LEX LOCALIS - JOURNAL OF LOCAL SELF-GOVERNMENT

ISSN:1581-5374 E-ISSN:1855-363X

VOL. 24, NO. 1(2026)

The Smart Tax System as a Mechanism for Curbing Tax Evasion (A Proposed Artificial Intelligence–Driven Tax Model and a Field Study of Tax Experts in Algeria)

Hocine Chihi*

University of Algiers 3, (Algeria);hocine310@gmail.com

Received: 01/10/2025 **Accepted:** 26/02/2026 **Published:** 24/03/2026

Abstract

This study advances a practical proposal for an intelligent Algerian tax system grounded in e-invoicing, advanced analytics, and artificial intelligence to enhance revenue collection, reduce audit costs, and combat tax evasion. The model centers on an integrated national platform linking the General Directorate of Taxes (DGI) with key stakeholders, including banks and payment institutions, customs authorities, the National Commercial Registry, social security institutions, land registry services, and oversight bodies, while ensuring data protection and algorithmic governance safeguards.

Adopting a descriptive-analytical approach complemented by a field survey of 55 tax experts—most with over 25 years of experience—the findings (based on a five-point Likert scale) reveal a low evaluation of the current tax system (≈ 2.55/5), compared to a high assessment of AI integration in tax administration (≈ 4.12/5) and a very high evaluation of the proposed intelligent e-invoicing platform (≈ 4.22/5). International experiences (France, the United Kingdom, the United States, Australia, India, and Brazil) indicate that integrating multi-source data with risk-based models improves audit targeting and strengthens voluntary compliance. The study concludes with phased recommendations adapted to the Algerian context and underscores the model's adaptability to other jurisdictions, subject to institutional alignment.

Keywords: Artificial Intelligence; Tax System; Taxation; Tax Evasion; Electronic Invoicing; Advanced Analytics.

1. Introduction

Public administrations worldwide are undergoing accelerated digital transformation, with tax administration standing among the sectors most capable of leveraging data and advanced analytics due to its information-intensive functions of data collection, verification, cross-referencing, and enforcement(Nose& Mengistu, 2023; Slimani,2024). As the informal economy expands and transactions and tax regulations grow increasingly complex, reliance on traditional

* Corresponding author:HocineChihi

audit mechanisms alone has become insufficient, both in terms of cost-efficiency and precise risk targeting (Beer, Kasper, Kirchler, & Erard, 2022).

In Algeria, digitalization efforts have progressed in recent years through information systems and electronic services, including remote filing and payment via the "Jibayatic" portal, alongside broader modernization initiatives such as SAP-based systems and related platforms. However, persistent challenges—particularly data fragmentation across public institutions, limited interoperability, and the high cost of information retrieval—underscore the need to move beyond procedural digitization toward a comprehensive digital transformation grounded in institutional integration and the structured deployment of artificial intelligence within a clear governance framework.

1.1 Research Problem and Questions

The central research question is: To what extent can the integration of artificial intelligence technologies within a comprehensive digital tax platform enhance the effectiveness of the Algerian tax administration and reduce tax evasion?

This overarching question gives rise to several sub-questions:

a) What is the current state of digitalization within the Algerian tax system?
b) What technical and organizational challenges hinder the large-scale adoption of artificialintelligence in taxation?
c) How can artificial intelligence strengthen audit mechanisms and fraud detection?
d) To what extent is the implementation of an integrated national platform based on electronic invoicing and advanced analytics feasible?

1.2 Research Hypotheses

I. Main Hypothesis

The adoption of artificial intelligence within an integrated digital tax system will enhance collection efficiency, improve audit effectiveness, and reduce tax evasion.

II. Secondary Hypotheses

1. The current lack of digital integration limits revenue collection efficiency.
2. The implementation of artificial intelligence supports risk-based auditing.
3. Weak digital infrastructure and insufficient inter-administrative coordination hinder broader implementation.
4. The proposed national platform improves case-processing speed and information flow.
5. Taxpayer acceptance is associated with usability, procedural safeguards, and perceived fairness.

1.3 Objectives and Significance of the Study

This study aims to:

1. Diagnose the current state of digitalization within the Algerian tax system;
2. Examine the contribution of artificial intelligence to the modernization of tax administration;
3. Propose an operational model for a smart national platform based on electronic invoicing and institutional interoperability;
4. Assess expert attitudes toward the proposed model and provide an implementation roadmap tailored to the Algerian context and comparable jurisdictions.

The study is significant in that it bridges legal, administrative, and technological dimensions, offering a structured reform perspective grounded in both conceptual analysis and expert evaluation.

1.4 Study Limitations

1. The reliance on expert opinions—rather than actual administrative or financial data—renders the findings indicative rather than a direct measurement of causal impact.
2. The absence of individual-level data prevented the calculation of reliability indicators (e.g., Cronbach's alpha) and advanced explanatory analyses (e.g., regression or modeling).
3. The qualitative representativeness of the sample is limited, particularly due to the predominance of a specific age group and experience level.
4. The proposed system requires a high degree of institutional coordination, a variable that was not empirically measured as an independent factor in the field study.

2. Theoretical Framework: Artificial Intelligence and the Transformation of Tax Administration

Axis I: The Concept of Artificial Intelligence and Its Objectives

1.1 Concept of Artificial Intelligence

Artificial Intelligence (AI) is a scientific field that has been subject to numerous definitions proposed by researchers and specialists(Nilsson,2010). The World Intellectual Property Organization (WIPO) defines AI as a branch of computer science aimed at developing machines and systems capable of performing tasks that are perceived as requiring human intelligence, whether with limited or no human intervention (Al-Asad, 2023).

AI constitutes a major branch of computer science concerned with designing and developing computational programs that simulate human cognitive processes, enabling machines to perform tasks traditionally requiring human reasoning, comprehension, perception, speech, and decision-making in a structured and logical manner (Boden, 2018). In this sense, AI encompasses efforts to create computerized information systems capable of learning natural languages, executing

coordinated tasks, processing visual and sensory inputs, storing accumulated knowledge, and employing such knowledge in decision-making processes (Dehmani, 2022).

It has also been defined as "the study of how to make computers perform tasks that humans currently perform better" (Attiyat, 2006, p. 12). Leading scholars further describe AI as the study and design of intelligent systems that perceive their environment and take actions that maximize their chances of success. John McCarthy, who coined the term in 1955, defined it as "the science and engineering of making intelligent machines" (Belassel& Amrouche, 2022).

In recent years, AI technologies have experienced remarkable advancements, most notably in the field of deep learning. This technology is based on artificial neural networks that simulate the functioning of the human brain, enabling systems to experiment, learn, and self-improve autonomously without direct human intervention (Al Jazeera Net, 2022). Deep learning has demonstrated strong capabilities in image recognition, speech comprehension, and language translation, prompting major technology companies—particularly in Silicon Valley, such as Facebook and Google—to intensify investment and research in this domain, despite ongoing warnings regarding potential long-term risks (Al Jazeera Net, 2022).

Based on the foregoing, artificial intelligence may be understood as the utilization of advanced digital technologies to serve human needs by facilitating tasks, saving time, and reducing costs compared to traditional manual processes.

1.2 Benefits of Artificial Intelligence

AI systems offer a wide range of solutions and future opportunities that support economic growth and societal development. A European Union study published in June 2020 highlighted several sectors in which AI technologies are expected to generate substantial benefits (Eager, 2020), including:

a) Environment: AI could contribute to reducing global greenhouse gas emissions by approximately 1.5% to 4% by 2030.

b) Health: AI applications may accelerate the discovery and development of new medicines, facilitate drug repurposing, improve diagnostic accuracy and treatment outcomes, enhance prenatal health, predict and monitor epidemics and chronic diseases, strengthen primary healthcare services, and advance medical research (Shokrollahi, et al., 2024).

c) Productivity and Employment: AI systems are projected to generate significant productivity gains. One estimate anticipates labor productivity growth ranging between 11% and 37% by 2035. Moreover, AI is expected to contribute positively to the achievement of the United Nations Sustainable Development Goals(Kulkov, 2024).

1.3 Risks Associated with Artificial Intelligence

Despite its advantages, the negative or uncontrolled use of AI systems poses risks across several critical domains, particularly employment, national security, and autonomous weapons.

a) Employment and Labor Markets: The expansion of AI across economic, social, and political sectors has led to reduced reliance on human labor, particularly as robots and automated systems increasingly perform tasks once considered exclusive to humans (Shadi, 2018). The growing automation of productive activities has intensified concerns about labor market disruptions, wage stagnation, and structural unemployment. In response, some technology executives and economists have proposed decoupling income levels from employment status through mechanisms such as universal basic income or income guarantee programs(Frey& Osborne, 2017). However, these proposals face significant financial, administrative, and incentive-related challenges, although certain governments have initiated pilot programs to assess their feasibility (William, 2017).

AI adoption also threatens traditional occupations, raising concerns about job displacement and the evolving nature of required skills across industrial and service sectors(Acemoglu& Restrepo, 2020). Many individuals express apprehension regarding their ability to adapt through continuous learning and professional reskilling in response to rapid technological change (BBC Arabic, 2023).

b) National Security: While AI enhances efficiency, decision-making accuracy, and productivity, its integration into political, military, and security domains introduces substantial risks. AI technologies can be employed in advanced cyberattacks, the development of novel biological threats, deepfake media manipulation, and the targeting of civilians in armed conflicts—particularly in the absence of clear legal and ethical governance frameworks (Al-Bahi, 2023). Incidents such as the Pegasus spyware scandal illustrate the potential national security implications of AI-enabled technologies (DW, 2022).

c) Autonomous Weapons and Large-Scale Destruction: Recent years have witnessed growing concerns regarding the use of AI applications by terrorist organizations. AI-supported technologies have reportedly been utilized to target military bases, oil facilities, airports, and neighboring states. Additionally, autonomous vehicles—equipped with deep learning systems capable of mimicking human driving decisions—have been used in deliberate vehicular attacks, including incidents in Berlin (December 2016) and Barcelona (August 2017). Such technologies enable remote execution of attacks without direct physical involvement, thereby increasing the complexity of prevention and accountability (Al-Bahi, 2023, p. 3).

Axis II: The Current State of Artificial Intelligence Use in the Tax System (Digitalization)

2.1 Structural Overview of the Tax System (2023)

Executive Decree No. 06-327 repealed the provisions of Executive Decree No. 91-60 (Official Gazette of the People's Democratic Republic of Algeria, 2006). Pursuant to this decree, the external services of the tax administration are structured as follows:

- Directorate of Large Enterprises
- Regional Directorates of Taxes
- Regional Departments of Research and Audits

- Regional Centers for Information and Documentation
- Wilaya (Provincial) Directorates of Taxes
- Tax Centers
- Local Tax Centers

This regulatory framework establishes a three-tier structure of external services:

1. **National Level:** Represented by the Directorate of Large Enterprises.
2. **Regional Level:** Including the Regional Directorates of Taxes, Regional Departments of Research and Audits, and Regional Centers for Information and Documentation.
3. **Provincial Level:** Including the Wilaya Directorates of Taxes, Tax Centers, and Local Tax Centers.

Although the decree was issued in 2006, its effective implementation only commenced in 2009. To date, full application has not been achieved, despite the binding nature of its provisions. Implementation is estimated at approximately 70%, even though this organizational model constitutes a foundational pillar for digital transformation—particularly through the "Jibayatic" system available on the official website of the tax administration.

This shortfall is largely attributed to limited institutional commitment to fully generalize the structure, which has had tangible repercussions on tax revenues and has slowed the broader deployment of digital tax declaration services via the "Jibayatic" platform.

2.2 The Current State of Digitalization and Artificial Intelligence in the Tax System as a Tool to Combat Tax Evasion

The unprecedented digital transformations witnessed globally have reshaped economic and administrative systems, generating gains in productivity and competitiveness by redefining operational mechanisms across productive and service sectors. These transformations have also influenced macroeconomic policy instruments, including fiscal policy. In this context, many countries—including Algeria—have pursued public finance digitalization to develop more efficient mechanisms for revenue collection and expenditure management, thereby achieving significant financial savings in alignment with fiscal policy objectives (Gouadri, 2022).

As part of integrating modern digital information systems into tax administration, the General Directorate of Taxes (DGI) introduced several technological applications, most notably:

a) The Tax Information System (SAP):

The integration of modern information and communication technologies within the tax administration marked a significant phase in the ongoing modernization program. To this end, a foreign consultancy firm was engaged to develop a new project framework based on technical specifications tailored to both technological requirements and the operational mandates of the DGI. Ultimately, the Spanish operator Indra Sistemas was contracted to acquire and implement an integrated information system composed of 23 modules, covering phases from project structuring to maintenance and warranty services.

First: Definition of the Tax Information System

The tax information system consists of integrated modules designed to address the operational requirements of the tax administration. It defines and structures digital solutions while accommodating evolving technological needs aligned with the functional missions of the DGI. The system was developed using the administration's dedicated computing infrastructure (Charfi, 2022).

Second: Organization of the Tax Information System (SAP) Project

The project was structured into several operational workshops, including:

1) Functional Integration Workshop, composed of seven working groups whose responsibilities correspond to the core operational processes outlined in the technical specifications.

Table (01): Organizational Structure of the Functional Integration Workshop

Group	Assigned Function
Group One	Taxpayer reception and assistance
Group Two	Taxpayer tax management
Group Three	Assessment and determination of the tax base
Group Four	Tax collection and recovery
Group Five	Tax audit and control
Group Six	Dispute and appeals processing
Group Seven	Supervision and oversight of operations

Source: Prepared by the researcher based on information obtained from the official website of the General Directorate of Taxes (DGI).

2) Data Migration and Recovery Workshop;
3) Interfaces Workshop;
4) Systems and Technical Architecture Workshop;
5) Revenue and Allocation Workshop;
6) Training Workshop;
7) Planning, Risk Management, and Document Management Unit.

Third: Objectives of the Tax Information System Project (SAP)

Among the principal objectives pursued by the SAP Tax Information System are the following:

1. Enhancing control over taxpayer categories, particularly with regard to their declared activities and owned assets.
2. Adopting modern digital procedures for processing all data related to tax assessment and the collection of various taxes and duties.
3. Managing tax audit operations and dispute resolution efficiently, while generating summarized statistical reports to produce automated and timely performance and management indicators.

4. Integrating modern information and communication technologies, particularly through the implementation of an efficient and comprehensive information system.

Fourth: Expected Outcomes of the Tax Information System (SAP)

The key anticipated outcomes of the SAP system may be summarized as follows:

1. Reducing the workload carried out by tax officers.
2. Dematerializing tax procedures, from taxpayer reception to tax base assessment, collection, and case management.
3. Enabling authorized personnel to access the information system through structured accreditation and control mechanisms.
4. Facilitating rapid data exchange among internal departments and with other public institutions through the development of multiple interfaces.
5. Providing timely statistical dashboards to assess administrative performance and monitor revenue collection by tax category and economic sector.
6. Delivering reliable summarized data to support forecasting studies, analysis, and decision-making.
7. Strengthening control over tax resources.
8. Combating the informal and illegal economy.
9. Addressing all forms of tax fraud.
10. Facilitating taxpayer access to their tax accounts through secure authentication certificates.

b) The Tax Information System "JIBAYA TIC" (TIC'JIBAYA)

The establishment of the General Directorate of Taxes' information system, known as "JIBAYA TIC," represents a significant milestone in the modernization of the Algerian tax administration. Its implementation was enabled by strengthening the technological infrastructure, expanding remote services, improving institutional conditions, and advancing the digitalization of the tax sector. Initially, the services of the "JIBAYA TIC" portal were deployed within Wilaya Directorates of Taxes and are gradually being extended to Tax Centers, Regional Directorates, and the Directorate of Large Enterprises (Hanniche, 2022).

First: Definition of the "JIBAYA TIC" System

In a 2013 official statement published on its website, the Ministry of Finance, represented by the General Directorate of Taxes (DGI), announced that the information system under development would henceforth be named "JIBAYA TIC." The term combines the Arabic word "Jibaya" (taxation) with the acronym TIC (Technologies of Information and Communication).

This conceptual integration places the taxpayer at the center of the system, recognizing them as the primary actor within tax administration processes, while simultaneously granting access to more efficient and higher-quality electronic services (Sellini&Announ, 2021).

Second: Advantages of the "JIBAYA TIC" System

The benefits of the "JIBAYA TIC" system extend to both the tax administration and taxpayers (Hanniche, 2022):

1) For the Tax Administration:

- Full automation of administrative procedures, from taxpayer reception to assessment, collection, and file management.
- Rapid information exchange among departments and with institutional partners through integrated interfaces.
- Digitalization of tax management processes.
- Automation of accounting operations, including treasury management, allocation of professional activity tax, calculation of declared principal amounts, and taxpayer registration.
- Digitalization of official notifications and enhanced verification mechanisms for auditors.
- Generation of timely statistical reports to evaluate performance and monitor collection levels by tax type and sector.
- Provision of reliable summarized data for forecasting, analysis, and decision-making.
- Reduction of costs associated with printed tax documentation.

2) For Taxpayers:

- Conducting tax procedures remotely without the need for physical travel.
- 24/7 online access to tax services.
- Access to updated tax calendars and compliance obligations.
- Consultation of submitted tax declarations.
- Online payment of various taxes and duties.
- Access to overall tax debt information.
- Requests for tax certificates and incentives.
- Submission of appeals, including provincial appeals and conditional reduction claims.

3. Drivers for the Adoption of Artificial Intelligence in the Tax System

The primary motivations for integrating artificial intelligence into tax administration include the following (Harrach, 2012):

a) Expansion of Administrative Structures:

The Algerian tax administration faces structural expansion and duplication of functions, which contradicts the objective of achieving a cost-efficient administration. Modernization programs therefore aim to streamline structures by consolidating similar units according to taxpayer activity type and turnover.

b) Deterioration of Administrative Infrastructure:

More than half of the administrative structures are in moderate to poor condition, and some premises are not owned by the DGI, negatively affecting institutional image and service quality. Modernization and digital transformation are thus necessary to improve service delivery and meet taxpayer expectations.

c) Escalation of Tax Fraud, Evasion, and Informal Economy Expansion:

The liberalization of the market economy led to unprofessional practices among certain businesses, including underreporting turnover, concealing profits, and manipulating invoices to evade taxation. Given the economic risks posed by these practices, modernization and the integration of advanced technologies such as artificial intelligence have become imperative. This includes establishing specialized structures to monitor taxpayer compliance and enhance revenue collection efficiency.

Axis III: A Smart National Tax Platform Based on Electronic Invoicing and Artificial Intelligence

1. Core Concept of the Proposal

The proposal is grounded in a straightforward yet decisive premise: the "certified digital invoice" should constitute the cornerstone of every stage of the economic transaction cycle (sale, purchase, payment, and delivery). Rather than relying solely on ex post tax declarations, the study advocates the adoption of a clearance-based electronic invoicing system, whereby invoices are validated or authorized in real time and automatically linked to payment and delivery processes.

Such an approach would generate a continuous and verifiable digital trail for each transaction. Advanced analytics and artificial intelligence techniques would then be employed to transform this digital footprint into structured risk indicators and targeted audit decisions. In this way, oversight shifts from broad, retrospective verification toward proactive, data-driven risk management.

1.1 Proposed Architectural Framework

The research proposes the establishment of a unified national platform integrating the following components:

1. **A Central Electronic Invoicing Hub**, responsible for invoice validation and certification.
2. **A Multi-Source Data Integration Layer**, enabling interoperability among tax administration systems and external institutional databases.
3. **A Governed Data Warehouse/Data Lake**, ensuring structured storage, data quality control, and compliance with governance standards.
4. **A Risk Engine (Data Lake–Based)** powered by machine learning models for anomaly detection, predictive risk scoring, and behavioral pattern analysis.
5. **Digital Services for Taxpayers**, including an online portal, mobile applications, and an AI-supported virtual assistant.

The following figure illustrates the general conceptual architecture of the proposed system:

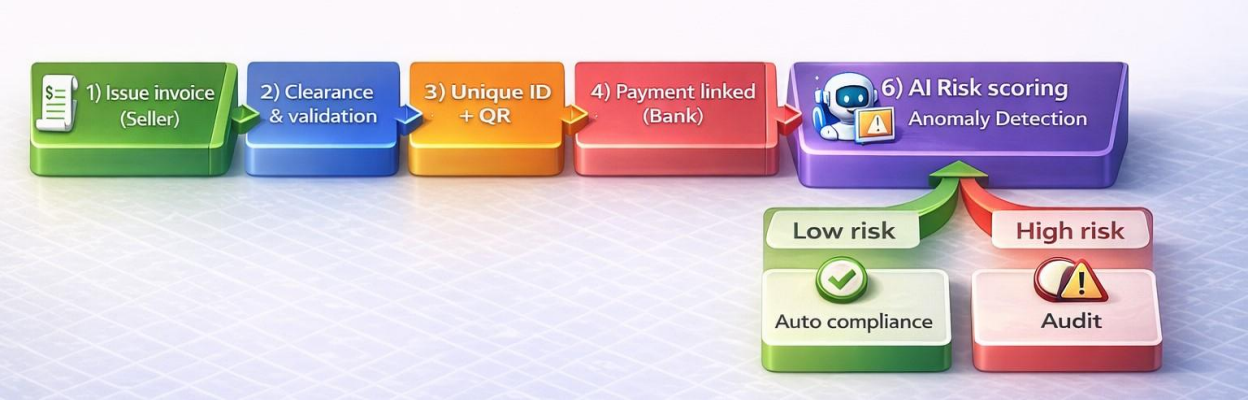
Figure (01): Architectural Design of the Proposed AI-Driven Tax System

1.2 Proposed Value Chain: From Invoice to Audit

To reduce tax evasion, it is insufficient to develop artificial intelligence models in isolation from the underlying economic process. Instead, the transaction pathway must be redesigned to generate reliable real-time data(Zheng &Penetrante, 2025).

The following simplified process links electronic invoicing to payment operations and subsequently to automated risk assessment.

Figure (02): The Electronic Invoice Pathway up to the Automated Risk Assessment Stage



1.3 Functions of Artificial Intelligence within the Proposed Platform

Artificial intelligence performs several core functions within the proposed platform, summarized in the following table:

Table (02): Functional Examples of Integrating Artificial Intelligence within the Proposed Platform

Area ofOperation	AI / Analytics Functions	Expected Outcome
Registration and Classification	Detection of duplicate identifiers; taxpayer classification by behavior/sector; alerts for fictitious registrations	Improved taxpayer database and expansion of the tax base
Invoicing and Real-Time Compliance	Detection of anomalous invoices; linkage of invoices to payments; tracking of VAT value chains, where applicable	Reduction of fictitious invoices and fraudulent chains
Risk-Based Audit	Case selection models for audits; anomaly detection; network analysis to identify "invoice rings"	Increased audit efficiency and reduction of ineffective inspections
Taxpayer Services	Virtual assistant; intelligent guidance; compliance nudging messages	Improved voluntary compliance and enhanced user experience
Disputes and Collection	Prediction of appeal probabilities; prioritization of collection cases based on non-payment risk	Faster case processing and reduction of outstanding arrears

Source: Prepared by the researcher.

Axis IV: Operation of the Digital Platform

1. Map of Algeria and a Model Table for Tracking Fast-Moving Consumer Goods through a Smart Tax–Commercial Platform

This annex presents a customizable practical model illustrating how the proposed smart digital platform enables the tracking of goods and raw materials across wilayas (provinces), calculates expected consumption in comparison with actual consumption, and automatically identifies "black spots" by triggering investigations in cases of detected discrepancies.

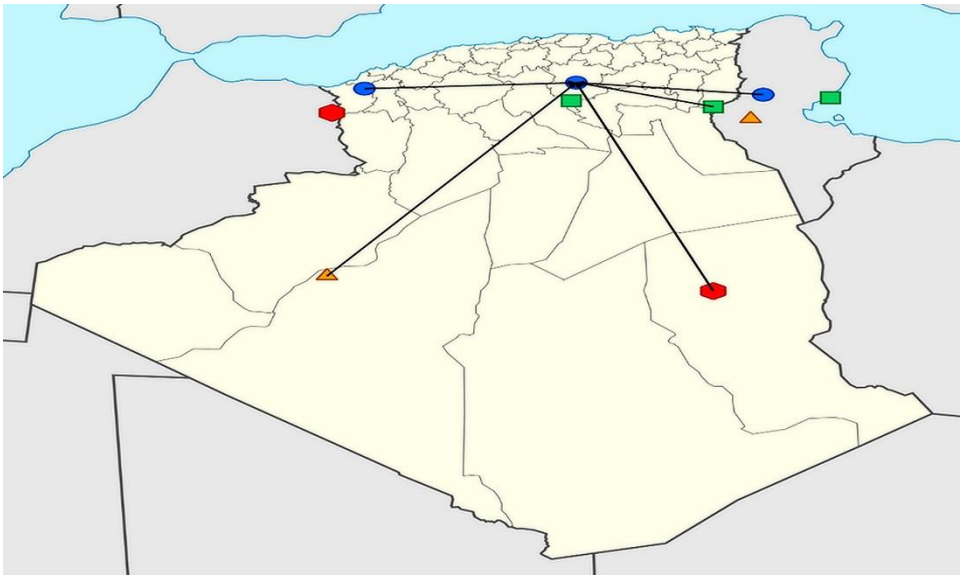
1.1 Operational Concept from the Perspective of the Directorate of Commerce

- Making the "electronic waybill" (e-Waybill) mandatory for every shipment, including fast-moving consumer goods, raw materials, sensitive goods, or subsidized products;
- Linking the transport declaration to a certified electronic invoice (Tax Identification Number + digital signature/certification + QR code);
- Calculating provincial consumption on a monthly or weekly basis using the formula: *Recorded inflows + local production – recorded outflows ± change in inventory*;
- Estimating expected consumption based on population size and sector-specific activity indicators or equipment related to the product (e.g., mills, dairy plants, industrial bakeries);

- In cases of significant deviation from expected levels, the platform automatically generates an alert, opens an "investigation ticket," and identifies the relevant supply chain actors involved.

The following figure provides an illustrative example of how the platform may display the flow of a widely consumed product (such as semolina, oil, or milk) between wilayas, distinguishing normal cases from alert situations and identified "black spots" (hypothetical example for explanatory purposes only).

Figure (03): Illustrative Map of the Flow of a Fast-Moving Consumer Good Across Wilayas with Risk Indicators Highlighted (Hypothetical Representation)



Source: Wikimedia Commons, Algeria_Wilayas-blank.

Legend of Symbols Used in the Figure:

- ● (Hub): Wilaya with significant logistical weight or a primary distribution/aggregation center.
- ■ Normal consumption within expected thresholds.
- ▲ Early warning: moderate deviation requiring monitoring.
- ⬢ Significant deviation / suspected leakage, smuggling, or manipulation of invoices/declarations.

A. Electronic Waybill Data Table for Tracking Any Product

The following table proposes standardized data fields that the platform should incorporate to ensure that inter-wilaya tracking of goods is both feasible and auditable.

Table (03): Electronic Waybill Data for Tracking Any Product

Field	Description / Supervisory Purpose	Practical Example
Waybill_ID	Unique number generated by the system for each transport operation	WB-2026-000145
QR Code	Used by enforcement officers (Gendarmerie / Police / Customs / Commerce) for instant verification	Encrypted QR
Product / Product Code	Identification of the product according to a unified coding system (or national GS1 coding)	SEM-001 (Semolina)
Quantity and Unit of Measure	Exact transported quantity (kg / ton / liter, etc.)	10,000 kg
Origin Wilaya	Wilaya of departure + warehouse/address	Oran – Warehouse A
Destination Wilaya	Wilaya of arrival + destination entity (wholesaler / distributor / processing unit, etc.)	Algiers – Distributor B
Sender Identification	Tax Identification Number + Commercial Register + digital signature	NITA: 123456789
Receiver Identification	Tax Identification Number of the recipient + electronic confirmation	NITA: 987654321
Vehicle / Carrier	Vehicle registration number + transport license + driver ID	123-45-678
Time and Route	Departure/arrival time + optional checkpoints	Departure: 08:15Arrival: 14:30
Electronic Invoice Reference	Direct linkage to the certified electronic invoice within the platform	INV-2026-3321
Waybill Status	Active / Closed / Cancelled / Under Investigation	Active

Source: Prepared by the researcher.

B.Simplified Log Table of Shipment Movements for a Fast-Moving Consumer Good (Hypothetical Representation)

This table illustrates how successive movements of the same product are recorded across wilayas, and what supervisory authorities would visualize within the monitoring dashboard.

Table (04): Simplified Log of Shipment Movements for a Fast-Moving Consumer Good (Hypothetical Representation)

Date	Waybill_ID	From	To	Quantity	Status	Risk Indicator
2026-01-05	WB-2026-000145	Oran	Algiers	10 tons	Closed	23
2026-01-07	WB-2026-000188	Sétif	Algiers	8 tons	Closed	18
2026-01-09	WB-2026-000214	Constantine	Algiers	6 tons	Closed	55
2026-01-10	WB-2026-000233	Béchar	Algiers	4 tons	Closed	77
2026-01-11	WB-2026-000240	Ouargla	Algiers	5 tons	Under Audit	92

Source: Prepared by the researcher.

C. Consumption Monitoring Dashboard by Wilaya and Its Correlation with Population/Industrial Equipment

The detection of discrepancies relies on comparing "actual consumption" (derived from recorded goods movements) with "expected consumption," calculated based on population size and sectoral activity indicators (machines/processing units).

The figures presented below are hypothetical for illustrative purposes and may be replaced with official data (sectoral statistics, licensing records, or data from the National Office of Statistics—ONS).

Table (05): Simulation Example of Product Consumption (Hypothetical) Linked to Population/Industrial Equipment and Deviation Analysis

Wilaya	Population (Millions)	Equipment Index	Expected (Tons/Month)	Actual (Tons/Month)	Deviation %	Risk Score	Platform Decision
Algiers	3.8	120	28.0	36.5	+30%	88	Investigation
Oran	1.6	60	12.5	17.2	+38%	81	Investigation
Constantine	1.0	40	8.2	9.6	+17%	58	Alert
Sétif	1.5	75	11.4	10.9	−4%	22	Normal
Annaba	0.7	28	5.6	5.4	−3%	18	Normal
Blida	1.2	50	9.0	9.8	+9%	35	Monitoring
Batna	1.1	45	8.5	11.0	+29%	74	Alert
Béchar	0.3	15	2.8	3.9	+39%	79	Investigation
Ouargla	0.6	20	4.5	7.2	+60%	95	Urgent Investigation

Source: Prepared by the researcher.

D. When is a "Discrepancy" Considered Sufficient to Trigger an Investigation?

A discrepancy warranting the opening of an investigation may be identified in the following cases:

1. When actual consumption deviates from expected levels beyond a defined threshold (e.g., more than 20% over two consecutive weeks or 35% within a single week).

2. When substantial inflows or transfers are recorded to a wilaya without demographic or activity-based justification, or without corresponding inventory registration.
3. When transport declarations are repeatedly cancelled or quantities are modified after passing through control checkpoints.
4. When "closed" supply chains are detected (same sender / same carrier / same destination) exhibiting unusual pricing or quantity patterns.
5. When inconsistencies arise between sales invoices, transport declarations, and receipt or inventory records at the wholesaler or point of sale.

E. Proposed Digital Investigation Pathway within the Platform

1. Automatic generation of an alert accompanied by an "investigation file" specifying the wilaya, product, period, and deviation indicator;
2. Identification of related operators and ranking them according to risk score;
3. Automated cross-checking of the electronic invoice, transport declaration, periodic tax declaration, and inventory movements;
4. Issuance of a digital inspection order to a joint control team (Commerce + Taxes + Customs, as applicable);
5. Documentation of on-site findings within the platform, followed by closure of the case or referral to dispute resolution or judicial authorities.

1.2 Unit for Monitoring Real Estate, Vehicles, and Self-Use Trucks

A. Objective and Practical Challenge

Real estate and vehicle transactions are among the most sensitive areas prone to tax evasion due to:

1. The possibility of underreporting declared transaction values;
2. The use of cash payments or informal intermediaries;
3. The resale of assets intended for personal use or benefiting from tax incentives before the expiry of the eligibility period, resulting in direct losses to the public treasury and undermining the principle of tax equity.

B. Regulatory Framework within the Platform

- Transfer of ownership authorization (final deed, vehicle registration card, or ownership record update) shall not be granted unless the transaction is registered and digitally closed within the platform.
- Mandatory registration of the negotiated price along with valuation parameters (location, area, and specifications for real estate; year, mileage, and model for vehicles).
- Inter-party transfer permitted only after platform verification of transaction validity and calculation of applicable duties and taxes through an escrow or suspended account mechanism.
- Automatic withholding of taxes and duties at source, transferred directly to the public treasury, with the net amount subsequently released to the seller.

- Generation of a "Digital Asset Passport" accompanied by a QR code, attached to the asset and used for administrative and field verification purposes.

C. Transaction Flow: From Registration to Transfer of Ownership

The following figure illustrates the proposed functional sequence for the sale and purchase of real estate or vehicles within a unified platform linking the tax administration, banks, land registry/vehicle registration authorities, and notaries.

Figure (04): Sequence of Asset Transfer (Real Estate/Vehicle) through the Platform — From Registration to Tax Withholding and Record Update

D. Digital Asset Passport (Asset Passport) — Proposed Data Fields

The following table outlines the minimum data elements to be stored in the "Digital Asset Passport" to ensure lifecycle traceability of the asset and to prevent unlawful transfer or value manipulation.

Table (06): Proposed Data Fields for the Digital Asset Passport

Category	Mandatory Fields (Examples)	Supervisory / Tax Purpose
Asset Identification	National Asset ID; asset type (real estate / car / truck); Vehicle Identification Number (VIN) for vehicles; property/parcel number; address / municipality / wilaya	Standardize identification, prevent duplication, and link the asset to all subsequent transactions
Ownership and Use	Owner identification (NIF/NIN); nature of use (personal / commercial); date of acquisition; non-transfer restrictions (if any) and their duration	Prevent premature sale of self-use assets and automatically activate "benefit recovery" in case of violation
Price and Reference Value	Declared transaction price; platform valuation (AI model / market benchmark); deviation rate; justification for deviation (if any)	Detect underreporting of prices, assess risk levels, and trigger investigation where necessary
Payments and Taxes	Calculated taxes and duties; bank transfer receipt; account numbers; transfer date; payment order	Ensure withholding at source and prevent large-scale cash transactions

	reference	
Chronological Record	Event log (creation / modification / transfer of ownership / mortgage / seizure); executing authority; timestamp; digital hash	Ensure auditability and prevent retroactive manipulation

Source: Prepared by the researcher based on the proposed digital platform model.

E. True Price Estimation Engine and Manipulation Detection

To determine the fair transaction value without disrupting market dynamics, the platform combines a legal benchmark (reference prices/official indicators) with a data-driven benchmark (machine learning model). The objective is not to impose an administratively fixed price, but rather to calculate a reasonable price range, detect significant deviations, and refer high-risk cases to expedited review.

- **Real Estate:** A pricing model based on property characteristics (location, surface area, frontage, available services, construction year, proximity to facilities), combined with historical transaction data.
- **Vehicles:** Benchmarking against market indicators (import/customs data, year of manufacture, mileage, maintenance records, accident history, where available).
- **Network Analysis:** Detection of brokerage or speculative networks through linkage of recurring owners, registration centers, and repeated short-term resale patterns.
- **Composite Risk Score (0–100):** Automatically calculated and used to generate immediate supervisory decisions, such as automatic validation, request for additional clarification, temporary suspension, or referral to human review.

F. Direct Transfer Mechanism to Ensure Transparency and Protect State Revenue

The platform implements a two-stage payment logic within the banking system:

- Deposit/transfer by the buyer into an escrow account linked to the transaction;
- Upon validation, the amount is automatically split into taxes and duties payable to the Treasury, with the remaining net amount transferred to the seller.

This mechanism eliminates the risk of off-contract payments and ensures real-time tax collection.

Table (07): Stages of Vehicle Transfer under the Proposed Digital Platform

Stage	Actor	Verification through the Platform	Outputs
1	Buyer / Bank	Confirmation of active transaction request + identity verification of parties + asset ID validation	Funds frozen in escrow account and payment receipt linked to the transaction
2	Pricing / Risk Engine	Comparison of declared price with reference range + deviation assessment	Approval / request for justification / referral for review
3	Bank (Execution)	Platform validation + calculation of taxes and duties	Automatic withholding of taxes to the Treasury and transfer of net amount to the seller
4	Notary / Registry	Confirmation of fund transfer and	Update of ownership records, issuance

	Authorities	transaction reference number	of final document, and QR code update

Source: Prepared by the researcher based on the proposed digital platform.

G. Monitoring Self-Use Assets and Preventing Premature Resale

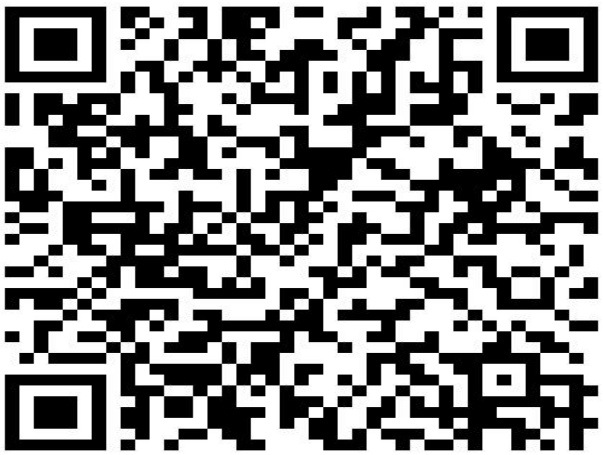
Self-use cases—such as subsidized residential property, vehicles benefiting from tax incentives, or trucks allocated to specific activities—require a regulatory mechanism that either prevents unlawful transfer or ensures recovery of granted benefits in the event of early resale.

1. Specification of the type of benefit or restriction (e.g., resale prohibition period or obligation to repay the tax differential if sold before maturity).
2. Tagging the asset within the Digital Asset Passport with a "Self-Use Lock" indicator, including the restriction expiry date.
3. Blocking registration of any final sale contract within the platform before the expiry date, except upon special authorization accompanied by automatic calculation of benefit recovery.
4. Integrating an alert mechanism if a sale advertisement or ownership transfer attempt is detected outside the platform (formal linkage with notarial and registration records).
5. In case of violation, automatic generation of an investigation file including the parties involved, declared price, identified deviations, and payment trail.

H. Illustrative Example of a QR Code Linked to an Asset Passport

The following code represents a hypothetical example (non-authentic) of a Digital Asset Passport that may be verified on-site through an official application accessible to authorized agents (notary, land registry authority, police, gendarmerie, or tax inspector).

Figure (05): Example of a QR Code for a Digital Asset Passport (Demo)



1.2.1 Unit for Monitoring Agricultural Funds and Product Flows to Curb the Black Market

The agricultural sector faces structural challenges related to the multiplicity of intermediaries, price volatility, heavy reliance on cash transactions, and limited visibility over product flows from source to major retail outlets. This proposal aims to establish a unified digital trail for large and recurrent transactions in order to:

1. Channel liquidity into the banking system;
2. Enhance transparency in pricing and quantities;
3. Detect "black spots" (internal smuggling, hoarding, speculation, or underreporting).

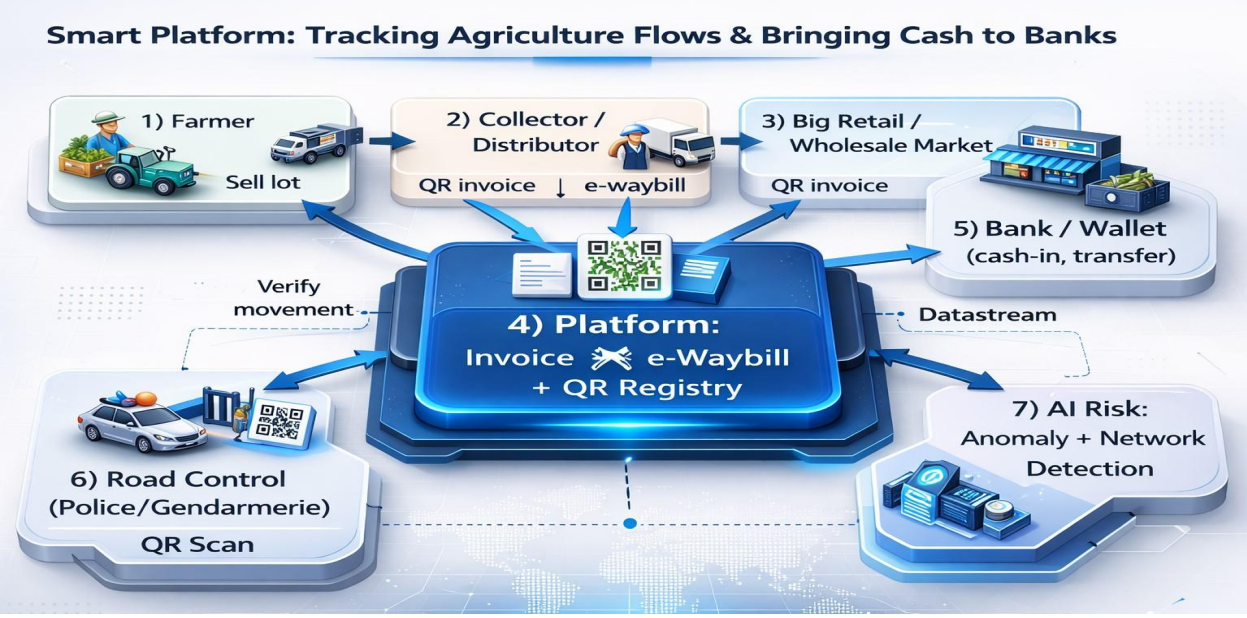
A. Proposed Digital Components

- A simplified electronic invoice for farmers incorporating a QR code (mobile interface or service points within agricultural offices/cooperatives);
- An electronic waybill (e-Waybill) for agricultural products and related raw materials, including QR code integration and linkage to route and timing data;
- Flexible digital payment mechanisms: bank transfer, digital wallet, point-of-sale terminals in wholesale markets, with mandatory thresholds for large transactions;
- A monitoring dashboard at the level of the Directorates of Commerce, Agriculture, and Taxes to measure deviations by wilaya, municipality, or market;
- Integration with roadside inspection systems through QR verification and real-time alerts in cases of inconsistency.

B. Sequence for Tracking Funds and Products from Farmer to Retail Points

The following figure illustrates how the electronic invoice and electronic transport declaration are linked to bank payment systems and the risk engine in order to create a fully traceable chain.

Figure (06): Agricultural Flow Tracking Chain and QR-Based Control Mechanism — Products and Funds with Integrated Oversight



C. Agricultural Product Batch Tracking Card

Lot Card: To ensure full traceability of any agricultural product, the platform proposes the creation of a batch card generated at the stage of first sale or aggregation. This card accompanies the batch throughout its movement until it reaches the major retail point.

Table (08): Method for Tracking Agricultural Products

Category	Core Fields	Automated Verification	Supervisory Use
Batch Identification	LOT_ID, product, grade/quality, harvest date, quantity and unit of measure	Logical value validation (minimum/maximum thresholds) according to product and season	Standardization of batches and prevention of mixing unidentified consignments
Source	Farmer/farm ID, geographic location (municipality/wilaya), production capacity/area (optional)	Approximate matching between declared output and historical production capacity	Detection of inflated production used to channel unofficial goods
Route	Wilaya/municipality of departure and destination, carrier, vehicle plate number, potential inspection points	Route and time verification (Geo/Time), where available, and consistency between declaration and invoice	Detection of undeclared transfers and internal smuggling
Price and Payment	Unit price, total amount, payment method, bank payment proof for large transactions	Identification of abnormal pricing and deviation from local market range	Channeling liquidity into banks and reducing the black market

Source: Prepared by the researcher based on the proposed digital platform.

D. "Black Spot" Detection Engine in Distribution Chains

The platform relies on quantitative and behavioral indicators to identify wilayas, markets, or distributors exhibiting significant deviations. This is achieved by comparing recorded inflows into a wilaya (transport declarations), local sales (invoices), and bank deposits (payments) against demand indicators (population, activity level, seasonality).

- **Expected Consumption Index:** Population × per capita consumption rate, or activity index / number of machines, depending on the product type.
- **Deviation Index:** Actual ÷ expected consumption, taking seasonal factors into account for agricultural products.
- **Undeclared Liquidity Index:** Value of large sales without banking trace ÷ total sales.
- **Suspicious Network Index:** Repeated involvement of the same parties and carriers in illogical routes.
- **Progressive Automated Decision:** Alert → rapid desk review → coordinated field investigation (Commerce / Taxes / Security).

E. Roadside Control via QR: Digital Opening of Investigations

A field officer scans the QR code linked to the electronic waybill (e-Waybill) using an official application. The system instantly retrieves a summary including LOT_ID, product type, quantity, sender and recipient, carrier, declaration validity, and departure time.

These data are immediately compared with the on-site situation in terms of product type, approximate quantity, and declared destination.

In the event of discrepancies (expired declaration, mismatched destination, absence of invoice, repeated abnormal route), the platform automatically generates a digital incident ticket. The ticket is then forwarded to the competent investigation unit (Directorate of Commerce, Taxes, or Security), accompanied by all relevant digital evidence.

F. Governance and Implementation Requirements (Summary)

- **Legal Framework:** Mandatory registration and bank-based payment for transactions exceeding a defined threshold, with data protection safeguards and right to appeal.
- **Data Governance:** Clear identification of data owners (Taxes / Commerce / Agriculture / Interior / Transport) and defined access and exchange protocols.
- **Cybersecurity:** Encryption, tamper-proof audit logs, multi-factor authentication, and periodic system reviews.
- **Equity and Inclusion:** Simplified pathways for farmers and small operators (lightweight application, assistance mechanisms, service offices).
- **Measurability:** Monthly performance indicators (revenue collection, banking payment ratio, deviation reduction, number of investigations).

Summary of the Theoretical Axis

This annex presents a practical framework for integrating two high-impact units into the smart tax platform: first, the tracking of high-value assets to ensure fair price determination and

withholding at source; and second, the monitoring of agricultural product flows to channel liquidity into the banking system and enhance market transparency.

The central objective is to shift from costly ex post control toward preventive digital oversight based on a unified trace (Invoice + Waybill + Payment) supported by a risk engine enabling timely intervention while preserving market fluidity and protecting operators' rights.

This framework encompasses various transaction types, including fast-moving consumer goods, real estate, vehicles, equipment, and other goods and services. Although monitoring services presents relatively greater complexity, their inclusion within the digital platform remains necessary to complete settlement procedures and strengthen the overall comprehensiveness and supervisory effectiveness of the proposed system.

3. Field Study

3.1 Research Method and Population

The study adopted a descriptive-analytical approach, supported by a field survey conducted through a structured questionnaire. The questionnaire was addressed to experts in taxation, accounting, and auditing, with the aim of assessing their attitudes toward:

- Evaluation of the current tax system;
- The importance and effectiveness of artificial intelligence in taxation;
- The feasibility of adopting the proposed system.

This stage represents a central component of the research, complementing the theoretical framework. It seeks to examine the relationship—if any—between the conceptual foundations discussed in the theoretical section and the empirical findings, as well as to address the research questions and test the hypotheses formulated in the introduction.

3.2 Field Research Methodology

It is essential to outline the methodological framework adopted for collecting the data necessary to achieve the study's objectives. The main methodological components are presented below.

3.2.1 Questionnaire Design

A. Formulation of Statements

The initial drafting of the questionnaire items was based on the research topic, objectives, and guiding questions. The instrument was subsequently submitted to academic reviewers specialized in taxation and statistics for evaluation of its structure and content. Following validation, the questionnaire was distributed to the selected sample.

The instrument comprised the following sections:

1. Questions related to demographic and professional characteristics;
2. Axis I: The Current Tax System;
3. Axis II: The Tax System in Light of Artificial Intelligence;
4. Axis III: The Proposed AI-Based Tax System.

In total, the questionnaire included fourteen (14) statements distributed across the three axes, as presented in the following table.

Table (09): Distribution of Questionnaire Items across the Three Axes of the Proposed AI-Based Tax System

Axis of the Proposed AI-Based Tax System	Number of Items
Axis I: The Current Tax System	04
Axis II: The Tax System in Light of Artificial Intelligence	04
Axis III: The Proposed AI-Based Tax System	06

Source: Prepared by the researcher based on the questionnaire instrument.

Table (10): Direction of Questionnaire Items

Item Direction	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Positive Items	1	2	3	4	5

Source: Prepared by the researcher.

The study adopted a five-point Likert scale as the evaluative measure, calculated according to the following steps:

- **Range calculation:**

$$5 - 1 = 4$$

where 5 represents the highest value on the Likert scale and 1 the lowest.

- **Class interval length:**

$$4 \div 5 = 0.80$$

Accordingly, the first interval of the arithmetic mean extends from 1.00 to 1.80, and subsequent intervals follow the same increment.

Table (11): Evaluative Scale According to the Five-Point Likert Measure

Response	Weighted Mean Range	Evaluation Level (Proposed AI-Based Tax System)
Strongly Disagree	1.00 – 1.80	Very Low
Disagree	1.81 – 2.60	Low
Neutral	2.61 – 3.40	Moderate
Agree	3.41 – 4.20	High
Strongly Agree	> 4.20	Very High

Source: Prepared by the researcher.

3.2.2 Validity of the Questionnaire

Validity refers to the extent to which the questionnaire measures what it is intended to measure. The face validity of the research instrument was verified by submitting it to a panel of academic reviewers for evaluation and feedback prior to its distribution.

3.2.3 Reliability of the Questionnaire

Reliability refers to the degree to which the instrument yields consistent results when administered repeatedly under similar conditions to the same population. To assess the internal consistency of the questionnaire, Cronbach's Alpha coefficient was calculated. The following table presents the reliability coefficients for each axis.

Table (12): Cronbach's Alpha Coefficients for Measuring Axis Reliability

Questionnaire Axis	Number of Items	Reliability Coefficient
Axis I: The Current Tax System	04	93%
Axis II: The Tax System in Light of Artificial Intelligence	04	93%
Axis III: The Proposed AI-Based Tax System	06	93%
Overall Reliability Coefficient	14	95%

Source: Prepared by the researcher based on SPSS 24 outputs.

The results shown in Table (12) indicate a high level of internal consistency. The overall reliability coefficient demonstrates that the instrument possesses strong stability, thereby supporting its suitability for data analysis, interpretation of results, and hypothesis testing.

3.2.4 Research Population

The research population consists of tax experts.

3.2.5 Research Sample

A purposive sample of 55 tax experts was selected.

3.3 Questionnaire Data Analysis

The questionnaire was administered to the selected sample of 55 tax experts. The following table presents the targeted statistical population and response outcomes.

Table (13): Targeted Statistical Population

Number of Questionnaires Distributed	Number Returned	Number Not Returned	Number Discarded	Number Valid for Analysis
55	55	0	0	55

Source: Prepared by the researcher.

3.3.1 Analysis of Questionnaire Data

First: Analysis of Demographic Variables

The following section presents a tabular and graphical analysis of the demographic characteristics of the research sample (gender, age, and years of experience).

A. Distribution of the Sample by Gender

Table (14): Distribution of the Sample by Gender

Gender	Frequency	Percentage
Female	00	00%
Male	55	100%
Total	55	100%

Source: Prepared by the researcher based on SPSS 24 outputs.

Table (14) indicates that the entire sample consists of male respondents (100%), while female representation is absent (0%). This distribution is largely attributable to the professional characteristics of the field under study.

Figure (07): Distribution of the Sample by Gender

Source: Prepared by the researcher based on SPSS 24 outputs.

B. Distribution of the Sample by Age

Table (15): Distribution of the Sample by Age

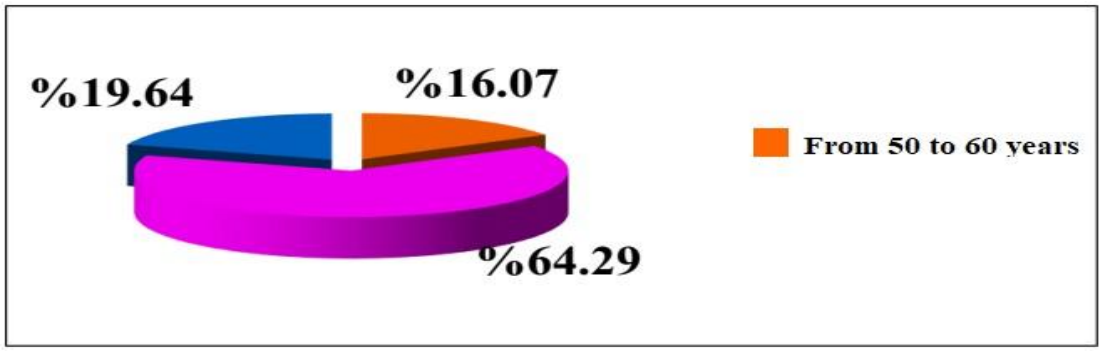
Age Group	Frequency	Percentage
50–60 years	09	16.07%
60–65 years	35	64.29%
Over 65 years	11	19.64%
Total	55	100%

Source: Prepared by the researcher based on SPSS 24 outputs.

Table (15) indicates that 64.29% of respondents are between 60 and 65 years old, constituting the majority of the sample. This is followed by those over 65 years (19.64%) and those aged

between 50 and 60 years (16.07%). This distribution reflects the extensive professional experience possessed by the surveyed experts.

Figure (08): Distribution of the Sample by Age



Source: Prepared by the researcher based on SPSS 24 outputs.

C. Distribution of the Sample by Years of Experience

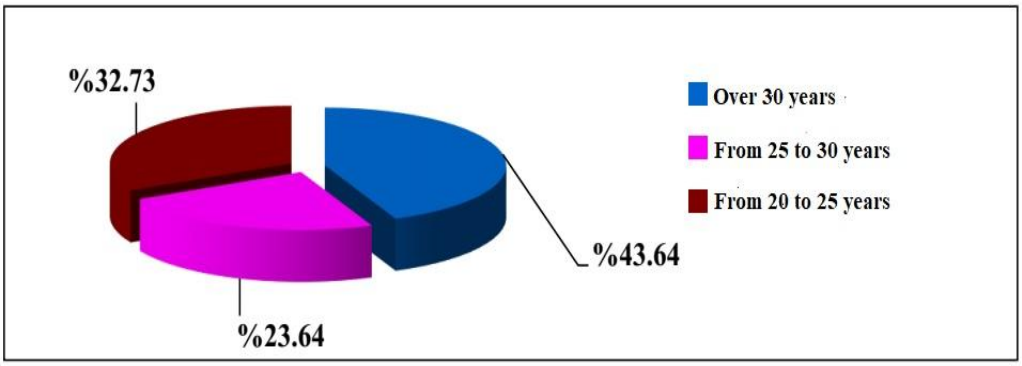
Table (16): Distribution of the Sample by Years of Experience

Years of Experience	Frequency	Percentage
20–25 years	18	32.72%
25–30 years	13	23.64%
Over 30 years	24	43.64%
Total	55	100%

Source: Prepared by the researcher based on SPSS 24 outputs.

Table (16) shows that 43.64% of respondents have more than 30 years of professional experience, representing the largest group within the sample. This is followed by those with 20–25 years of experience (32.72%) and those with 25–30 years (23.64%). The predominance of highly experienced professionals enhances the credibility of the findings, particularly given the critical role played by tax and accounting experts in auditing financial statements and ensuring compliance.

Figure (09): Distribution of the Sample by Years of Experience



Source: Prepared by the researcher based on SPSS 24 outputs.

As shown in Table (16), 43.64% of the respondents have more than 30 years of professional experience, representing the majority of the sample. This is followed by those with 20–25 years of experience (32.72%), and those with 25–30 years (23.64%). This distribution reflects the high level of expertise within the sample, particularly given the significant role played by tax and accounting professionals in auditing financial statements and ensuring fiscal compliance.

3.3.2 Analysis of Items Related to the Proposed AI-Based Tax System

To analyze the items related to the proposed AI-based tax system, the responses of the experts were examined through the calculation of frequencies, percentages, arithmetic means, and standard deviations. The statements were then ranked in descending order according to their mean scores, and the overall direction of each item was determined. The following table presents the results of this analysis.

3.3.2.1 Analysis of Items Related to the Current Tax System

Table (17): Analysis of Axis I – The Current Tax System

Axis I: The Current Tax System	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev.	Overall Direction	Rank
1. The current tax system limits tax evasion	4	8	8	19	16	3.36	1.253	Moderate	1
(%)	7.3	14.5	14.5	34.5	29.1				
2. The current tax system facilitates the fulfillment of tax obligations	6	10	6	7	26	2.33	1.491	Low	4
(%)	10.9	18.2	10.9	12.7	47.3				
3. The current tax system provides information quickly and efficiently	13	8	5	8	21	2.71	1.652	Moderate	3
(%)	23.6	14.5	9.1	14.5	38.2				
4. The current tax system, in its present structure, is not costly	11	12	5	9	18	2.80	1.580	Moderate	2
Weighted Mean for Axis I: 2.02 – Low									

Source: Prepared by the researcher based on SPSS 24 outputs.

The results presented in Table (17) show that Item (1), which states that "the current tax system limits tax evasion," ranked first with a mean of 3.36 and a standard deviation of 1.253, reflecting a moderate overall direction. This suggests a relatively balanced distribution of opinions, although a substantial proportion of experts expressed disagreement or strong disagreement with the statement.

Item (4), stating that "the current tax system, in its present structure, is not costly," ranked second with a mean of 2.80 and a standard deviation of 1.580, also indicating a moderate orientation.

In contrast, Item (2), which addresses whether "the current tax system facilitates the fulfillment of tax obligations," ranked last with a mean of 2.33 and a standard deviation of 1.491, reflecting a low evaluation. Notably, 47.3% of respondents selected "strongly disagree," while only 18.2% selected "agree." This indicates that a significant proportion of experts perceive shortcomings in the system's ability to effectively support taxpayers in meeting their obligations.

Overall, the relatively low weighted mean of Axis I suggests that the current tax system, in its existing form, does not fully achieve its intended objectives in terms of limiting tax evasion or facilitating compliance. These findings underscore the need for structural, legislative, and procedural reforms aimed at simplifying processes, enhancing transparency, strengthening control mechanisms, and improving compliance incentives in order to increase trust and voluntary tax adherence.

3.3.2.2 Analysis of Items Related to the AI-Based Tax System

Table (18): Analysis of Axis II – The Tax System in Light of Artificial Intelligence

Axis II: AI-Based Tax System	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev.	Overall Direction	Rank
5. The tax system becomes more effective in achieving its financial and policy objectives when AI and digitalization are applied	33	10	5	4	3	4.20	1.208	High	3
(%)	60.0	18.2	9.1	7.3	5.5				
6. The application of AI and digitalization in the tax system reduces tax evasion	33	10	5	6	1	4.24	1.122	Very High	2
(%)	60.0	18.2	9.1	10.9	1.8				
7. Artificial intelligence is effective in tax auditing	21	17	9	6	2	4.45	0.899	Very High	1
(%)	38.2	30.9	16.4	10.9	3.6				
8. The AI-based tax	22	26	3	2	2	3.89	1.149	High	4

system is not costly									
Weighted Mean of Axis II: 4.73 – Very High									

Source: Prepared by the researcher based on SPSS 24 outputs.

The results presented in Table (18) indicate that Item (7), stating that "Artificial intelligence is effective in tax auditing," ranked first with a mean of 4.45 and a standard deviation of 0.899, reflecting a very high overall direction. A substantial proportion of respondents expressed strong agreement, confirming a strong consensus regarding the effectiveness of AI in enhancing tax audit mechanisms.

Item (6), which addresses the role of AI and digitalization in reducing tax evasion, ranked second with a mean of 4.24 and a standard deviation of 1.122, also reflecting a very high level of agreement.

Item (5), concerning the contribution of AI to improving the effectiveness of the tax system in achieving its financial and policy objectives, ranked third with a high mean score of 4.20.

Although Item (8), relating to the cost implications of an AI-based tax system, ranked last among the four statements, it still recorded a high mean of 3.89, indicating general agreement that such a system would not be excessively costly.

Overall, the high weighted mean of Axis II (4.73) demonstrates strong support among experts for the integration of artificial intelligence within the tax system. These findings suggest that AI adoption is perceived as a strategic and effective reform pathway capable of enhancing efficiency, strengthening oversight, reducing tax evasion, and potentially generating long-term cost savings. Moreover, the results reinforce the view that transitioning toward a smart tax system represents a key pillar of modern tax reform, with positive implications for tax equity, transparency, and trust between the tax administration and taxpayers.

3.3.2.3 Analysis of Items Related to Axis III: The Proposed AI-Based Tax System

Table (19): Analysis of Axis III – The Proposed AI-Based Tax System

Proposed AI-Based Tax System	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev.	Overall Direction	Rank
9. The proposed AI-based tax system is implementable in its components	22	26	3	2	2	4.16	0.958	High	4
(%)	40.3	47.3	5.5	3.6	3.6				
10. The proposed AI-based tax system reduces tax evasion	35	16	0	4	0	4.49	0.836	Very High	1
(%)	63.6	29.1	0	7.3	0				
11. Taxpayers, if required to declare	34	14	2	3	2	4.36	1.043	Very High	2

all their invoices, would comply									
(%)	61.8	25.5	3.6	5.5	3.6				
12. The proposed system provides necessary information on the tax base in a timely manner	33	13	3	4	2	4.29	1.100	Very High	3
(%)	60.0	23.6	5.5	7.3	3.6				
13. The proposal is beneficial for tax auditors as it provides sufficient taxpayer information	19	25	6	3	2	4.02	1.009	High	5
(%)	34.5	45.5	10.9	5.5	3.6				
14. The proposed system is not financially costly	21	22	6	3	3	4.00	1.106	High	6
Weighted Mean of Axis III: 4.41 – Very High									

Source: Prepared by the researcher based on SPSS 24 outputs.

The results presented in Table (19) indicate that Item (10), stating that "the proposed AI-based tax system reduces tax evasion," ranked first with a mean of 4.49 and a standard deviation of 0.836. A large majority of respondents expressed strong agreement (63.6%) or agreement (29.1%), reflecting a very high overall evaluation.

Item (11), concerning taxpayers' compliance if required to declare all invoices, ranked second with a mean of 4.36 and a standard deviation of 1.043, also reflecting a very high orientation.

Item (12), relating to the system's ability to provide timely information on the tax base, ranked third with a mean of 4.29.

Although Item (14), which addresses the financial cost of the proposed system, ranked last among the six statements, it still recorded a high mean of 4.00, indicating general agreement that the system would not impose excessive financial burdens.

Overall, the high weighted mean of Axis III (4.41) demonstrates strong expert support for the proposed AI-based tax system. The findings suggest that the proposal is perceived as an effective and sustainable solution to the shortcomings of the traditional tax system, particularly in reducing tax evasion, enhancing transparency, and strengthening tax compliance. These results further confirm that the adoption of artificial intelligence within tax administration represents a promising strategic reform aligned with contemporary digital transformation trends.

3.4 Presentation of Results in Light of the Study Hypotheses

The results are presented according to the hypotheses formulated in the introduction:

1. Hypothesis One:
"There is a high level of digitalization and artificial intelligence usage within the current Algerian tax system."

The analysis of items related to the current state of digitalization and AI adoption, as shown in Table (17), indicates that the overall evaluation reflects a low level of implementation. Accordingly, this hypothesis is not supported by the empirical findings, as the results suggest limited integration of digital and AI-based technologies within the existing tax framework.

2. Hypothesis Two:
"Artificial intelligence significantly contributes to improving tax auditing and detecting fraud and tax evasion at the significance level ($\alpha \leq 0.05$)."

The results presented in Table (18) demonstrate a high overall mean for the items related to this hypothesis. This confirms that respondents perceive artificial intelligence as an effective tool for strengthening tax control mechanisms and detecting fraudulent practices. Therefore, this hypothesis is supported by the findings.

3. Hypothesis Three:
"What is the extent of expert and taxpayer acceptance of the proposed AI-based tax system?"

The analysis of items related to the proposed system, as presented in Table (19), shows a high overall mean (4.41), indicating strong acceptance among experts, subject to certain implementation conditions. This finding suggests broad professional support for the proposed reform model.

A. Existence of a Statistically Significant Relationship between the Current Tax System and the AI-Based Tax System

To examine the validity of this hypothesis, arithmetic means, standard deviations, and Pearson's correlation coefficient were calculated to determine the nature and strength of the relationship between the two variables. The results are presented in the following table.

Table (20): Pearson Correlation between the Current Tax System and the AI-Based Tax System

Variables	N	Mean	Std. Dev.	Pearson Correlation (r)	Significance Level
Current Tax System	55	2.02	0.682	0.054	Not Significant
AI-Based Tax System	55	4.73	0.302		

Source: Prepared by the researcher based on SPSS 24 outputs.

The results presented in Table (20) indicate that the significance level is statistically non-significant, and the Pearson correlation coefficient between the current tax system and the AI-based tax system is 0.054. This value reflects a very weak positive relationship between the two variables.

Accordingly, the findings suggest that perceptions of the current tax system are largely independent of attitudes toward the proposed AI-based tax system, reinforcing the notion that the

latter is viewed as a distinct reform alternative rather than a mere extension of the existing framework.

B. Existence of a Statistically Significant Relationship between the Current Tax System and the Proposed AI-Based Tax System

To test this hypothesis, arithmetic means, standard deviations, and Pearson's correlation coefficient were calculated in order to determine the strength and direction of the relationship between the two variables. The following table presents the results of this analysis.

Table (21): Pearson Correlation between the Current Tax System and the Proposed AI-Based Tax System

Variables	N	Mean	Std. Dev.	Pearson Correlation (r)	Significance Level
Current Tax System	55	2.02	0.682	0.306*	Significant at 0.05
Proposed AI-Based Tax System	55	4.41	0.398		

Source: Prepared by the researcher based on SPSS 24 outputs.

The results presented in Table (21) indicate that the correlation coefficient between the current tax system and the proposed AI-based tax system is 0.306, which is statistically significant at the 0.05 level. This reflects a moderate positive relationship between the two variables.

Accordingly, the findings confirm the existence of a statistically significant association at the 5% significance level. The positive direction of the relationship suggests that perceptions of the current tax system are meaningfully related to attitudes toward the proposed AI-based reform model.

C. Existence of a Statistically Significant Relationship between the AI-Based Tax System and the Proposed AI-Based Tax System

To test this hypothesis, arithmetic means, standard deviations, and Pearson's correlation coefficient were calculated in order to determine the strength and direction of the relationship between the two variables. The following table presents the results of this analysis.

Table (22): Pearson Correlation between the AI-Based Tax System and the Proposed AI-Based Tax System

Variables	N	Mean	Std. Dev.	Pearson Correlation (r)	Significance
AI-Based Tax System	55	4.73	0.302	0.198	Significant
Proposed AI-Based Tax System	55	4.41	0.398		

Source: Prepared by the researcher based on SPSS 24 outputs.

The results shown in Table (22) indicate that the Pearson correlation coefficient between the AI-based tax system and the proposed AI-based tax system is 0.198, and the relationship is statistically significant.

This value reflects a weak positive relationship between the two variables. Although the association is statistically significant, the strength of the correlation remains limited, suggesting that while favorable perceptions of AI integration are related to support for the proposed model, the relationship is not strong in magnitude.

3.5 Comparative Perspective: How Have International Experiences Supported the "Smart Taxation" Hypothesis?

To strengthen the practical relevance of the proposed model, it is essential to situate it within international experiences demonstrating that artificial intelligence, advanced analytics, and electronic invoicing are not merely technological enhancements, but governance instruments aimed at improving compliance and reducing the tax gap.

The following selected examples provide a concise overview of such experiences.

Table (23): International Examples of AI and Electronic Invoicing in Tax Administration – Analytical Summary

Country / Authority	Technology / Project	Nature of Use	Lessons for the Algerian Proposal
United Kingdom (HMRC)	*Connect* System + Cloud Data Modernization	Large-scale multi-source data analytics to build a risk engine and target audits; transition toward cloud-based data consolidation to support AI	Prioritize establishing a unified data warehouse and robust data governance before expanding AI models
France (DGFiP)	*Foncier Innovant*	AI-based analysis of aerial imagery to detect property anomalies and underreporting, and update tax registers	Demonstrates the value of integrating unstructured data (images/documents) with tax databases, subject to legal safeguards
United States (IRS)	AI models for audit case selection	Improving audit selection and reducing "no-change" audits; oversight reports emphasize feedback loops and model evaluation	Necessity of measuring model performance (precision/recall), documentation, and maintaining human oversight
Australia (ATO)	AI Transparency Statement + Risk Models and Compliance Nudging	Use of models to guide taxpayers toward correcting returns (nudging) and managing compliance risks, within a transparency framework	Integrate transparency, explainability, and taxpayer safeguards from the outset
India (CBDT)	Risk analytics and AI/ML systems	AI and machine learning for identifying high-risk cases within centralized databases	Importance of building a centralized analytics platform and improving data quality before scaling automated oversight
Brazil	NF-e / SPED (Electronic Invoicing System)	Legally binding electronic invoicing managed through official platforms supporting full digital traceability	Clearance-based electronic invoicing serves as a structural lever to reduce fictitious invoices and fraud chains
Italy	Mandatory Electronic Invoicing (since 2019)	Enhanced compliance and reduction of certain VAT fraud patterns through early-stage oversight and data flow integration	Gradual implementation beginning with high-risk sectors, combined with support for economic operators

Source: Prepared by the researcher.

These international experiences, despite contextual differences, reveal three common features:

1. **Data First Principle:** Intelligent models are ineffective without unified, high-quality data infrastructure.
2. **Embedded Compliance is Superior to Ex Post Control:** Electronic invoicing linked to payment and delivery mechanisms significantly reduces opportunities for fraud.
3. **AI Requires Governance:** Effective deployment of artificial intelligence depends on transparency, cybersecurity, privacy protection, and structured human oversight mechanisms.

3.6 Implementation Roadmap for the Algerian Context

Preconditions for Successful AI Deployment

Before introducing machine learning models, the project requires foundational structural enablers to ensure feasibility, sustainability, and institutional legitimacy. The most critical prerequisites include:

- **A Clear Legal Framework for Data Exchange:**Explicit legislation regulating data sharing between public institutions and the financial sector for defined tax purposes, accompanied by enforceable privacy and data protection safeguards.
- **Comprehensive Data Governance:**Clear identification of data owners, quality standards, a unified Tax Data Dictionary, and structured management of master and reference data to ensure consistency and interoperability.
- **Unified Digital Identity System:**Establishment of a consolidated tax identification mechanism linked—under strict regulatory controls—to commercial registry identifiers, social security numbers, and banking accounts.
- **Robust Cybersecurity Infrastructure:**Deployment of high-level security architecture, including encryption protocols, immutable audit trails, role-based access controls, and continuous intrusion monitoring.
- **Institutional Change Management and Capacity Building:**Development of specialized competencies in data science, risk analytics, digital law, and AI ethics, alongside structured organizational change strategies to facilitate adoption and ensure operational alignment.

Proposed Implementation Phases

Table (24): Phased Implementation of the Tax System (Digital Platform)

Phase	Indicative Timeline	Key Deliverables
0) Foundation and Governance	0–6 months	Steering committee; legal framework for data exchange; reference architecture; e-invoicing standards; pilot roadmap
1) Pilot Electronic Invoicing and Payment Integration	6–18 months	B2B e-invoicing portal for large taxpayers and selected sectors; initial integration with banks; preliminary data lake
2) Initial Risk Engine and Anomaly Detection Models	18–30 months	Risk-based case selection models; analytical dashboards; feedback mechanisms based on audit outcomes
3) Gradual Expansion and Deep Integration	30–48 months	Broader e-invoicing coverage; integration of additional registries (customs, land registry, etc.); smart taxpayer services (virtual assistant)

4) System Maturity (Tax Administration 3.0)	Beyond 48 months	Embedded compliance within business systems; "law-as-code" rules; continuous evaluation and algorithmic auditing

Source: Prepared by the researcher.

Key Performance Indicators (KPIs)

To ensure measurable progress and accountability, the following indicators are proposed:

- **Electronic Invoicing Coverage Rate:** Percentage (by number and value) of invoices validated electronically.
- **Processing Time:** Average time required for filing and collection compared to the baseline system.
- **No-Change Audit Rate:** Proportion of audits resulting in no adjustment, measured before and after the deployment of the risk engine.
- **Audit Yield Ratio:** Share of productive audit cases relative to total cases opened.
- **Taxpayer Trust and Satisfaction Index:** Based on periodic survey assessments.
- **Data Quality and Security Metrics:** Data error rates; number of cybersecurity incidents; system response time.

3.7 Risk Management and Ethical Considerations

Table (25): Key Risks and Mitigation Measures within the Smart Taxation Project

Risk Type	How It May Manifest	Proposed Mitigation Measures
Privacy and Data Protection	Expanded data exchange may lead to misuse or processing beyond defined purposes	Data minimization principle; encryption; purpose limitation; access logs; independent oversight authority
Algorithmic Bias	Risk models may disproportionately target specific sectors or groups due to imbalanced data	Fairness testing; periodic model review; human oversight; comprehensive model documentation
Cybersecurity Threats	The platform becomes a high-value target for cyberattacks	Multi-layered security architecture; penetration testing; business continuity and incident response plans
Resistance to Change	Internal or external resistance driven by fear of automation or increased scrutiny	Institutional communication strategy; capacity-building programs; phased implementation; compliance incentives
Data Quality Issues	Incomplete or inconsistent data leading to flawed risk assessments or decisions	Strong data governance framework; data cleansing protocols; unified identifiers; validation rules prior to data entry

Source: Prepared by the researcher.

4. Conclusion

4.1 Discussion of Hypotheses, Findings, and Recommendations

This study sought to shift the tax approach from a logic of "digitizing procedures" to one of "redesigning the system," whereby each economic transaction becomes a generator of reliable, verifiable real-time data. Such data can then be leveraged within an AI-based risk engine. This transformation is particularly necessary in an economic environment characterized by a large

informal sector, multiple transaction channels, and increasing revenue pressures, where the cost of obtaining reliable information—whether in terms of human effort or time—constitutes a major determinant of limited tax effectiveness.

4.2 Discussion of Hypotheses in Light of the Results

1. Main Hypothesis

The main hypothesis posited that integrating artificial intelligence within a comprehensive digital platform would enhance tax effectiveness and reduce tax evasion. The descriptive indicators support this assumption from two perspectives:

- The high evaluation by experts regarding the use of AI in tax administration.
- The even higher evaluation of the proposed system based on electronic invoicing, data integration, and AI.

In other words, experts perceive that value does not arise from isolated AI applications, but rather from a coherent information system that restructures the transaction lifecycle.

More specifically, the strong support for AI reflects a clear recognition of its analytical and predictive capabilities, particularly in processing large datasets, identifying hidden patterns, and detecting abnormal tax behaviors. AI is thus viewed as a tool enabling a shift from ex post control to proactive, risk-based oversight.

At the same time, the stronger endorsement of the integrated platform—combining e-invoicing, interoperability, and AI—indicates that experts associate AI effectiveness with the availability of a unified and reliable data environment. Integration among tax, financial, and commercial databases ensures input quality, which is a fundamental condition for meaningful AI outputs. Hence, the added value lies not in AI per se, but in its integration within a reengineered tax information architecture capable of reducing reporting gaps and limiting manipulation.

Accordingly, the main hypothesis is supported not only statistically through expert perceptions, but also logically and functionally. The integration of AI within a unified tax and financial information system contributes to:

- Improving collection and audit effectiveness;
- Enhancing transparency and traceability of economic transactions;
- Significantly narrowing the scope for tax evasion and fraud.

2. Sub-Hypotheses

a) Digitalization and Collection Efficiency: Although financial efficiency was not measured directly (e.g., tax gap or revenue growth), the low evaluation of the current system signals perceived procedural and informational inefficiencies, reinforcing the need for deeper digital integration.

b) AI and Fraud Detection: Responses under the second axis reached a "high" level, providing strong support for adopting risk models and anomaly detection tools. International experiences further confirm the effectiveness of such approaches when embedded within sound governance structures.

c) Infrastructure and Coordination Constraints: This hypothesis is logically valid and grounded in the observed fragmentation of data. Accordingly, the proposed roadmap prioritizes a foundational governance phase before launching advanced AI models.

d) Platform Impact on Processing Speed and Information Flow: The high evaluation of the third axis—particularly regarding information provision and practical applicability—supports the assumption that the proposed platform would improve processing efficiency and information circulation.

e) Taxpayer Acceptance: The present study measured expert opinions rather than taxpayers' perspectives directly. Therefore, this hypothesis requires complementary empirical research targeting firms and individuals, focusing on usability, trust, perceived fairness, and compliance costs.

4.3 Deeper Interpretation of the Findings

The gap between the low evaluation of the current system and the very high evaluation of the proposed model reflects primarily a systemic design gap rather than merely a technological gap. The current system—despite offering certain digital services—still largely operates through fragmented data structures and ex post control mechanisms. Effective reduction of evasion requires early-stage (pre-emptive) oversight based on trusted digital traces (e-invoicing, electronic payments, interoperable registries).

Furthermore, expert support for AI reflects a pragmatic understanding that comprehensive manual auditing is neither feasible nor efficient. Smart targeting reduces unnecessary audits on compliant taxpayers while increasing the productivity of limited human resources.

The correlation results suggest that support for AI does not necessarily depend on satisfaction with the current system. Institutional adoption of AI should therefore be grounded in independent cost–benefit and risk analyses rather than being driven solely by dissatisfaction with the status quo. The weak correlation between certain axes may also reflect a ceiling effect or indicate the need for more granular measurement instruments distinguishing among platform components (invoicing, payments, integration, risk models, taxpayer services).

4.5 Practical Recommendations

1. Adopt electronic invoicing as a structural reform lever, progressively implementing a clearance model beginning with large taxpayers and high-risk sectors.
2. Establish a national tax data lake with a unified Tax Data Dictionary and harmonized taxpayer identifiers before investing heavily in complex AI models.

3. Institutionalize AI governance within DGI: model documentation, performance metrics, periodic review, and appeal mechanisms for automated decisions.
4. Launch pilot projects with measurable success indicators (e.g., reduction in no-change audits, improved audit yield, shorter collection cycles).
5. Invest substantially in human capital: dedicated data science teams within DGI, auditor training in interpreting risk outputs, and academic partnerships.
6. Secure societal acceptance through simplified compliance procedures, taxpayer support tools, and maximum feasible transparency regarding data usage.
7. Gradually implement a "Rules-as-Code" approach to standardize interpretation and enhance legal certainty and tax fairness.

The success of smart taxation should not be measured solely by technological sophistication, but by its capacity to balance three essential dimensions:

- **Effectiveness and Cost Efficiency (Value for Money)**
- **Deterrence and Voluntary Compliance (Deterrence vs. Facilitation)**
- **Innovation and Rights Protection (Innovation vs. Rights)**

The proposed framework remains adaptable and scalable, and may serve as a practical foundation for a national tax digital transformation program in Algeria—or in any country seeking to modernize its tax administration through integrated, responsible, and data-driven reform.

5. References

1] Acemoglu, D., & Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. Journal of Political Economy, 128(6), 2188–2244. https://doi.org/10.1086/705716
2] Al Jazeera Net. (2022). *Artificial intelligence: What is it and what are its main manifestations?* Doha, Qatar: Al Jazeera Net.
3] Al-Asad, S. A. (2023, March 31). Artificial intelligence: Opportunities, risks, and realities in Arab countries. *Additions Journal for Economic Studies*, 165–184.
4] Al-Bahi, D. (2023, June 23). Dimensions of the growing interest in artificial intelligence in the Middle East. *Interregional for Strategic Analysis*, 1–6.
5] Attiyat, T. M. (2006). *Introduction to artificial intelligence*. Amman, Jordan: Arab Community Library for Publishing and Distribution.
6] BBC Arabic. (2023). *Artificial intelligence: Is it dangerous, and which jobs does it threaten?* BBC Arabic.
7] Beer, S., Kasper, M., Kirchler, E., & Erard, B. (2022). Audits, audit effectiveness, and post-audit tax compliance
8] Belaassel, Y. B. N., & Amrouche, H. (2022, June 26). Artificial intelligence and its role in achieving sustainable development. *Journal of Legal and Economic Studies*, 1153–1177.
9] Boden, M. A. (2018). Artificial intelligence: A very short introduction. Oxford University Press.
10] Charfi, A. H. (2022, June 18). The impact of the electronic tax system on enhancing tax audit effectiveness: A field study of a group of tax inspectors and controllers. *Journal of Quantitative Economic Studies*, 173–186.
11] Dehmani, S. L. (2022, October 22). Artificial intelligence as a digital technology fostering the creation of an emerging educational experience in Algeria: The case of the company Enkdia. *Journal of Educational and Media Studies*, 87–97.

12] DW. (2022, January 28). *Pegasus: Details of the "spyware scandal" involving surveillance of an Arab journalist and a lawsuit against Hungary*. Retrieved from https://www.dw.com/ar/
13] Eager, J. a. (2020). Opportunities of Artificial Intelligence. France:: European Parliament. Retrieved from:www.europarl.europa.eu.
14] Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs tocomputerisation? Technological Forecasting and Social Change, 114, 254–280.https://doi.org/10.1016/j.techfore.2016.08.019
15] Gouadri, M. (2022, October 10). Digitalization of the tax system and its role in strengthening tax control in Algeria. *Al-Muntada Journal for Economic Studies and Research*, 235–248.
16] Hannich, A. (2022, December 30). The impact of implementing e-administration on the performance of tax administration in Algeria. *Journal of Tax Studies*, 85–103.
17] Harrach, I. (2012). *Modernizing tax administration as a variable of tax reform to enhance management effectiveness: An evaluative study of the Algerian experience (2002–2010)* (Doctoral dissertation). Faculty of Economic Sciences, Commercial Sciences and Management Sciences, University of Algiers 3, Algiers, Algeria.
18] Kulkov, I. (2024). Artificial intelligence-driven sustainable development: Examining organizational, technical, and processing aspects. Sustainable Development, 32(4), 2253–2267, https://doi.org/10.1002/sd.2773
19] Nilsson, N. J. (2009). The Quest for Artificial Intelligence. Cambridge: Cambridge University Press.
20] Nose, M., & Mengistu, A. (2023). Exploring the adoption of selected digital technologies in tax administration: A cross-country perspective. IMF Notes. https://www.imf.org/en/publications/imf-notes/issues/2023/12/11/exploring-the-adoption-of-selected-digital-technologies-in-tax-administration-a-cross-541094
21] Official Gazette of the People's Democratic Republic of Algeria. (2006). *Executive Decree No. 06-327 determining the external services of the tax administration*. Algiers, Algeria.
22] Shadi, A. (2018). Opportunities and threats of artificial intelligence over the next ten years. *Future Center for Advanced Research and Studies, Trends of Events Series*, Issue 27.
23] Shokrollahi, Y., Yarmohammadtoosky, S., Nikahd, M. M., Dong, P., Li, X., & Gu, L. (2023). A comprehensive review of generative AI in healthcare.
24] Silini, J. D., &Announ, F. (2021, October 21). Algeria's orientation toward electronic tax governance as a mechanism to enhance tax control and reduce collection costs. *Journal of Real Estate Law*, 85–102.
25] Slimani, S. (2024). The impact of tax administration digitalization on taxpayer behavior: A comprehensivereview of previous studies.
26] William, A. (2017). *The risks of artificial intelligence to security and the future* (pp. 1–22). RAND Corporation.
27] Zheng, S., &Penetrante, M. O. (2025). Design and analysis of an AI-driven tax avoidance detection system in big data environments for public sector tax administration. International Journal of Research and Innovation in Social Science.