significant, meaning that at least one of the predictors is significantly related to the dependent variable.

Durbin-Watson statistic (2.568948): the ideal value for the Durbin-Watson statistic is 2, indicating no autocorrelation in the residuals. However, the value of 2.568948 is close to 2, meaning that there is no significant autocorrelation between the residuals.

Statistics jarque berq (0.635845): This statistic is used to test whether the residuals follow a normal distribution, and in this case, there is a very high value indicates that the residuals follow a normal distribution.

Statistics Breusch-Pagan-Godfrey (0.7263): Used to test for heteroskedasticity in the model, so in this case there is a high value indicates no variable variance, meaning that the variance in errors is constant across all observations.

Discussion

The model shows a strong explanatory power of R-squared (0.602954), which indicates that 29.60% of the variance in the scop is explained by the model.

Other statistical measures confirm the explanatory power of the model, making it a reliable tool for understanding the underlying dynamics.

The results of the regression analysis indicate that OLS indicates a strong relationship between UPSCOP and the independent variables EN, FS, while the F statistic indicates the overall significance of the model.

The probability indicates FS is 0.0001 and the probability indicate EN is 0.0853: the probabilistic significance of the variables is at a 10% confidence level

IV. Conclusion:

Despite the efforts made in the field of budgetary reforms in Algeria, financing higher education and scientific research remains a complex issue characterized by the difficulty of financial measurement of the sector's outputs.

In addition to measuring the achievement of economic, social and political goals associated with higher education, it is increasingly difficult to measure performance in a university system funded entirely by the public sector, in which universities consume multiple outputs.

The following results:

There is a positive statistically significant relationship between the productivity of faculty members within the Scopus database and the level of pedagogical supervision.

There is a positive statistically significant relationship between faculty productivity within the Scopus database and operating expenses.

Faculty productivity can be influenced within the Scopus database by using operating expenses and the level of pedagogical supervision as a governance mechanism for managing financial resources.

Recommendations:

Opening the field of research regarding the use of software and ministerial portfolios as a mechanism for governing the higher education sector in Algeria

Research on scientific productivity and raising classifying universities through the key principle indicators of activity included in the ministerial program in Algeria

– **Referrals and references:**

- **Official gazette:**

abd elaziz djarrad. (n.d.-a). Official Gazette No. 11, 2021 Executive Decree 21-62 of February 8, 2021, defining the appropriate budgetary and accounting management procedures for the budgets of public institutions of an administrative nature and other public bodies and institutions benefiting from state budget allocations.

abd elaziz djarrad. (n.d.-b). Official Gazette No. 80-2020 ,Executive Decree No. 20-404 of December 29, 2020, determining the methods of managing and delegating financial appropriations. Retrieved November 1, 2024, from <https://www.joradp.dz/HAR/Index.htm>

abdelaziz bouteflika, S. A. (2018, September 2). Official Gazette No. 53-2018, Organic Law 15-18 Related to Financial Laws. 2018. <https://www.joradp.dz/HAR/Index.htm>

• **Journal article :**

Balyer, A., & Öz, Ö. (2018). Academicians' Views on Digital Transformation in Education. *International Online Journal of Education and Teaching*, 5(4), 809–830. <https://eric.ed.gov/?id=EJ1250526>

Bygstad, B., Øvrelid, E., Ludvigsen, S., & Dæhlen, M. (2022). From dual digitalization to digital learning space: Exploring the digital transformation of higher education. *Computers & Education*, 182, 104463. <https://doi.org/10.1016/j.compedu.2022.104463>

Jalal, A. (2020). Research Productivity in Higher Education Environment. . . Vol, 3(1).

Jameel, A. S., & Ahmad, A. R. (2020). Factors Impacting Research Productivity of Academic Staff at the Iraqi Higher Education system. *International Business Education Journal*, 13(1), Article 1. <https://doi.org/10.37134/ibej.vol13.1.9.2020>

Manongsong, M. J. G., Refozar, R. F. G., Encio, H. A., Mendoza, F. M., & Laguador, J. M. (2020). Business Administration Faculty Members' Personal Productivity and Motivational Factors in Conducting Research. 9(06).

Nachadi, A. R. (2023). Appearances and Challenges of Digital Transformation in Higher Education Institutions in Algeria University of Blida 2 Lounici Ali as a role model. *Journal of Development and Human Resource Management*, 10(1), 582–599. <https://www.asjp.cerist.dz/en/article/224694>

Nicoletta, F., Marinò, L., Pischedda, G., & Ezza, A. (2022). The effect of performance-oriented funding in higher education: Evidence from the staff recruitment budget in Italian higher education. *Higher Education*, 83(5), 1003–1019. <https://doi.org/10.1007/s10734-021-00725-4>

Oladele, O. M., & Longlong, H. (2019). THE INFLUENCE OF FACULTY BUDGETARY PARTICIPATION, BUDGET ADEQUACY, VALUES AND VISION ON STAFF PERFORMANCE: A CASE STUDY OF UNIVERSITY OF IBADAN, NIGERIA. 20(3).

Yuliana, Y. (2021). The Challenges and Opportunities in Digital Transformation for Education During the COVID-19 Pandemic. *International Conference On Education And Technology*, 1(1), Article 1. <https://e-journal.staima-alhikam.ac.id/icete/article/view/784>

• **Internet websites:**

<https://www.almentor.net/courses/English-Writing-for-AI-Usage-Prompt-Engineering>, web page. (n.d.). English writing course for using artificial intelligence (command engineering). Almentor. Retrieved November 1, 2024, from <https://www.almentor.net/courses/English-Writing-for-AI-Usage-Prompt-Engineering>