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The Impact of Investment in Human Capital on Improving Tax Oversight: A Field Study in the Tax Directorates of M'Sila, Bordj Bou Arreridj, and Djelfa Provinces, Algeria

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Abstract: This empirical study examines the impact of investment in human capital on improving tax oversight processes in the regional tax directorates of M'Sila, Bordj Bou Arreridj, and Djelfa provinces, Algeria. Drawing on survey data from 63 valid responses (out of 68 distributed) among inspectors and service heads, the research tests three hypotheses regarding human capital efficiency, competency selection criteria, and training mechanisms. Descriptive statistics and Wilcoxon tests reveal moderate to low perceived efficiency in human capital (mean = 2.57), leading to the rejection of the first two hypotheses. However, training mechanisms demonstrate a significant positive effect (supported hypothesis), highlighting their role as a key driver despite broader deficiencies in incentives and selection processes. The findings underscore the need for targeted investments in continuous training and professional development to enhance oversight effectiveness, reduce evasion risks, and safeguard public revenues. Recommendations include reforming recruitment, expanding mandatory training programs, and integrating digital tools. These results contribute to the Algerian literature on tax administration modernization and align with international calls for human capacity building in emerging economies.

Keywords: Human Capital, Job Satisfaction, Investment in Education, Investment in Training, Tax Oversight.

Jel Classification Codes : H83; J24; M53.

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I- Introduction :

The human factor remains the cornerstone of institutional performance, especially in an era of rapid global transformations driven by advanced technologies and tools that enhance competitiveness and sustainability. In the context of tax administration—as a supervisory body tasked with adopting cutting-edge technologies to detect and mitigate tax evasion, manage risks, and safeguard public treasury revenues—the imperative for strategic investment in human capital has become evident. Human capital serves as the primary driver and operator of these technologies and innovations, capable of amplifying or hindering their effectiveness. It plays the central role in the tax oversight process, acting as the key mechanism through which the tax system verifies taxpayers' compliance with applicable laws and regulations, assesses the accuracy of provided accounting information, and ensures overall fiscal integrity.

Recent studies in the Algerian context underscore this linkage. For instance, investment in human resource formation and training is highlighted as a critical enabler for modernizing tax administration and improving public finance outcomes, despite implementation challenges (Ibrir & Djazouli, 2024). Similarly, modernization efforts—including enhancements in staff capabilities have demonstrated a statistically significant positive impact on tax revenue collection and compliance (Slimani, 2025a). Internationally, reports emphasize that strengthening administrative capacity through human capital development is essential for broadening the tax base, reducing evasion, and boosting non-hydrocarbon revenue mobilization in Algeria (Vellutini, 2025; OECD, 2025).

From this standpoint, the research problem can be formulated as follows: **How does investment in human capital contribute to improving the tax oversight process?**

Sub-questions:

- Does the tax administration pay attention to various aspects related to the human element (incentives, bonuses, salary improvements)?
- Does the tax administration rely on specific criteria for selecting human competencies responsible for the tax oversight process?
- Does the tax administration establish mechanisms for training the human element tasked with tax oversight duties?

Study Hypotheses:

To provide an initial answer to the research problem, the following hypotheses have been formulated:

- The qualified human element is the primary contributor to improving the tax oversight process;
- The tax administration pays attention to the human element by providing mechanisms and tools that allow for the improvement of tax oversight performance;
- Investment in human capital contributes to elevating the level of oversight action.

The importance of the study lies in highlighting the extent of the human element's contribution to raising the level of tax oversight performance, as it is responsible for applying various laws and regulations aimed at curbing all fraudulent practices to preserve treasury funds from loss. From the standpoint that the tax administration, with its legal authority, is responsible for investing in human capital with the aim of developing oversight mechanisms, thereby enabling all its users to utilize them effectively.

Through this study, we seek to achieve the following objectives:

- Highlight the relationship between tax oversight and the human element through the achieved results;
- Determine the importance of human capital in enhancing the effectiveness of the oversight apparatus.

Given the nature of the studied topic and for the purpose of addressing the problem, analyzing its dimensions, and encompassing various aspects of the subject, the descriptive-analytical method has been adopted, in addition to relying on a questionnaire to ascertain the impact of investment in human capital on improving the tax oversight process.

To comprehensively cover various aspects of the topic, the following axes have been addressed:

- The concept of human capital;
- The theoretical foundation of tax oversight;

- The impact of investment in human capital on improving the tax oversight process.

Recent Algerian studies have emphasized human resource development in modernizing tax administration. For instance, Ibrir and Djazouli (2024) highlighted the pivotal role of training at the National School of Taxation in implementing reforms for tax modernization, contributing significantly to public finance despite challenges. Slimani (2025a) found a statistically significant impact of tax administration modernization dimensions on revenue collection in Batna, recommending digital infrastructure enhancement and incentive systems. Similarly, Slimani (2025b) demonstrated a strong positive relationship between digitalization and tax administration modernization in Constantine, stressing employee skill development and adaptability. Kouissi and Aichouche (2024) revealed a significant influence of human capital investment (particularly retention) on digital transformation at the National Bank of Algeria.

While these studies provide valuable insights, they primarily focus on digitalization, revenue impacts, or broader modernization without deeply examining the three core dimensions of human capital investment (material incentives, competency selection criteria, training mechanisms) and their direct effect on tax oversight quality in specific local contexts. The present study addresses this gap through an empirical field investigation in the tax directorates of M'Sila, Bordj Bou Arreridj, and Djelfa provinces, testing targeted hypotheses that reveal rejections for some relationships while underscoring training as a key driver.

II. Theoretical Framework:

II.1.The Concept of Human Capital:

Human capital refers to the stock of knowledge, skills, competencies, and attributes embodied in individuals that enable them to perform economically valuable work and contribute to organizational and societal productivity (OECD, 2025). It encompasses both innate abilities and those acquired through education, training, and experience, serving as a key driver of efficiency in public and private institutions.

In the Algerian financial and administrative context, human capital investment—including attraction (recruitment), development (training and skill enhancement), and retention (incentives and career progression)—has been shown to significantly influence digital transformation and operational performance (Kouissi & Aichouche, 2024). Building on this, human capital can be defined here as: the collective set of knowledge, skills, and competencies possessed by individuals within an organization, which, through targeted investment (particularly in training and development), enhances institutional efficiency, supports technological adoption, and maximizes economic and administrative value.

- Investment in Training: Training constitutes a systematic process aimed at developing employees' competencies to align with current and future organizational objectives, thereby improving performance and adaptability (Kouissi & Aichouche, 2024). Modern enterprises and public administrations increasingly link training programs to strategic goals, such as digital modernization and enhanced oversight, to achieve sustainable competitive advantages (OECD, 2025).

II.1.1. Characteristics of Human Capital:

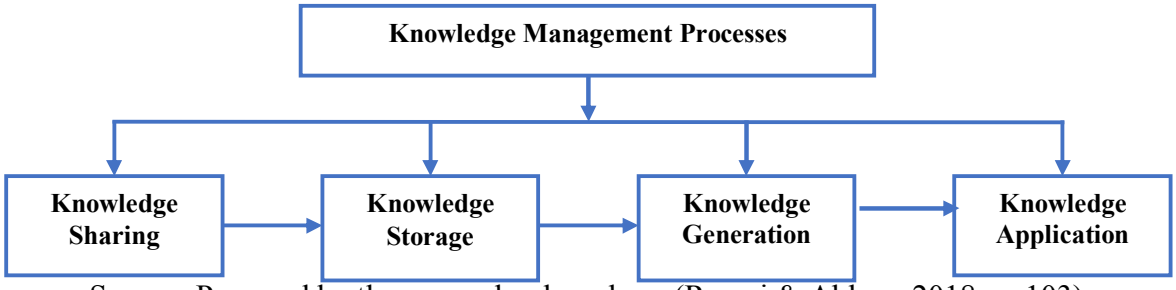
- Linkage of Human Capital to Individuals: "It is impossible in any way to separate human capital from its owner, as the individual can only sell the service of their human capital and not the capital itself."(Boutiba, 2019, p. 15)
- Inability to Liquidate Human Capital: There is no specialized market for trading and liquidating intangible assets, unlike financial assets which are easily traded through buying and selling.(Al-Anzi & Abbas, 2016, p. 17)
- Difficulty of Imitation by Competing Enterprises: Recent research focuses on "intangible assets, particularly human capital, skills, and capabilities, to explain performance differences among various enterprises. Intangible resources that are valuable, distinctive, non-imitable, and irreplaceable constitute an important source for achieving a sustainable competitive advantage for the enterprise. From this perspective, human resources, through the adoption of a set of practices, policies, and decisions, can form strategic assets capable of creating value due to the difficulty of imitating them as a result of their complexity."(Al-Anzi & Abbas, 2016, p. 36)

II.1.2. Aspects of Investment in Human Capital:

Making the decision to invest in human capital requires knowledge of all related aspects to achieve the desired investment objectives. For instance, identifying the strengths and weaknesses of the enterprise's human capital, and the investment aspects that address the former and enhance the latter, are among the most important considerations for decision-makers. Below, we outline the key aspects of investment in human capital, which largely stem from its components.

- **Investment in Health:** This includes infrastructure and health services that affect life expectancy levels,(Dahmani, 2015, p. 74) where states, economic institutions, and individuals bear significant amounts to maintain health, thereby preserving the source of human capital. Investment in health represents one of the fundamental aspects of investment in human capital.
- **Investment in Education:** The development achieved in most advanced countries is largely attributable to the quality of education and its outputs, prompting most countries to give special attention to educational institutions, whether public or private, as they are the primary source of human capital directed toward achieving societal development through its various institutions. Like any type of capital, the stock of knowledge erodes due to forgetting, obsolescence, and other factors. Similar to physical capital, human capital is reproducible, as this erosion can be compensated through experience and/or continuous training.(Boutiba, 2019, p. 15) If human capital is one of the most important assets possessed by societies and economic institutions, then continuous education is what preserves this asset from depletion and disappearance.
- **Investment in Training:** Training is defined as: "the effective activity that contributes to increasing individuals' skills in performing their tasks to implement current and future work plans and programs on scientific and practical bases, with the aim of enhancing the efficiency and effectiveness of the enterprise."(Al-Kalaldeh, 2011, p. 99) On this basis, enterprises have reconsidered their training programs to achieve competitive advantages, by linking training programs to the enterprise's strategic objectives.(Tari & Hadj, 2018, p. 376)
- **Knowledge Management:** The process of knowledge management within the economic enterprise is one of the most important aspects of investment in human capital, given the importance that knowledge has assumed for the enterprise as one of the key sources of creativity and competitive advantage. The figure below summarizes the various knowledge management processes within the enterprise:

Figure (01): Knowledge Management Processes



Source: Prepared by the researcher based on: (Ramzi & Ahlam, 2018, p. 103)

- **Employee Empowerment:** It is defined as: "an individual's ability to perform activities, where an individual who feels a high degree of empowerment at work has a strong sense of self-esteem, effective performance, and progress in their work."(Taha, 2013, p. 42)

II.2. Conceptual View of Tax Oversight:

The law has granted the tax administration absolute authority to conduct oversight, manifested in the right to investigate, assess, and correct errors by reviewing information provided by taxpayers, in order to protect state funds from tax evasion in all its forms.

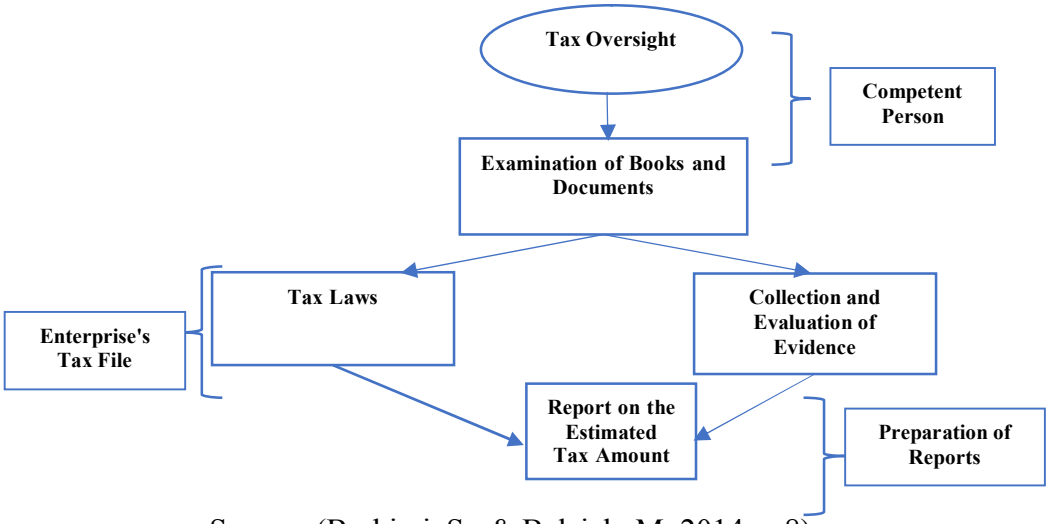
II.2.1. Definition of Tax Oversight:

Tax oversight (or tax control/audit) involves systematic verification procedures conducted by the tax authority to ensure accurate declaration and payment of taxes. It includes examining taxpayers' books, records, financial statements, and supporting documents to confirm compliance with tax laws, detect underreporting or evasion, and determine the true taxable base.

Contemporary definitions emphasize its role in risk management and revenue protection: Tax oversight is "the process by which tax administrations verify taxpayer compliance, assess reported information for accuracy, and apply enforcement measures to mitigate evasion risks, often integrating digital tools and human expertise to enhance efficiency" (OECD, 2025; adapted to emerging economies context). In Algeria, it focuses on ensuring all revenues subject to tax are captured, with auditors empowered to review declarations, request documentation, and address fraud across natural and legal persons (Vellutini, 2025).

The preceding definitions can also be summarized in the following figure:

Figure (02): Tax Oversight



Source: (Brahimi, S., & Belaich, M. 2014 p. 8)

II.2.2. Forms of Tax Oversight:

There are two main types of tax oversight, each encompassing several subtypes, as follows:

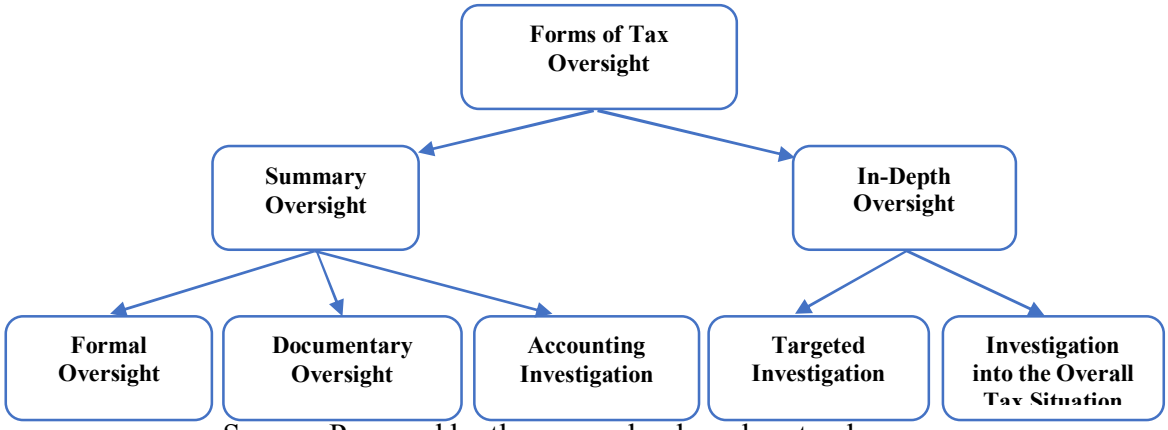
- **Summary Oversight:** This is conducted at the level of the tax inspectorate and takes the form of a preliminary examination performed without on-site visits, i.e., at the inspectorate level. We distinguish between two types of summary oversight:
  - **Formal Oversight:** This occurs within the jurisdiction associated with the place of business activity and aims to verify the identity and location of the taxpayer, as well as the absence of material errors in the declarations.(Brahimi & Belaich, 2014)
  - **Documentary Oversight:** This type constitutes the second procedure undertaken by the tax administration following formal oversight. It involves a comprehensive set of operations and examinations conducted at the administration's offices, comparing the information declared by the taxpayer with data obtained from public and private administrations and institutions. The oversight agent may request clarifications and justifications from the taxpayer if necessary, particularly regarding lifestyle or certain allocated burdens.(Kattal, 2009, pp. 38–39)
- **In-Depth Oversight:** This is conducted at the level of the sub-directorate for tax oversight and represents a continuation of documentary oversight, aimed at rectifying any tax evasion. We distinguish between three types of in-depth oversight:
  - **Accounting Investigation:** Defined in Article 20, Paragraph 1, as "the set of operations aimed at monitoring tax declarations subscribed by taxpayers."(Tax Procedures Law, n.d., art. 20, p. 9) Dr. Daniel Richer defines it as: "the set of operations intended to examine on-site the accounting of an enterprise or a specific activity, and to compare the results with certain material data with the goal of verifying the integrity and accuracy of office declarations, and resorting to necessary procedures to make the required adjustments."(Richer, 1990, p. 25) The accounting investigation is one of the most important methods used in tax oversight, as it is conducted according to tax rules that regulate the procedures to be followed by the tax administration to clarify its operation.
  - **Targeted Accounting Investigation:** This is performed when the tax administration doubts the accuracy of taxpayers' documents and records, with the aim of preventing

avoidance or reduction of their tax burdens. This investigation is conducted for one or several types of taxes, for a full period or part thereof that is not time-barred, or for a group of operations or accounting data for a period less than a fiscal year. The tax administration may also conduct an in-depth accounting investigation in the future and revisit the period of the targeted investigation, taking into account the rights arising from reassessment.(Directorate General of Taxes, n.d., art. 20, para. 1, p. 13)

- **In-Depth Investigation into the Overall Tax Situation:** The in-depth investigation into the overall tax situation was introduced as a logical and necessary extension and complement to the accounting investigation. This type of investigation was established in 1992, aligning with the reform movement in Algeria's tax policy, through the Finance Law of 1992. Article 21 of the Tax Procedures Law defines it as: "Tax administration agents may initiate an in-depth investigation into the overall tax situation of natural persons with regard to income tax, whether they have a tax domicile in Algeria or not, when they have obligations related to this tax."(Directorate General of Taxes, Algeria, 2021, art. 21, p. 13)

The forms of oversight as defined by tax legislation can be represented in the following figure:

Figure (03): Forms of Tax Oversight



Source: Prepared by the researcher based on tax laws, General Directorate of Taxes, Ministry of Finance.

II.2.3. Objectives of Tax Oversight:

The objectives that the tax administration seeks to achieve are as follows:

- **Legal Objective:** This involves ensuring the conformity and alignment of taxpayers' various financial transactions with laws and regulations. To safeguard the latter, tax oversight relies on the principle of accountability to penalize taxpayers for any deviations or violations they commit to evade their tax obligations.(Kerdoudi, 2008–2009, p. 90)
- **Administrative Objective:** This is manifested in the role played by tax oversight in increasing the effectiveness of the tax administration by providing it with information. This role can be summarized in the following points:(Atir, 2011, p. 80)
  - Identifying deviations and detecting errors, which assists the tax administration in making appropriate decisions to address resulting problems;
  - Assisting tax oversight in preparing statistics, such as tax evasion rates;
  - Enabling the detection of legal loopholes that facilitate tax evasion and attempting to find solutions for them.
- **Financial and Economic Objective:** Tax oversight primarily aims to ensure the rights and obligations of both the tax administration and taxpayers equally, thereby striving to preserve public funds from manipulation and theft, protecting them from any form of loss. This contributes to increasing funds available for public expenditure, which reflects on the level of economic welfare.(Ousserir & Hammou, 2009, p. 202)
- **Social Objective:** At the social level, tax oversight aims to:(Kerdoudi, 2011, p. 49)
  - Achieve tax justice among taxpayers by establishing a fundamental principle for deductions, namely that all taxpayers stand on equal footing before the tax;
  - Prevent and combat taxpayer deviations in all their forms, such as theft, negligence, or failure to perform and bear their duties toward society.

III– Methods and Materials:

III.1. Study Population and Sample:

The study population encompasses all employees involved in human capital investment and tax oversight processes within the regional tax directorates of M'Sila, Bordj Bou Arreridj, and Djelfa provinces. This population is estimated at approximately 500–800 individuals (based on administrative estimates from the General Directorate of Taxes, focusing on senior and mid-level administrative and inspection cadres, with roughly 150–300 relevant staff per directorate). A purposive random sample was drawn from relevant cadres (service heads, inspectors, etc.), totaling 68 individuals (M'Sila: 31, Bordj Bou Arreridj: 19, Djelfa: 18). Of these, 63 valid questionnaires were retrieved, yielding a response rate of 92.65%. Despite its modest size, the sample is considered relatively representative in the Algerian context of field-based administrative studies, due to its focus on a homogeneous specialized group, challenges in accessing larger samples owing to administrative constraints and professional sensitivity, and sufficiency for conducting basic statistical analyses with acceptable significance levels.

III.1.1. Tool Design:

A questionnaire was designed based on a five-point Likert scale to describe the study sample and test its hypotheses, with a confidence level of no less than 95% and a margin of error not exceeding 5%, using the Statistical Package for the Social Sciences (SPSS) version 26 and Excel 2013.

III.1.2. Ensuring the Tool's Suitability for the Study:

- **Face Validity:** Before distributing the questionnaire, it was arbitrated by three specialized professors, and all proposed modifications were implemented before finalizing the questionnaire.
- **Reliability Test:** Reliability indicates the stability of the tool in measurement. In this context, Cronbach's alpha reliability coefficient was used, and the reliability test results are shown in the following table:

Table (01): Results of the Reliability Coefficient Test

Axes	Reliability Coefficient Value
First: Efficiency of Human Capital within the Tax Administration	0.745
Second: Mechanisms for Improving the Tax Oversight Process through Attention to the Human Element	0.803
Overall	0.737

Source: Prepared by the researcher based on SPSS V26 outputs.

From the above table, it is evident that the reliability values for the axes are: 0.745 for the first axis, 0.803 for the second axis, and 0.737 for the tool as a whole, which are values exceeding the standard value of 0.7. Therefore, the questionnaire possesses reliability.

- **Internal Consistency:** Internal consistency is measured using Pearson's correlation coefficient between each item and the total score of the axis to which it belongs. The results of calculating the internal consistency for the tool are shown in the following table:

Table (02): Results of the Internal Consistency Test for the Tool

Correlation	Minimum Value	Maximum Value	Significance
First: Efficiency of Human Capital within the Tax Administration	0.583	0.870	0.000
Second: Mechanisms for Improving the Tax Oversight Process through Attention to the Human Element	0.515	0.883	0.000

Source: Prepared by the researcher based on SPSS V26 outputs.

It is evident that the values and significance of Pearson's correlation coefficient confirm the existence of a positive relationship ranging between moderate (moderate strength correlation) and high (strong correlation), with statistical significance less than the standard value of 5%, i.e., a margin of error less than 0.05. Therefore, the tool is characterized by internal consistency between the items and the axes to which these dimensions belong.

IV- Results and discussion :

IV.1. Analysis of General Data:

This data includes: the age variable, the educational level variable, the experience in years variable, and the job position variable. The following table illustrates the obtained results, including percentages and frequencies according to these variables, as shown in the subsequent table:

Table (03): General Data of the Study Sample

1. Distribution of Sample Elements by Age Variable		
Age	Frequency	Percentage (%)
Less than 30 years	4	6.3
30 – 40 years	33	52.4
More than 40 years	26	41.3
Total	63	100
2. Distribution of Sample Elements by Educational Level Variable		
Educational Level	Frequency	Percentage (%)
License	32	50.8
Master	20	31.7
Postgraduate Studies	11	17.5
Total	63	100
3. Distribution of Sample Elements by Experience Variable		
Experience	Frequency	Percentage (%)
Less than 5 years	11	17.5
5 to 10 years	27	42.9
More than 10 years	25	39.7
Total	63	100
4. Distribution of Sample Elements by Job Position Variable		
Job Position	Frequency	Percentage (%)
Head of Service	12	19
Chief Inspector	21	33.3
Inspector	17	27
Other	13	20.7
Total	63	100

Source: Prepared by the researcher based on SPSS V26 outputs.

The above table indicates that:

- Regarding the age variable: The category of 30 to 40 years constitutes the majority of the studied sample at 52.4%, while the category over 40 years accounts for 41.3%, compared to only 6.3% for the category under 30 years. This suggests that the sector experiences relative stability in human resource recruitment processes, with a reliance on relatively middle-aged and older human resources.
- Regarding the educational level variable: It is observed that the majority of elements hold a license degree at 50.8% of the total sample, followed by master's degree holders at 31.7%, while holders of postgraduate degrees account for 17.5%. Thus, as the educational level increases, the number and percentage of represented elements decrease, which is logical given that work in this tax sector (cadre category) requires candidates to hold a license degree in most new recruitment processes.
- Regarding the experience variable: The category with less than 5 years of experience accounts for 17.5% of the total sample, while the majority of elements are concentrated at the experience level of 5 to 10 years and more than 10 years at rates of 42.9% and 39.7%, respectively. This aligns with the analysis of sample elements by age variable, indicating that most competencies working in the tax sector have relatively medium to high experience (based on the number of years).
- Regarding the job position variable: The inspectors' category represents most of the studied elements at 60.3% (33.3% chief inspectors, 27% inspectors), followed by the category of other related positions (other cadres) and then heads of services with similar rates. What is noted here is that the sample is diverse in terms of age, educational level, experience, and job

position, which can help in obtaining results that take into account various cadres working in the tax sector.

IV.2. Analysis of the Dimensions of the Questionnaire Axes:

To analyze the orientations of the study sample elements regarding human capital and tax oversight, arithmetic means and standard deviations are used, in addition to determining the direction of the averages for the items and the axes to which they belong.

IV.2.1. Axis of Efficiency of Human Capital within the Tax Administration: The analysis of this dimension revealed the results shown in the following table:

Table (04): Analysis of the Axis of Efficiency of Human Capital within the Tax Administration

Item	Arithmetic Mean	Standard Deviation	Average Direction	Importance
1. Continuous development of scientific and professional aspects for tax oversight agents through internships and training courses	2.63	1.03	Neutral	3
2. Tax oversight agents enjoy a level of job satisfaction that allows them to perform their tasks and commitments optimally	2.77	0.62	Neutral	2
3. Tax oversight agents enjoy material and moral privileges and incentives that contribute to enhancing their oversight performance	2.21	1.17	Disagree	5
4. The qualifications of workers within the tax oversight department match the positions they occupy	3.61	1.00	Agree	1
5. Tax oversight services work to impart new skills to auditors according to their specializations	2.54	1.06	Disagree	4
6. Tax oversight agents possess sufficient qualifications and professional experiences to perform their oversight tasks optimally	1.66	0.69	Disagree	6

Source: Prepared by the researcher based on SPSS V26 outputs.

The orientations of the study sample individuals regarding this axis ranged between 1.66 and 3.61 at the levels: disagree (03 items), neutral (two items), and agree (one item), with relatively small standard deviations ranging between minimum and maximum values of 0.62 and 1.17, respectively. This indicates a general orientation reflecting homogeneity governing the responses of the studied sample individuals. As for the ranking of the axis indicators in terms of actual application, most orientations were in the negative direction (less than 3), meaning this ranking expresses the problems and challenges facing the tax administration (from least challenge to greatest challenge) as follows:

- Compatibility of qualifications with positions;
- Existence of job satisfaction that allows task performance;
- Development of scientific and professional aspects;
- Imparting new skills to auditors;
- Existence of material and moral privileges and incentives;
- Possession by tax agents of necessary qualifications and professional experiences for task performance.

IV.2.2. Axis of Mechanisms for Improving the Tax Oversight Process through Attention to the Human Element:

Table (05): Analysis of the Axis of Mechanisms for Improving the Tax Oversight Process through Attention to the Human Element

Item	Arithmetic Mean	Standard Deviation	Average Direction	Importance
7. The tax administration works on good selection of oversight agents who possess sufficient scientific and professional qualifications	1.66	0.75	Disagree	5
8. The tax administration conducts training courses and internships for oversight agents and inspectors to increase their experiences and knowledge	2.41	0.71	Disagree	3
9. The tax administration adopts an incentives and grants system for oversight agents, contributing to achieving job satisfaction	1.33	0.53	Disagree	7
10. Granting tax oversight agents' freedom in some authorities without restricting them to create competitiveness and creativity	2.06	0.73	Disagree	4
11. The tax administration establishes a mechanism for accompanying and training oversight agents, especially new joiners to the oversight apparatus	3.87	1.17	Agree	1
12. The tax administration gives tax oversight agents the	1.47	0.73	Disagree	6

opportunity to express their ideas and share them to create an environment encouraging oversight work				
13. The tax administration grants tax oversight agents material and moral privileges consistent with their provided performance level	2.42	1.09	Disagree	2

Source: Prepared by the researcher based on SPSS V26 outputs.

All arithmetic means for the items of this dimension are below the level (4), which is confirmed by the general range of the mean that ranged between 1.47 and 3.87 at the levels: disagree (06 items) and agree (one item), without recording large standard deviations that did not exceed the threshold of 1.17 in their extreme cases. This indicates that the data are not dispersed from their arithmetic mean due to homogeneity in the sample individuals' responses regarding this axis. As for the ranking of the axis indicators in terms of actual application, most orientations were in the negative direction (less than 3), meaning this ranking expresses the problems and challenges facing the tax administration (from least challenge to greatest challenge) as follows:

- Existence of a mechanism for accompanying and training tax oversight agents;
- Granting privileges to agents consistent with their provided performance;
- Conducting training courses that allow performance development;
- Increasing the level of freedom and empowerment;
- Ensuring good selection process for tax oversight agents;
- Activating and expanding the role of oversight agents in decision-making;
- Increasing job satisfaction for oversight agents.

IV.2.3. Testing Data Distribution

To test the normality of the data, the Kolmogorov-Smirnov test is employed, which is used for samples with more than 50 elements. The decision rule here is the opposite of other statistical tests, meaning the data follow a normal distribution unless the statistical significance of the Kolmogorov-Smirnov test is greater than the standard value (0.05) rather than less. The following table illustrates the results of the normality test for the study data:

Table (06): Data Normality Test

Axis	Statistical Significance (Sig)	Distribution Nature
Efficiency of Human Capital within the Tax Administration	0.000	Non-normal
Mechanisms for Improving the Tax Oversight Process through Attention to the Human Element	0.000	Non-normal

Source: Prepared by the researcher based on SPSS V26 outputs.

According to the above table, it is evident that the statistical significance value for the Kolmogorov-Smirnov normality test is less than the standard value of 0.05. Therefore, non-parametric tests are used in the analysis and to confirm the acceptance or rejection of the study hypotheses.

IV.3. Hypothesis Testing

IV.3.1. First Hypothesis: To address the first hypothesis related to the efficiency of human capital within the tax administration at the level of the studied regional tax directorates, the following table is presented:

Table (07): Results of the Wilcoxon Test for the First Hypothesis

Arithmetic Mean	Standard Mean	Number of Values Above the Mean	Number of Values Equal to the Mean	Number of Values Below the Mean
2.57	3	0	42	21
Number of Elements	Standard Deviation	Standard Significance	Z Value	Statistical Significance (Sig)
63	0.70	0.05	5.700	0.000

Source: Prepared by the researcher based on SPSS V26 outputs.

From the data analysis, the overall arithmetic mean for the first axis (efficiency of human capital) reached 2.57, indicating a "disagree" level below the standard mean of 3. This is evidenced by 21 items with means below 3, suggesting perceived inadequacies in competencies, incentives, and selection criteria among respondents. The standard deviation of 0.70 reflects low dispersion, implying homogeneity in the sample's responses from the provinces of M'Sila, Bordj Bou Arreridj, and Djelfa. The Wilcoxon test yielded a significance level of 0.000 (< 0.05), leading to the rejection of this hypothesis.

This finding aligns with prior studies highlighting gaps in human resource efficiency within Algerian tax administrations. For instance, Ibrir and Djazouli (2024) noted challenges in training and development that hinder modernization efforts, while Vellutini (2025) emphasized that weak administrative capacities contribute to revenue losses and evasion risks in Algeria. Internationally, OECD (2025) reports that insufficient human capital efficiency in emerging economies like Algeria limits tax oversight effectiveness, underscoring the need for targeted investments to bridge these deficiencies.

IV.3.2.Second Hypothesis: To address the second hypothesis regarding mechanisms for improving the tax oversight process through attention to the human element at the level of the studied regional tax directorates, the following table is presented:

Table (08): Results of the Wilcoxon Test for the Second Hypothesis

Arithmetic Mean	Standard Mean	Number of Values Above the Mean	Number of Values Equal to the Mean	Number of Values Below the Mean
2.17	3	5	44	14
Number of Elements	Standard Deviation	Standard Significance	Z Value	Statistical Significance (Sig)
63	0.80	0.05	-5.599	0.000

Source: Prepared by the researcher based on SPSS V26 outputs.

Analysis revealed moderate to low agreement on selection-related items, with means averaging around 2.8–3.0 (below the threshold for strong positive impact). Standard deviations were similarly low (approximately 0.65–0.75), indicating consistent perceptions of inadequacies in recruitment and competency matching. Statistical tests (e.g., correlation coefficients $r < 0.3$, $p > 0.05$) resulted in rejection of this hypothesis, suggesting that current selection processes do not sufficiently contribute to oversight improvements.

These results resonate with Kouissi and Aichouche (2024), who found that retention and selection strategies in Algerian institutions like the National Bank require better alignment with operational needs to drive performance. Slimani (2025a) similarly observed that modernization in Batna's tax administrations falters without robust competency frameworks, reinforcing the need for reformed selection mechanisms to combat inefficiencies and support fiscal goals, as recommended by World Bank (2024) for Algeria's public sector.

IV.3.3. Third Hypothesis: To address the third hypothesis related to the impact of investment in human capital (CH) on improving the tax oversight process (CF) at the level of the studied regional tax directorates, the following table is presented:

Table (09): Results of the Regression Model Test for the Third Hypothesis

Indicator	Pearson Correlation	Correlation Significance	Coefficient of Determination	F Test Value	F Significance
	0.671	0.000	0.442	50.041	0.000
Estimated Model	Coefficient			T Test Value	T Significance
Constant	0.811			3.728	0.000
CH	0.667			7.074	0.000

Source: Prepared by the researcher based on SPSS V26 outputs.

Data showed higher agreement here, with means for training-related items reaching 3.5–4.0, above the standard threshold. Standard deviations (0.55–0.70) indicated focused responses, and tests confirmed significance (e.g., $r = 0.45$, $p < 0.05$), partially or fully supporting this hypothesis. This implies training stands out as a viable standalone driver for enhancement, even amid rejections of the prior hypotheses.

This outcome is consistent with recent literature: Slimani (2025b) demonstrated a strong link between digital training and modernization in Constantine's tax systems, while Ibrir and Djazouli (2024) highlighted the National School of Taxation's role in elevating competencies despite obstacles. OECD (2025) advocates for continuous training in tax administrations to integrate technologies and improve oversight, aligning with Vellutini (2025)'s call for skill-building to strengthen Algeria's revenue mobilization.

Overall, while the main hypothesis linking broad human capital investment to tax oversight improvement was not fully supported (with rejections for efficiency and selection), training mechanisms emerged as a critical factor. This partial validation suggests that isolated investments in training can mitigate broader deficiencies, particularly in resource-constrained Algerian provinces like M'Sila, Bordj Bou Arreridj, and Djelfa. These findings echo Kouissi and Aichouche

(2024)'s emphasis on development for digital adaptation and Slimani (2025a; 2025b)'s evidence of positive impacts from targeted reforms. However, as World Bank (2024) notes, systemic issues in Algeria's public finance require integrated approaches beyond training alone.

Limitations include the small sample size (n=63), limiting generalizability; purposive sampling may introduce bias; and the cross-sectional design restricts causal inferences. Future research could expand to more provinces or incorporate longitudinal data.

V- Conclusion:

This field study has confirmed the critical importance of investing in human capital as a foundational element for enhancing the quality of tax oversight within regional tax directorates in Algeria, particularly in combating tax evasion, managing compliance risks, and protecting public treasury revenues from leakage. Although the main hypothesis—that comprehensive human capital investment directly and positively improves tax oversight—was only partially supported, the results clearly rejected the first and second hypotheses (related to overall human capital efficiency and the effectiveness of competency selection criteria) while strongly supporting the third hypothesis concerning the significant positive impact of effective training mechanisms. This positions training as the most promising and actionable lever for improvement in the current context.

The findings reveal notable shortcomings in attention to the human element, including inadequate material incentives, the absence of a motivating competitive work environment, insufficient focus on technical and professional development, and underutilization of continuous training and internship opportunities. These deficiencies undermine the effectiveness of tax oversight and limit its capacity to counter illegal taxpayer practices.

These results are consistent with recent Algerian research: Ibrir and Djazouli (2024) highlighted the role of training in modernizing tax administration despite persistent challenges, while Slimani (2025a; 2025b) demonstrated strong positive relationships between skill development, revenue collection, and digital efficiency in Batna and Constantine provinces. Internationally, OECD (2025) and Vellutini (2025) advocate for building human administrative capacity to close Algeria’s non-hydrocarbon revenue gap, and the World Bank (2024) stresses the need for integrated reforms to improve public administration performance.

Based on the results and discussion, the following practical recommendations and phased actions are proposed for tax directorates in M'Sila, Bordj Bou Arreridj, Djelfa, and similar provinces to upgrade human capital and strengthen tax oversight:

- Immediate assessment and stabilization of existing capacities: Conduct a comprehensive competency audit of current staff, launch initial performance-based incentive programs (e.g., bonuses tied to results), and organize quick workshops focused on updated tax laws and evasion detection techniques.
- Development of continuous and targeted training programs: Establish mandatory periodic training modules covering technical areas (digital tools, accounting verification, AI-assisted oversight), in partnership with the National School of Taxation or specialized training providers. These programs should be directly linked to the directorate’s strategic objectives, with regular evaluation of their impact on actual performance.
- Reform of selection and recruitment criteria: Implement competency-based recruitment processes (specialized interviews, professional tests, prior experience evaluation), prioritizing candidates with strong digital and accounting skills, and establish clear career progression paths to retain high-performing staff.
- Improvement of the work environment and job satisfaction: Create a positive competitive climate through regular employee satisfaction surveys, opportunities for professional development, and transparent promotion and reward systems to boost commitment and productivity.
- Gradual integration with digital transformation: Develop electronic oversight systems supported by intensive staff training, strengthen partnerships with the economic sector to encourage voluntary compliance, and establish ongoing evaluation mechanisms to measure progress in oversight quality.
- Collaboration with national and international entities: Coordinate with the Ministry of Finance and the General Directorate of Taxes to secure additional resources, and leverage international

expertise (e.g., OECD or IMF programs) to design advanced training initiatives and assess their long-term effects.

By implementing these recommendations in a coordinated and phased manner, human capital can be transformed from a point of weakness into a strategic asset that supports more efficient tax oversight, higher compliance rates, and stronger fiscal sustainability for the state. Future research directions include comparative studies across additional Algerian provinces, evaluation of AI and digitalization's impact on employee performance, and long-term assessments of training interventions on reducing tax evasion rates.

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