Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 5 Issue 4 (2025)

The Contribution of Artificial Intelligence to Enhancing Electronic Tax Collection in Algeria - Empirical Study

Siham Taleb Hacine
University Mohamed El Bachir El Ibrahimi of Bordj Bou Arreridj, Algeria. siham.talebhacine@univ-bba.dz

Received: 11/04/2025 ; Accepted: 20/08/2025 ; Published: 23/10/2025

Abstract :
This study examines the role of artificial intelligence (AI) in enhancing electronic tax collection in Algeria within the context of digital transformation. AI is considered a key driver of the Fourth Industrial Revolution due to its ability to simulate human intelligence and improve efficiency, accuracy, and flexibility in administrative processes. The research aims to analyze how AI contributes to improving tax administration performance, strengthening tax compliance, and reducing tax evasion through electronic tax systems.

The study adopts a descriptive and analytical methodology, combining a theoretical framework with a qualitative field study based on interviews conducted with experts in taxation, accounting, and information technology. Qualitative data were analyzed using NVivo 15 software through several approaches, including lexical analysis, word cloud visualization, linguistic similarity, thematic analysis, and cognitive mapping.

The findings indicate that AI significantly improves the taxpayer experience by simplifying electronic declaration and payment procedures, reducing errors, providing intelligent assistance, and issuing automated reminders. Moreover, AI enhances tax compliance and effectively limits tax evasion through advanced data analysis, risk identification, and the detection of suspicious patterns. The results also highlight a strong convergence in experts' perspectives regarding the importance of AI in electronic taxation. Despite these benefits, the study identifies major challenges, including weak digital infrastructure, lack of qualified human resources, cybersecurity risks, and the absence of a comprehensive legal framework. The study concludes that integrating AI into electronic tax collection is a strategic necessity for improving efficiency, transparency, and tax revenue in Algeria

Keywords : Artificial Intelligence, Electronic Tax Collection, Tax Compliance, Tax Evasion, Algeria

Introduction:

Artificial intelligence (AI) represents one of the most significant drivers of the Fourth Industrial Revolution, due to the services and capabilities it provides that were previously unattainable by traditional machinery. The most distinctive feature of AI is its ability to simulate human intelligence, aiming to facilitate processes, making them more flexible, efficient, and accurate. AI has penetrated all sectors worldwide, including the tax sector. The adoption of AI in electronic tax collection has contributed to increasing the efficiency of tax administration and promoting tax compliance. Additionally, it has enhanced transparency and reduced administrative costs for tax authorities.

Research Problem:
Based on the foregoing, the central research question of this study can be formulated as follows:
How does artificial intelligence contribute to enhancing electronic tax collection in Algeria?
This primary question gives rise to the following subsidiary questions:

- How does AI improve tax compliance in Algeria?
- How does AI limit tax evasion in Algeria?
- What are the main challenges facing the implementation of AI in electronic tax collection in Algeria?

Research Hypotheses: To answer the research problem, the main hypothesis is proposed as follows:
Artificial intelligence contributes to enhancing electronic tax collection in Algeria by automating tax services and improving their efficiency.
The main hypothesis is further divided into the following sub-hypotheses:

- AI improves tax compliance by enhancing the taxpayer experience and fostering trust in the tax system.
- AI limits tax evasion through precise data analysis and risk identification.
- The primary challenges in implementing AI in electronic tax collection include weak digital infrastructure, lack of qualified personnel, and cybersecurity risks.

Research Objectives:
This study seeks to shed light on the effective role AI plays in activating electronic tax collection, through automating tax procedures, analyzing data to detect tax evasion, and improving the quality of services provided to taxpayers, thereby enhancing the efficiency of tax administration and increasing tax revenue.

Research Methodology:
To achieve the study's objectives and answer the research problem while testing the validity of the hypotheses, the study employs a descriptive and analytical methodology. This involves defining the study variables on one hand and analyzing the responses of the study sample to the items included in the field study instrument (interviews), which are then processed statistically on the other hand.

Structure of the Study:
The study is divided into two parts. The first part addresses the conceptual framework of AI and electronic tax collection, while the second part is devoted to the field study.

Theoretical Study:
This section addresses the study variables, namely AI and electronic tax collection, by highlighting the most important concepts associated with each:
First: Electronic Tax Collection
1. **Definition of Electronic Tax Collection:** Electronic tax collection has been defined in several ways, including:

- As "a set of legal and administrative rules that organize various taxes and duties electronically, established for the benefit of the state and local authorities, and considered an essential tool to implement the state's economic and social policy." (Khelasi 2014, 243)
- As "the deployment of computer systems, networks, and technologies to perform tax imposition, payment, assessment, collection, and management." (Amaefule 2012, 113)
- From the above, electronic tax collection can be defined as: "a digital system based on information and communication technology aimed at electronic tax declaration and payment."

2. **Objectives of Electronic Tax Collection:** Electronic tax collection aims to achieve the following objectives:

- Reduce the high costs associated with manual and paper-based tax declaration and payment.
- Save time and effort for both the tax administration and taxpayers.
- Facilitate smooth and efficient tax procedures.
- Enhance the quality of tax declarations by reducing human errors.
- Minimize direct interactions between taxpayers and tax officials, reducing potential confrontations and bribery.
- Limit tax evasion.
- Simplify statistical processing, ensuring reliable and continuous data availability.

3. **Electronic Tax Collection in Algeria:**

3.1 Legal Framework: Since 2008, Algeria has pursued digital transformation across all sectors, including taxation. The Algerian legislator has issued laws and regulatory decrees supporting the use of electronic means in providing all tax services, as part of the sector's comprehensive digital transformation. Key legislations governing digital tax services include:

- **Legal framework for electronic declaration:**
  - Order No. 08-02 dated 24 July 2008, Supplementary Finance Law 2008, Article 23, Official Gazette No. 42, 27 July 2008.
  - Law No. 16-14 dated 28 December 2016, Finance Law 2017, Articles 34 and 67, Official Gazette No. 77, 29 December 2016.
- **Legal framework for electronic payment:**
  - Order No. 08-02 dated 24 July 2008, Supplementary Finance Law 2008, Article 15, Official Gazette No. 42, 27 July 2008.
  - Law No. 16-14 dated 28 December 2016, Finance Law 2017, Article 68, Official Gazette No. 77, 29 December 2016.
  - Provisions of Article 47, Finance Law 2019 (amended).
  - Provisions of Article 65, Finance Law 2020 (amended).
- **Legal framework for electronic signature and evidential validity:**
  - Law No. 05-10 dated 20 June 2005, amending Order No. 75-58 of 26 September 1975, Civil Code, Article 44, Official Gazette No. 44, 26 June 2005.
- **Legal framework for electronic certification and signature:**
  - Executive Decree No. 07-162 dated 30 May 2007, amending Executive Decree No. 01-123 of 9 May 2001, concerning the operation of communication networks, Official Gazette No. 37, 7 June 2007.

3.2 Electronic Services: (DGI 2025)

- **Official website of the General Directorate of Taxes:** Provides access to all tax procedures and legislation, continuously updated.
- **Djibayatic portal:** A digital platform facilitating remote tax services, allowing taxpayers to declare and pay taxes electronically , the term "Jibayatic" refers to the Arabic word "Jibaya", which means taxation, while the abbreviation "TIC" stands for Information and Communication Technology (ICT). The Directorate of Taxes is working to expand the use of the Jibayatic platform across all regions of Algeria, enabling taxpayers to file their declarations from anywhere and at any time, without any obstacles that may prevent them from doing s
- **Musahamatic portal:** A platform dedicated to taxpayers in provinces lacking local tax offices, ensuring simplicity and ease of use, the services provided through the portal are intended for taxpayers affiliated with the Provincial Directorates of Taxes in areas where neither a Tax Center nor a Local Tax Center is currently operational
- **Tabioukoum platform:** Provides 24/7 electronic payment of tax stamps.
- **Qasimatouka platform:** Enables remote purchase of vehicle registration certificates, ensuring speed and security.
- **Tax identification number:** Obtained electronically through the General Directorate of Taxes' official website, reducing bureaucracy.
- **Algerian Business Creation Portal:** Facilitates and accelerates company registration through integrated electronic services.

Electronic tax collection in Algeria aims to simplify procedures, improve tax collection, enhance trust between taxpayers and tax authorities, and reduce tax evasion. This direction has been legally supported by the Supplementary Finance Law 2008 and the Finance Law 2017.

Second : Artificial Intelligence

1. **Historical Background:** AI is a broad scientific field aimed at developing systems capable of simulating human intelligence and performing tasks requiring reasoning, learning, and decision-making. Its development stages include: (Abdullah 2019, 38-41)

- 1950: Alan Turing introduced the Turing machine and the paper Computing Machinery and Intelligence, proposing the Turing Test.
- 1956: John McCarthy coined the term "Artificial Intelligence" at the first AI conference at Dartmouth College.
- Subsequent developments include programming languages, ELIZA, various robots, and, by 1990, breakthroughs in Machine Learning, Case-Based Reasoning, algorithms, automated scheduling, data mining, natural language understanding, translation, and virtual reality.
- Modern advances include commercially available interactive robots, autonomous vehicles by Google, and Alibaba's AI language model outperforming seniors at reading comprehension (Stanford University, 2018).

2. **Definition of AI:**

- John McCarthy defines AI as "the science of engineering intelligent machines, especially computer programs, that can think and behave like humans." (Al-Dahmashan 2019, P2)

- AI is also defined as “the ability of digital machines and computers to perform specific tasks similar to those performed by intelligent beings, such as thinking, learning from experience, and other mental processes.” (Abdelfattah 2021, P11)

Thus, AI can be summarized as: “the simulation of human intelligence by machines.”

3. **Fields of AI Application:** (Al-Masri 2019, P23)

- **Natural Language Processing (NLP) :**This field focuses on developing programs and systems capable of understanding human language efficiently and responding in multiple languages
- **Speech Recognition :** It aims to enable computers, machines, or technological systems to listen to human speech, recognize it, and interact accordingly by executing the requested commands
- **Automated Programming :** This approach relies heavily on intelligent algorithms to develop systems capable of understanding problems and transforming them into programming solutions. It helps accelerate software development processes, improve quality, and reduce potential errors
- **Computer Vision :** This refers to equipping computer systems with optical sensing devices that allow them to recognize individuals and interpret the surrounding environment
- **Expert Systems :** These are systems that depend on collecting the knowledge and expertise of specialists and using it as a reference base to provide solutions and recommendations to users
- **Intelligent Robotics :** An intelligent robot is an electromechanical machine that receives commands from its associated computer. Artificial intelligence enables it to interact with its environment through flexible movement and the ability to understand and perform assigned tasks

AI applications are virtually limitless, as long as they relate to human intelligence.

4. **Applications of AI in Electronic Tax Collection:** The following section will highlight the main applications of AI in electronic tax collection, demonstrating that adopting AI in this field is a necessity rather than a choice

Table (01): Applications of Artificial Intelligence in Electronic Tax Collection in the Top Five Countries Worldwide

Practical Examples	Key AI Applications in Electronic Tax Collection	Country
Using machine learning models to study rental income and property ownership to identify potential tax evasion cases.	Tax data analysis for detecting evasion.	France
Analyzing millions of cases to identify companies or individuals most likely to commit tax violations and directing audit teams accordingly.	Tax risk analysis.	Austria
Intelligent chatbot that answers taxpayer inquiries and corrects errors in real-time.	Interaction with taxpayers.	Singapore
Machine learning systems that classify and analyze taxpayer appeals, accelerate decision-making, and reduce human errors.	Automation of tax appeal processing.	Brazil

Practical Examples	Key AI Applications in Electronic Tax Collection	Country
Using satellite imagery to analyze undeclared properties and cross-reference with tax data to detect violations.	Detecting tax evasion through geospatial data and intelligent analysis.	Greece

Source: Prepared by the researcher based on (OECD 2025)

It is evident from the table above that artificial intelligence has proven its effectiveness in the field of electronic tax collection, delivering far better results than prior methods, i.e., before its adoption. Relying on AI allows for precise analysis of tax data, tax risk assessment, enhanced communication with taxpayers, automation of appeal processing with greater reliability and speed, and a significant ability to detect and reduce tax evasion.

Field Study: In this section, we aim to apply the theoretical framework to practical reality and address our research problem by relying on the study sample.

1. **Study Population:** Our study is based on the opinions and responses of specialists in the field (accounting and taxation). Personal interviews were conducted with relevant professionals from some eastern provinces and Algiers.
2. **Research Instrument:** The interview is considered the most suitable tool for this type of study. It is defined as: "a fundamental tool in scientific research, used to obtain detailed and in-depth information about the phenomenon under study, characterized by direct social interaction between the researcher and respondents, allowing the expression of their expertise and experiences in a specific field." (Duwaidri 2000, 324). The interviews were designed using directed, clear, and precise questions.
3. **Description of the Study Sample:** The study sample possesses the following characteristics

Table (02): Study Sample

Position	Educational Level	Years of Experience
Head of the National Tax Council	Bachelor's degree	More than 10 years
Accounts Controller / Tax Auditor	Bachelor's degree	More than 10 years
Accounts Controller / Tax Auditor	Bachelor's degree	More than 10 years
Tax Expert	Bachelor's degree	More than 10 years
Tax Expert	Master's degree	5–10 years
Head of IT Department, Tax Directorate	Master's degree	5–10 years
Total		

Source : Prepared by the researcher based on outputs from NVivo 15 software.

It can be observed from the table above that the study sample possesses a good educational level and considerable professional experience, with sufficient knowledge in the fields of accounting and taxation. Their practical experience ranges from 5 years to more than 10 years in the field, which enhances the reliability of their responses and supports the credibility of the study's findings.

4. Interview Approaches: In this section, we discuss the results of the qualitative analysis of the interviews conducted with a sample of six experts. The analysis was carried out using

NVivo 15 software. The results are presented through four main approaches: the lexical approach, the linguistic approach, the thematic approach, and cognitive mapping.

First: The Lexical Approach The lexical approach aims to describe what the respondents discussed regarding the study variables, namely artificial intelligence and electronic tax collection, by identifying the most frequently used terms in the interviews. This approach relies on frequency statistics and word similarity. A frequency analysis was conducted for the 100 most repeated words with more than three characters, using NVivo 15. From these, we selected the terms most relevant to the study topic. The following table illustrates the most frequently mentioned terms according to the study sources .

Table (03): Frequency of Key Terms in the Study

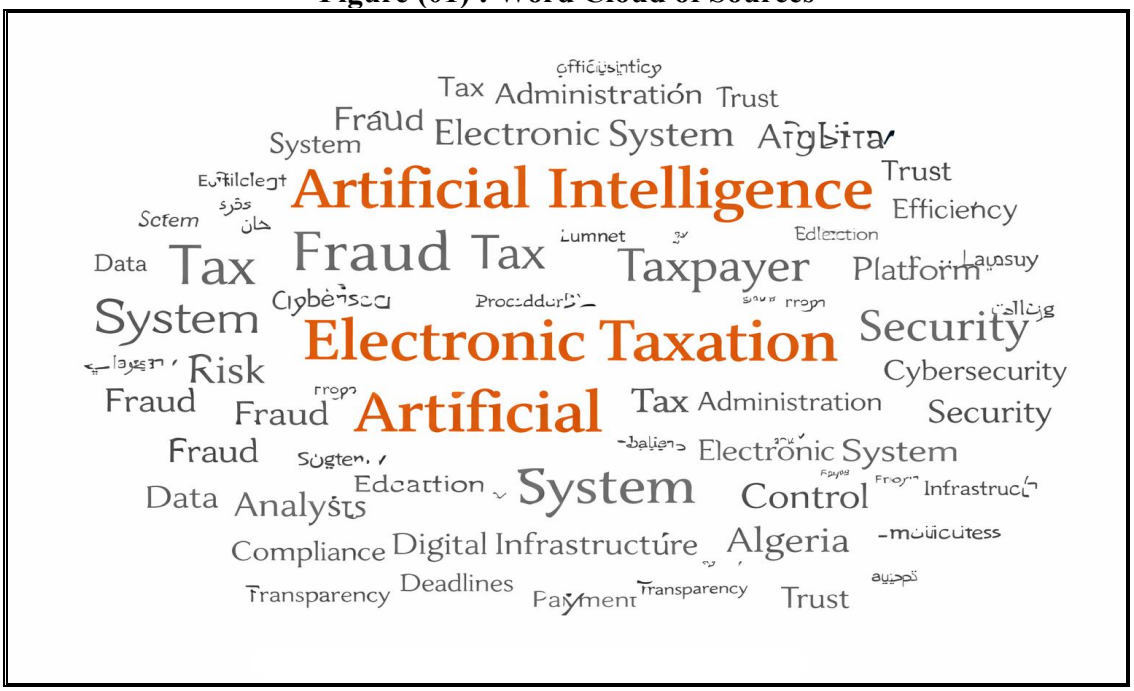
Terms	Similar Terms	Frequency
Intelligence	For intelligence	83
Artificial	Artificial	78
Electronic	Electronic – Electronics	53
Taxation	Tax – Fiscal	46
Data	Data – Of data – With the data	38
Tax	Tax – Fiscal – Tax-related	60
Taxpayer	Taxpayers – For taxpayers – The taxpayers	36
Evasion	Evasion – For evasion	32
Enhancement	Enhancement	9
Control	Monitoring	12
Portals	Platforms – Platforms – For the platform	12
Compliance	Compliance	14
Declarations	Declaration – For declaration	11
Interaction	Cooperation	9
Algeria	Algerian	8
Cyber	Cyber	15
Deadlines	Deadlines	12
Technologies	Technology	7
Commitments	Their commitments – Commitments	10

Source: Prepared by the researcher based on outputs from NVivo 15 software.

The table above shows the terms that were most frequently repeated according to the results of NVivo 15. The frequency analysis indicates that the responses of the expert sample reflect the studied phenomenon in two ways. First, certain terms were repeated with high frequency, demonstrating their importance to the experts and their relevance to the study topic, as most of these terms represent the core variables of the study. Second, the similarity and convergence of the terms used are evident; for example, electronic – electronically were used

interchangeably to convey the same meaning, as were platforms – portals. This reflects the variation in term usage depending on the answers provided by each expert for each question.
This diversity in term usage indicates that the interviews conducted with the experts were effective. The term intelligence (repeated 83 times) and artificial (repeated 78 times) play a central role in enhancing (repeated 9 times) tax collection taxation(repeated 46 times); electronic(repeated 53 times) in Algeria (repeated 8 times) by improving the taxpayer experience (repeated 36 times) and facilitating voluntary compliance (repeated 14 times). AI contributes to simplifying the procedures for declaration (repeated 11 times) and payment through electronic portals (repeated 53 times), reducing errors and saving time and effort for taxpayers (repeated 36 times).
Furthermore, AI can provide instant guidance and intelligent assistance to taxpayers, sending alerts regarding deadlines to ensure timely fulfillment of tax obligations. In addition, AI enhances tax oversight by analyzing large volumes of data (repeated 38 times) and detecting suspicious patterns, which effectively helps reduce tax evasion (repeated 32 times). On the other hand, it contributes to transparency and builds trust between the tax administration and taxpayers, encouraging voluntary compliance and improving the efficiency of tax collection.
The repetition of key terms can also be visualized through a word cloud generated from NVivo 15 qualitative analysis outputs, as shown below:

Figure (01) : Word Cloud of Sources



Source: Outputs from NVivo 15 software.

The Word Cloud Approach The word cloud is considered one of the most important tools of the lexical approach, as it identifies the topics addressed by the respondents by representing the size of words according to the frequency of their use in the answers provided by the sample participants. By observing the word sizes in the cloud, it becomes evident that the experts predominantly focused in their responses on the main study variables, namely artificial intelligence and electronic taxation. Consequently, the participants of the study sample assigned significant importance to the study topic.

Secondly: The Linguistic Approach

The linguistic approach to textual similarity among experts reveals the degree of similarity in the experts' statements in response to the interview questions. A comparison will be made between the interviews conducted with six experts from various organizations. The results, as generated by the qualitative analysis software NVivo 15, are presented in the following table.

Table 04 : Source Similarity Based on Textual Similarity Coefficient

Source A	Source B	Pearson Coefficient
Expert 6	Expert 3	0.803488
Expert 5	Expert 3	0.764744
Expert 4	Expert 3	0.763478
Expert 6	Expert 4	0.761127
Expert 6	Expert 5	0.756489
Expert 3	Expert 1	0.743108
Expert 5	Expert 1	0.727681
Expert 5	Expert 4	0.718549
Expert 4	Expert 1	0.699754
Expert 3	Expert 2	0.690995
Expert 4	Expert 2	0.668501
Expert 6	Expert 2	0.667270
Expert 2	Expert 1	0.654997
Expert 5	Expert 2	0.645424

Source: Prepared by the researcher based on the outputs of NVivo 15 software.

The table above shows that the correlation coefficients among the six experts included in the study ranged from 0.803488 to 0.645424. These results serve as an indicator of a high degree of textual similarity in terms of the content, substance, and orientation of each expert's responses. This suggests a considerable convergence of perspectives among the surveyed experts regarding the understanding and interpretation of the study's problem. Some of the textual similarity coefficients between experts can be interpreted as follows:

1. The correlation between Expert 6 and Expert 3 was 0.803488, representing the highest correlation among the interviews due to the substantial similarity in all responses provided by these two experts.
2. The correlation between Expert 5 and Expert 2 was 0.645424, representing the lowest correlation among the interviews, as similarity was observed only in the second and third responses.

Thirdly: The Thematic Approach

In this part, coverage percentages were extracted (calculated as the proportion of words from a single source related to a particular node relative to the total number of words in the same source, multiplied by 100) for each answer to each interview question. This was done to determine which questions received more attention from each respondent. The coverage percentages for the nodes were as follows.

Table 05: Node Coverage Percentages

	Coverage percentage (%)						
Expert 1	4.09	11.02	5.83	9.18	10.92	9.60	9.35
Expert 2	1.72	6.44	6.89	11.50	5.38	2.46	3.98
Expert 3	5.40	8.54	4.20	12.01	2.87	4.60	4.77
Expert 4	12.32	4.30	8.78	6.19	10.36	1.58	2.02
Expert 5	6.36	7.89	7.43	6.58	9.76	9.36	7.21
Expert 6	1.99	7.72	7.16	8.78	4.17	1.12	7.72

Source : Prepared by the researcher based on the outputs of NVivo 15 software.

The table above presents the coverage percentages for the seven nodes for each source. These percentages vary from node to node and from expert to expert. They can be summarized as follows:

- **Node 1 : What is Artificial Intelligence ?**

Coverage percentages ranged between 1.72% and 12.32%, with the highest coverage provided by Expert 4, who explained that AI is a branch of computer science aimed at enabling machines to simulate human cognitive abilities, such as learning, problem-solving, and decision-making. It is a technology that allows devices to perform tasks that typically require human intelligence.

- **Node 2: How can Artificial Intelligence improve taxpayers' experience when interacting with electronic tax portals for declaration and payment?**

Coverage percentages ranged from 6.44% to 11.02%, with the highest coverage provided by Expert 1. The expert indicated that AI can enhance the taxpayers' interaction with electronic tax portals in terms of usability, acting as an intelligent assistant that answers queries and explains complex legal terms. It can also learn from the user's behavior on the platform and display only relevant information. Moreover, AI improves processing speed by suggesting figures based on prior declarations, automatically extracting data from uploaded invoices and documents, and alerting users in case of errors.

- **Node 3: How does AI contribute to voluntary tax compliance and timely fulfillment of taxpayers' obligations ?**

Coverage percentages ranged between 4.20% and 8.78%, with the highest coverage provided by Expert 4. The expert stated that AI assists in preparing and submitting tax returns, significantly reducing human errors, enhancing compliance monitoring, and providing immediate alerts regarding new regulations.

- **Node 4: How do you perceive the impact of AI adoption in electronic taxation on reducing tax evasion?**

Coverage percentages ranged from 6.19% to 12.01%, with the highest coverage provided by Expert 3. The expert explained that AI positively affects tax evasion by enabling rapid and efficient analysis of large tax collection data to detect manipulation or inaccuracies, early identification of suspicious activities in collaboration with AI systems in banking and customs institutions, enhancing transparency and reducing administrative corruption by digitally

recording all transactions, encouraging voluntary compliance through easier reporting and payment processes, and reinforcing taxpayer trust and fairness.

- **Node 5: What data does AI require to implement electronic tax monitoring, and how is it obtained ?**

Coverage percentages ranged between 2.87% and 10.92%, with the highest coverage provided by Expert 1. The expert identified the required data as follows: taxpayers' basic information (identity, address, activity, tax identification number), financial data, commercial transaction records, customs data, banking data, and employee data. These are obtained from electronic tax declarations submitted by taxpayers, government electronic systems (such as commercial registers, customs, social security), financial institutions and banks, and accounting reports provided by auditors.

- **Node 6 : In your opinion, what is the relationship between the use of AI in electronic taxation and the effectiveness of cybersecurity for taxpayers' data ?**

Coverage percentages ranged from 1.58% to 9.60%, with the highest coverage provided by Expert 1. The expert explained that the more AI is used, the greater the importance of protecting tax data. Cybersecurity provides a secure environment for AI to operate efficiently, and AI itself can enhance cybersecurity through intelligent monitoring. Protecting data increases taxpayer confidence and encourages the use of electronic portals, making the electronic tax system safer and more effective.

- **Node 7: What are the main challenges in applying AI within electronic taxation from your perspective ?**

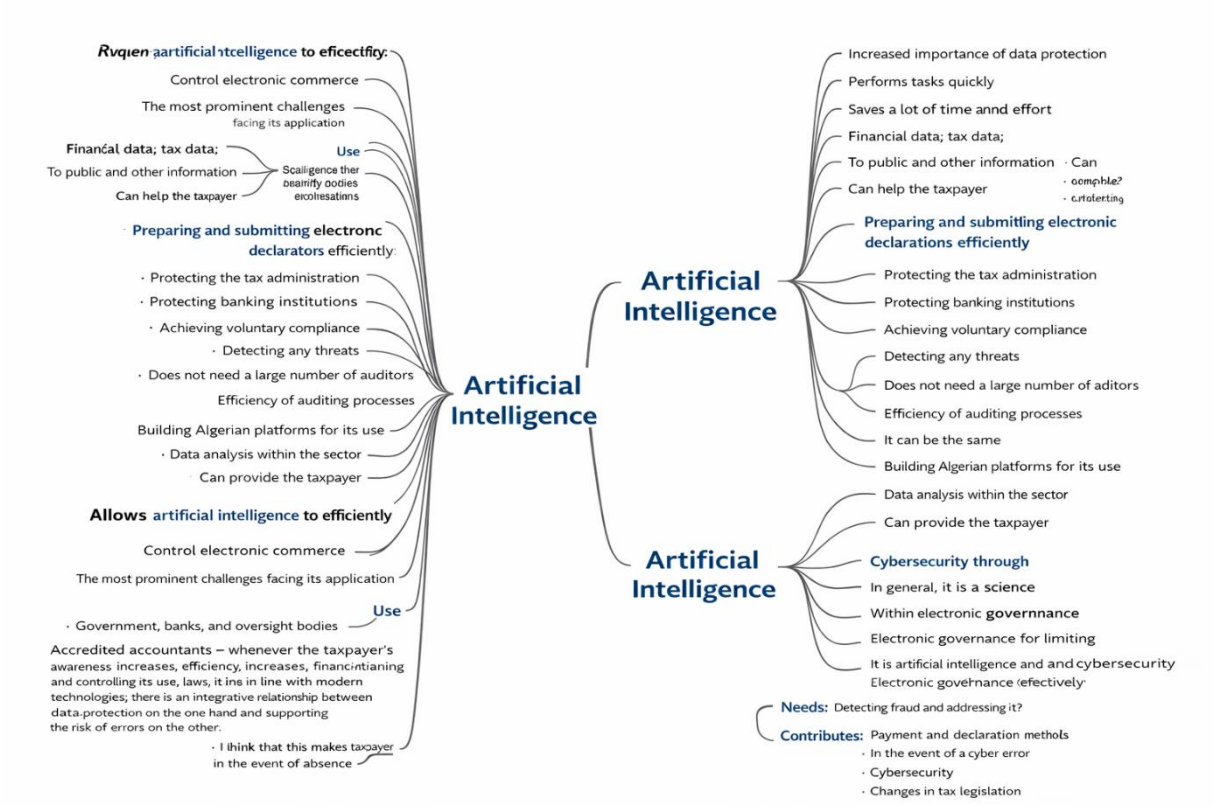
Coverage percentages ranged between 2.02% and 9.35%, with the highest coverage provided by Expert 1. The expert identified the challenges as weak digital infrastructure, incomplete electronic integration between administrations (tax, customs, commercial register, banks, etc.), high costs of establishing, developing, and maintaining advanced AI systems, lack of specialized expertise in AI and data analysis within the tax sector, and a legal framework that needs updating to keep pace with technology while ensuring citizens' privacy protection.

5.Cognitive Maps:

To structure the mental representations, the following illustrations link the main study variables (Artificial Intelligence and electronic taxation) with the various ideas expressed in the interviews of the six experts.

Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 5 Issue 4 (2025)

Figure (02): The Cognitive Map of Artificial Intelligence



Source: Prepared by the researcher based on the outputs of NVivo 15.

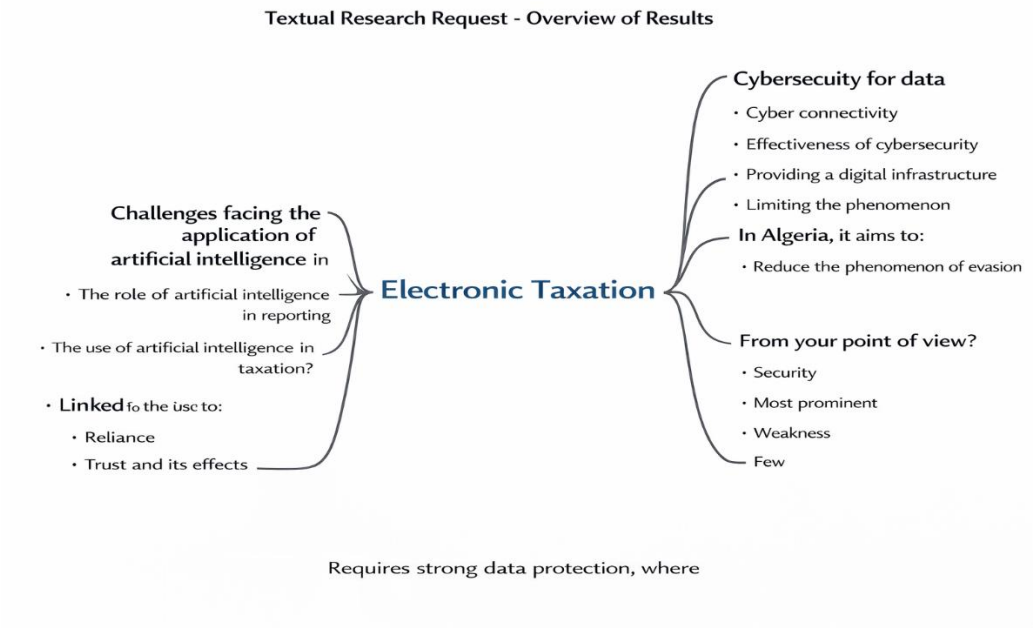
The figure above represents the cognitive map of artificial intelligence in electronic taxation. It shows that artificial intelligence plays an effective role in achieving voluntary tax compliance by simplifying declaration and payment procedures through electronic platforms. It also helps detect tax evasion and identify suspicious patterns through big data analysis, which enhances the efficiency of tax control and reduces fraud and evasion. In addition, artificial intelligence provides alerts for deadlines and due dates and offers instant guidance to taxpayers, thereby improving the taxpayer experience and strengthening trust and transparency between the tax administration and taxpayers.

However, there are challenges facing its application in Algeria, such as weak digital infrastructure, a shortage of specialized competencies, the absence of a clear legal and regulatory framework, as well as cybersecurity risks and data privacy concerns. Therefore, activating artificial intelligence in electronic taxation requires developing infrastructure, training staff, and updating tax legislation to ensure the safe and effective use of these technologies.

The cognitive map presented above clarifies the main axes of artificial intelligence in electronic taxation, branching into several key aspects. The first branch highlights the role of artificial intelligence in activating tax compliance by improving the taxpayer experience, simplifying procedures, providing alerts and guidance, and offering electronic portals. The second branch focuses on the role of artificial intelligence in combating tax evasion through data analysis, detecting suspicious patterns, uncovering fraud, and effectively strengthening tax oversight. The third branch addresses the challenges facing the application of artificial

intelligence in Algeria, including weak digital infrastructure, a lack of specialized human resources and competencies, the absence of a legal and regulatory framework, and cybersecurity and data protection risks. Finally, the fourth branch refers to the requirements necessary for successfully activating artificial intelligence, which include developing infrastructure, training employees and competencies, updating tax legislation, and ensuring data protection and cybersecurity.

Figure (03): The Cognitive Map of Electronic Taxation



Source: Outputs of NVivo 15.

The cognitive map presented above indicates that artificial intelligence plays a pivotal role in enhancing the effectiveness of electronic taxation through several integrated levels. At the level of processes and data, it provides a digital infrastructure that ensures secure procedures, strengthens cybersecurity effectiveness, and contributes to limiting tax evasion in Algeria. In response to the question "What?"—namely, how to reduce tax evasion—artificial intelligence operates by analyzing data with high precision. It also contributes to strengthening tax systems by ensuring robust data protection and enhancing transparency in financial transactions. When addressing the question "From your point of view?", evaluations range across notions such as security, prominence, magnitude, weakness, and scarcity. Moreover, the application of artificial intelligence relies on advanced programming, precision, reliability, consistency, and dependence on sophisticated systems. Through this integration, electronic taxation evolves into a more efficient and equitable system, supporting the digital economy and reinforcing trust between taxpayers and tax administrations, while requiring strong data protection.

From the foregoing, it is evident that artificial intelligence plays a central role in enhancing the effectiveness of electronic taxation by supporting secure processes, improving cybersecurity effectiveness, and reducing tax evasion in Algeria. It also contributes to high-precision data analysis, strengthens information protection, and promotes transparency in financial transactions, thereby fostering trust between taxpayers and the tax administration and enhancing the efficiency of the tax system within the framework of digital transformation.

Conclusion

In conclusion, this study has examined the role of artificial intelligence in activating electronic taxation in Algeria. The findings indicate that integrating artificial intelligence into electronic taxation has become imperative, as it enhances the performance efficiency of the tax administration, improves tax compliance, and reduces tax evasion. However, several challenges continue to hinder its application, most notably weak digital infrastructure and a shortage of qualified competencies. The main findings are summarized as follows:

- Artificial intelligence contributes to strengthening electronic taxation in Algeria through the automation of tax services and the improvement of their efficiency.
- Artificial intelligence enhances tax compliance by improving the taxpayer experience and strengthening trust in the tax system.
- Artificial intelligence reduces tax evasion through data analysis and precise risk identification.
- Among the most prominent challenges facing the application of artificial intelligence in electronic taxation are weak digital infrastructure, lack of competencies, and cybersecurity risks.
- Artificial intelligence improves the taxpayer experience with the tax administration's electronic portals by assisting taxpayers in their use and processing the data required for declaration.
- Artificial intelligence contributes to achieving voluntary tax compliance through automated reminder systems.
- Artificial intelligence helps limit tax evasion by detecting inconsistencies between declarations, linking suspicious patterns, and classifying them according to their risk level.
- Artificial intelligence enhances electronic oversight by providing comprehensive taxpayer data.
- There is a complementary relationship between artificial intelligence and cybersecurity.
- One of the major challenges of applying artificial intelligence in electronic taxation is the absence of a clear legal framework.

Recommendations

The most important recommendations include:

- Further activation and development of digital infrastructure.
- Linking all administrations thatDeal with with taxpayers to the tax administration.
- Training tax administration staff in artificial intelligence technologies and applications.
- Strengthening cybersecurity measures in Algeria.

References

1. Abdelfattah, N. Artificial Intelligence for Learning Support. 2021.
2. Abdullah, M., & Bilal, A. H. Artificial Intelligence: A Revolution in Modern Technologies . CAIRO, 2019.
3. Al-Dahmashan, J. A. K. A Teacher Preparation Program to Keep Pace with the Fourth Industrial Revolution. . 2019.
4. Al-Masri, A. M. Foreseeing the Educational Future in Light of Artificial Intelligence Systems. 2019.

5. Amaefule, C. The Efficacy of E-Taxation as a Strategic Tool for National Economic Development.. National Journal of Banking and Finance, 3., 2012.
6. DGI. «General Directorate of Taxes (DGI). (2025). Electronic Services. Retrieved from the website of the Algerian General Directorate of Taxes.» 2025.
7. Duwaidri, R. W. . Scientific Research: Its Theoretical Foundations and Practical Application . 2000.
8. Khelasi, R. Taxation Theory (An-Nathariya Al-Jibā'iya). 2014.
9. OECD. Governing with Artificial Intelligence: The State of Play and Way Forward in Core Government Functions. PARIS, 2025.
10. Order No. 08-02 dated 24 July 2008, Supplementary Finance Law 2008, Article 23, Official Gazette No. 42, 27 July 2008.
11. Law No. 16-14 dated 28 December 2016, Finance Law 2017, Articles 34 and 67, Official Gazette No. 77, 29 December 2016.
12. Order No. 08-02 dated 24 July 2008, Supplementary Finance Law 2008, Article 15, Official Gazette No. 42, 27 July 2008.
13. Law No. 16-14 dated 28 December 2016, Finance Law 2017, Article 68, Official Gazette No. 77, 29 December 2016.
14. Provisions of Article 47, Finance Law 2019 (amended).
15. Provisions of Article 65, Finance Law 2020 (amended).
16. Law No. 05-10 dated 20 June 2005, amending Order No. 75-58 of 26 September 1975, Civil Code, Article 44, Official Gazette No. 44, 26 June 2005.
17. Executive Decree No. 07-162 dated 30 May 2007, amending Executive Decree No. 01-123 of 9 May 2001, concerning the operation of communication networks, Official Gazette No. 37, 7 June 2007.