

ASSESSING THE FACTORS INFLUENCING TAX GOVERNANCE AND ADMINISTRATION FOR INFORMATION TECHNOLOGY ENTERPRISES: A FUZZY AHP APPROACH

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Abstract

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The rapid digitalization of business operations has introduced unique challenges for tax administration, particularly in the context of information technology (IT) enterprises (Heering et al., 2025; Mpofu, 2022). These challenges extend beyond administrative efficiency to encompass broader issues of tax governance and regulatory coherence, especially as Vietnam adapts its fiscal system to the fast-changing digital economy. Effective tax governance requires coordination between institutional design, regulatory clarity, and enterprise compliance behavior. In Vietnam, where digital economic growth is accelerating, tax authorities face increasing pressure to modernize administrative frameworks and respond to the evolving nature of intangible and cross-border transactions. This study aims to identify and prioritize the key factors affecting tax administration effectiveness for IT enterprises in Hanoi, using a multi-criteria decision-making approach based on the fuzzy analytic hierarchy process (FAHP). Drawing on expert input from tax officials, policy researchers, and industry professionals, the study applies three FAHP techniques to evaluate the relative importance of a hierarchical set of criteria and sub-criteria. The results consistently highlight tax authority efficiency as the most influential factor, particularly the clarity of regulations, competence of tax officers, and audit transparency. Enterprise-level factors such as managerial tax literacy and legal risk awareness also play critical roles. The findings provide actionable insights for policymakers and business leaders, emphasizing the need for institutional reform, strengthened tax governance, taxpayer education, and adaptive regulatory strategies in the digital economy.

Keywords: Tax Administration, Information Technology Enterprises, Fuzzy AHP, Digital Economy, Multi-Criteria Decision Making, Tax Compliance

Authors' individual contribution: Conceptualization — N.T.B.; Methodology — N.T.B. and T.B.T.V.; Formal Analysis — T.B.T.V.; Investigation — Q.H.D.; Data Curation — Q.H.D.; Writing — Original Draft — N.T.B.; Writing — Review & Editing — Q.H.D.; Visualization — Q.H.D.; Supervision — T.B.T.V.; Project Administration — N.T.B.

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1. INTRODUCTION

The digital transformation sweeping across Vietnam has positioned information technology (IT) enterprises in Hanoi as key drivers of economic innovation and digital governance. With increasing investments in software, cloud computing, and platform-based services, these firms contribute substantially to local gross domestic product and employment (Al-Hmesat et al., 2025; Beulen & Bode, 2021; Bukht & Heeks, 2017; Oyewole et al., 2024; Van & Duy, 2020). However, their unique operational models — including cross-border services, intangible assets, and rapid scalability — pose both opportunities and challenges for conventional tax administration systems (Belegu & Fejzullahu, 2023; El Merhebi & El Tanbour, 2025; Mpofu, 2022; Rukundo, 2020). From a governance perspective, digital taxation in Vietnam involves not only administrative modernization but also the establishment of coherent regulatory frameworks that ensure transparency, accountability, and fairness. Strengthening tax governance — defined as the institutional capacity to design, implement, and enforce equitable tax rules — is, therefore, central to improving compliance and sustaining fiscal integrity in the digital economy.

Despite significant progress in tax policy reforms — such as the introduction of e-invoicing and e-tax portals, alignment with base erosion and profit shifting, and increased data sharing — the enforcement mechanisms often lag behind technological advancements. These reforms have led to improved compliance and efficiency, with Vietnam reportedly becoming the Association of Southeast Asian Nations (ASEAN) leader in managing digital tax protocols, including foreign supplier taxation (Ngo, 2013; Nguyen et al., 2024).

Nevertheless, these developments have not been systematically evaluated from the perspective of critical success factors impacting tax administration effectiveness for Hanoi's IT enterprises. Prior studies tend to focus on broader e-commerce or generic digital economy tax issues rather than on the IT sector's specific constraints (Nguyen et al., 2024; Trang, 2023). Meanwhile, investigations into e-tax adoption in Vietnam emphasize users' attitudes and infrastructure readiness but do not directly link these to administrative effectiveness (Le Nguyen et al., 2024).

This study seeks to fill a critical gap in the literature by addressing two core objectives: first, to identify the key factors that influence the effectiveness of tax administration for IT enterprises in Hanoi; and second, to apply the fuzzy analytic hierarchy process (FAHP) as a methodological framework for systematically evaluating and prioritizing these factors based on expert judgments under uncertainty (Chang, 1992; van Laarhoven & Pedrycz, 1983). To guide this investigation, two primary research questions are formulated:

RQ1: Which factors most significantly influence the effectiveness of tax administration for IT enterprises in Hanoi?

RQ2: How can tax authorities strategically allocate resources and reform administrative processes based on the prioritization of these factors to enhance overall tax governance?

Despite a growing body of research on digital taxation across Southeast Asia — such as studies on e-tax adoption, compliance behavior, and digital platform taxation in Indonesia, Malaysia, and

the Philippines — empirical evidence focusing specifically on the tax administration of IT enterprises remains limited. Most regional works (e.g., focusing on e-commerce or general small and medium-sized enterprise (SME) compliance) emphasize technological readiness or user perceptions rather than the administrative effectiveness of tax authorities under digital transformation.

This study addresses that gap by offering a structured, evidence-based prioritization of the key determinants influencing tax administration effectiveness for IT enterprises in Hanoi, Vietnam. Unlike prior Southeast Asian research that primarily adopts behavioral or descriptive approaches, this paper employs an FAHP to integrate expert judgment under uncertainty, providing both methodological innovation and contextual specificity. Consequently, the study adds value by advancing the understanding of institutional and enterprise-level interactions in digital tax governance, with implications for regional policymaking beyond Vietnam.

The structure of the paper is organized as follows. Section 2 reviews the relevant literature on tax governance, digital taxation, and the application of fuzzy multi-criteria decision-making methods. Section 3 presents the research methodology, including the FAHP framework and data collection procedures. Section 4 reports the empirical results and analysis, while Section 5 discusses the main findings and their theoretical implications. Finally, Section 6 concludes the paper with key policy implications and recommendations for improving tax governance and administration in Vietnam's digital economy.

2. LITERATURE REVIEW

While several Southeast Asian economies have recently explored digital taxation frameworks — such as Indonesia's value-added tax on digital services and Malaysia's e-tax infrastructure — few studies have systematically examined how these reforms affect administrative effectiveness, particularly for IT-intensive enterprises. This section reviews existing literature to position the present study within that emerging regional discourse.

The administration of taxation for IT enterprises presents unique challenges arising from the sector's intrinsic characteristics. Unlike traditional industries, IT firms often generate revenues from intangible assets, digital platforms, and cross-border transactions, which complicate both tax compliance and regulatory oversight (Heering et al., 2025). Digital business models, particularly those involving software-as-a-service (SaaS), cloud computing, and digital advertising, typically operate without a fixed physical presence in the countries where value is created, challenging the application of traditional nexus-based taxation rules (Devereux & Vella, 2018).

Moreover, the digital nature of income streams — ranging from app-based microtransactions to subscription-based models — makes it difficult for tax authorities to verify, track, and assess taxable income accurately. These complexities are further compounded by the widespread use of cryptocurrencies, electronic payment gateways, and the ease of profit shifting through transfer pricing mechanisms among multinational IT enterprises (Beer et al., 2019).

A growing body of literature has examined tax compliance behavior in the context of digital

economies. Alm and Soled (2017) argue that the lack of transparency in digital income reporting significantly increases the risk of non-compliance. Similarly, Cobham and Jansky (2020) highlight how digital platforms enable firms to obscure income and shift profits to low-tax jurisdictions, reducing the effectiveness of domestic tax enforcement. Studies have also emphasized behavioral dimensions, suggesting that perceptions of fairness, audit probability, and the complexity of tax regulations influence voluntary compliance among digital entrepreneurs (Abdul Jabbar & Pope, 2009; Kasipillai & Abdul Jabbar, 2003; Kasipillai & Abdul Jabbar, 2006; Kirchler et al., 2008; Kogler et al., 2023).

The digitalization of business also calls for more adaptive regulatory frameworks. According to the Organisation for Economic Co-operation and Development's, tax challenges arising from digitalisation report, many jurisdictions, including Vietnam, face capacity constraints in auditing digital firms due to insufficient technological infrastructure and skilled personnel (Organization for Economic Co-Operation and Development [OECD], 2021). Therefore, several scholars have called for the integration of advanced analytical tools — such as artificial intelligence and big data analytics — into tax administration systems to improve detection, compliance monitoring, and risk assessment (Keen & Slemrod, 2017).

Recent studies published between 2021 and 2025 further clarify the links between tax governance, regulatory quality, and digital transformation. For example, Belegu and Fejzullahu (2023) emphasize that strengthening procedural rights and administrative transparency is key to building taxpayer trust in digital environments. El Merhebi and El Tanbour (2025) highlight governance and legal framework issues that shape fiscal control and enforcement capacity. From an organizational perspective, Al-Hmesat et al. (2025) show that digital transformation strategies improve institutional performance via human-capital development, while Beulen and Bode (2021) argue that dedicated IT and innovation governance structures (e.g., steering committees) help sustain transformation efforts. Empirical work in developing economies (Mpofu, 2022) suggests that the effect of digital tools on compliance is moderated by governance quality and enforcement practices. Methodologically, fuzzy multi-criteria decision-making — particularly FAHP — continues to be applied as a robust tool for policy evaluation under uncertainty (Kahraman et al., 2015). Collectively, these recent contributions justify situating our

FAHP-based assessment within a governance-centred research agenda on digital taxation.

3. RESEARCH METHODOLOGY

3.1. Study design

Several alternative methods could also be employed to evaluate the determinants of tax governance and administration. For example, structural equation modeling (SEM) or partial least squares (PLS-SEM) could be applied to test causal relationships among latent constructs based on survey data. Similarly, the analytic network process (ANP) and the technique for order preference by similarity to ideal solution (TOPSIS) are capable of ranking multi-criteria factors with interdependencies. However, these techniques often require large data samples or assume precise numerical judgments, which are difficult to obtain in expert-based policy evaluations.

In contrast, the FAHP provides a robust framework to incorporate both expert judgment and uncertainty, allowing for more nuanced weighting of qualitative and quantitative criteria. Its ability to handle ambiguity in human decision-making makes it particularly appropriate for evaluating the complex and subjective nature of tax governance factors in Vietnam's digital economy. Therefore, FAHP was chosen as the most suitable approach for this study.

The methodological framework comprised four main stages: developing a three-level hierarchy from literature and expert input; designing and validating a pairwise comparison survey; collecting and processing expert judgments into fuzzy numbers; and applying three FAHP methods — Buckley, Chang's extent, and alpha-cut — for computation and validation. This research design allows for both analytical rigor and contextual relevance, producing evidence-based insights that can inform digital tax policy reforms and capacity-building strategies within tax authorities and IT enterprises alike.

3.2. Hierarchy development

The hierarchical structure (Figure 1) of the FAHP model comprises three levels: the goal, main criteria, and sub-criteria. The goal is to prioritize the factors influencing tax administration for IT firms. The criteria and sub-criteria are identified through literature synthesis and expert consultation. Table 1 summarizes the hierarchical structure and the academic sources supporting each sub-factor.

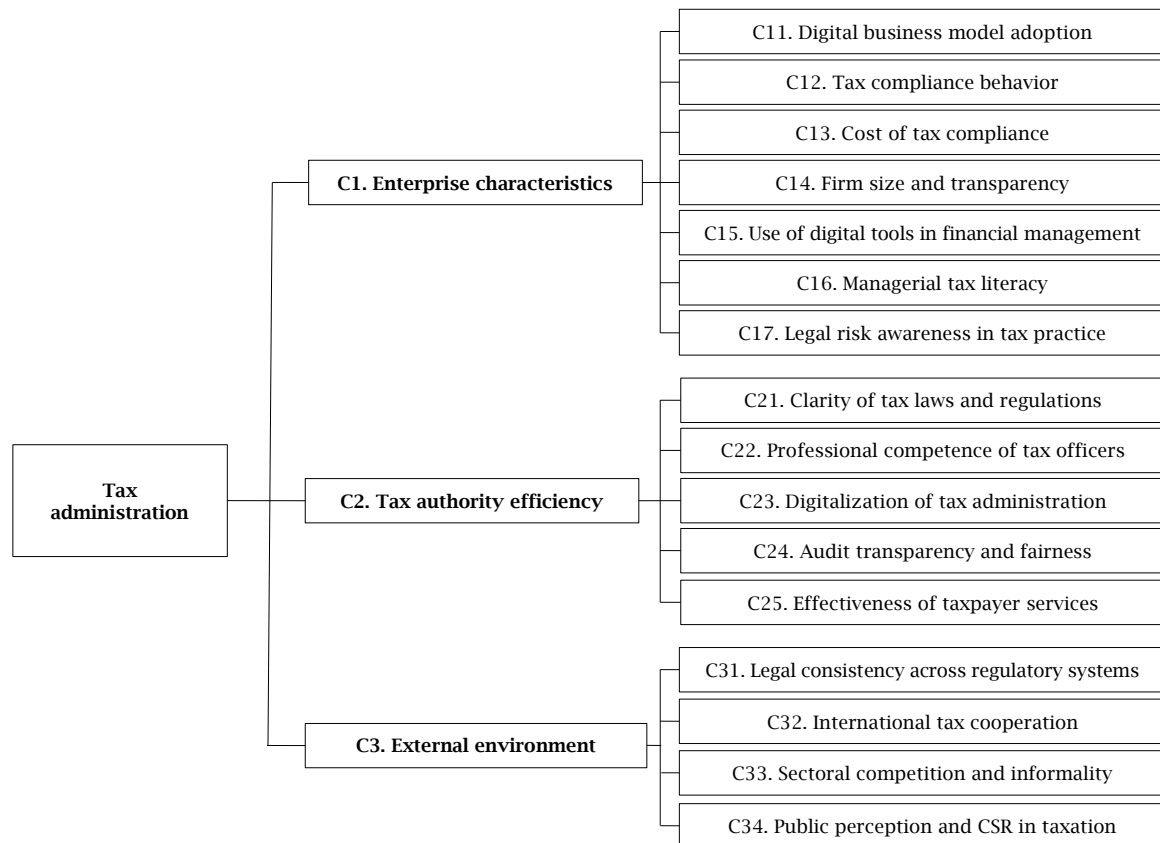
Table 1. Hierarchical structure of factors influencing tax administration for IT enterprises

Main criteria (Code)	Sub-criteria (Code)	Description	Source
C1. Enterprise characteristics	C11. Digital business model adoption	The extent to which firms adopt digital platforms and technologies in their core business operations.	Dhaliwal et al. (2023), Omowole et al. (2024)
	C12. Tax compliance behavior	The degree of voluntary and timely adherence to tax obligations by the enterprise.	Alm (2019), Loo et al. (2012)
	C13. Cost of tax compliance	The financial and administrative burden incurred by firms to fulfill tax-related requirements.	Trang (2024), Mahangila (2017)
	C14. Firm size and transparency	The scale of business operations and the level of financial disclosure and accountability.	Huyen (2024), Saad (2014)
	C15. Use of digital tools in financial management	The integration of digital tools (e.g., e-invoicing, accounting software) in financial and tax processes.	Belahouaoui and Attak (2024), Etim et al. (2020)
	C16. Managerial tax literacy	The tax-related knowledge, awareness, and capabilities of enterprise managers.	Agusti and Rahman (2023), Freudenberg et al. (2017), Kirchler et al. (2008), Munjevi and Schutte (2025)
	C17. Legal risk awareness in tax practice	The degree to which firms identify and manage legal risks associated with tax compliance.	Lipniewicz (2017), Neuman et al. (2020), Rudenko and Pohrishchuk (2024)

Table 1. Hierarchical structure of factors influencing tax administration for IT enterprises (Part 2)

Main criteria (Code)	Sub-criteria (Code)	Description	Source
C2. Tax authority efficiency	C21. Clarity of tax laws and regulations	The perceived consistency, interpretability, and comprehensibility of tax legislation.	Alm and Torgler (2011), Costea et al. (2025)
	C22. Professional competence of tax officers	The skills, ethical standards, and service orientation of tax officials.	Hasibuan et al. (2025), Rokhman and Salman (2024), Yakin (2024)
	C23. Digitalization of tax administration	The adoption of modern information systems and digital platforms in tax administration.	Hesami et al. (2024), Lagodiienko and Yakushko (2021), Rokhman and Salman (2024), Turanboyev and Musabekov (2023)
	C24. Audit transparency and fairness	The perceived integrity, transparency, and impartiality of tax audits and inspections.	Darmayasa and Hardika (2024), Pham et al. (2023)
	C25. Effectiveness of taxpayer services	The accessibility and quality of taxpayer assistance, consultation, and digital services.	Bakar et al. (2022), Hardika et al. (2021), Timothy and Abbas (2021)
C3. External environment factors	C31. Legal consistency across regulatory systems	The alignment and coherence between tax law and other regulatory frameworks.	Nguyen and Luong (2021), Le and Nguyen (2022)
	C32. International tax cooperation	The extent of cross-border coordination in tax policy and information sharing.	Andres et al. (2022), Grau Ruiz (2025)
	C33. Sectoral competition and informality	The level of competition and presence of informal enterprises in the IT sector.	Mehta and Cunningham (2023), Mishra (2022)
	C34. Public perception and corporate social responsibility (CSR) in taxation	The influence of societal expectations and corporate social responsibility on corporate tax behavior and transparency.	Gazzola et al. (2023), Kacem and Brahim Omri (2022), Scarpa et al. (2025), Scarpa and Signori (2023)

Figure 1. Hierarchical structure for evaluating tax administration effectiveness for IT enterprises



3.3. Expert selection and group decision approach

This study employs a group FAHP approach by collecting expert judgments from a panel of 68 professionals with extensive experience in tax administration and policy. The expert panel includes:

- senior tax administrators from the Hanoi Tax Department;

- researchers specializing in tax policy at national research institutes and academic institutions;
- certified public accountants and professional tax consultants;
- financial controllers and tax managers from IT enterprises operating in Hanoi.

Experts were purposefully selected based on their qualifications, which include a minimum of

10 years of experience in tax policy, administration, or corporate tax management, as well as demonstrated familiarity with digital taxation and the Vietnamese tax environment. In the preliminary phase, the Delphi method (Sahoo & Thakur, 2024) was applied to validate and refine the criteria.

Subsequently, participants conducted pairwise comparisons using the FAHP method. Divergent opinions were addressed through moderated group discussions, leading to the development of a consistent and consolidated group judgment matrix.

Table 2. Demographic information of the experts

Demographic variable	Category	Frequency (n)	Percentage (%)
Affiliation	Hanoi Tax Department	26	38.2%
	Academic institutions and research institutes	18	26.5%
	Certified accountants and consultants	12	17.6%
	Financial controllers from IT firms	12	17.6%
Years of experience	10-15 years	24	35.3%
	16-20 years	29	42.6%
	Over 20 years	15	22.1%
Academic qualification	Bachelor's degree	10	14.7%
	Master's degree	42	61.8%
	Doctoral degree	16	23.5%
Familiarity with digital taxation	High	50	73.5%
	Moderate	18	26.5%

3.4. Expert evaluation and fuzzy pairwise comparison process

To elicit expert judgments for the FAHP model, primary data were collected through structured questionnaires designed for pairwise comparison of all criteria and sub-criteria in the hierarchical model. The questionnaire was administered via a combination of direct interviews and on-site surveys to ensure clarity in interpretation and reliability of responses. Data collection was conducted over a five-month period, from March 2025 to July 2025.

A total of 68 experts participated in the survey, representing various stakeholder groups, including senior tax officials, academic researchers in taxation, certified public accountants, and tax professionals from IT enterprises. Following standard AHP

consistency checks (Saaty, 1980), 62 expert responses were retained for further analysis. The remaining six responses were excluded due to consistency ratios exceeding the acceptable threshold (consistency ratio > 0.1), indicating insufficient internal consistency in their judgment matrices.

Each pairwise comparison was based on linguistic assessments of relative importance between two elements. These qualitative judgments – such as equally important, moderately more important, or strongly more important – were systematically converted into triangular fuzzy numbers (TFNs) to address uncertainty and subjectivity in expert evaluations. The conversion followed the fuzzy scale proposed by Buckley (1985) and Van Laarhoven and Pedrycz (1983), as illustrated in Table 3.

Table 3. Fuzzy pairwise comparison scale

Crisp scale	Meaning	Triangular fuzzy scale	Triangular fuzzy reciprocal scale
1	Equally important	(1, 1, 1)	(1, 1, 1)
2	Equally to moderately more important	(1, 2, 3)	(1/3, 1/2, 1)
3	Moderately more important	(2, 3, 4)	(1/4, 1/3, 1/2)
4	Moderately to strongly more important	(3, 4, 5)	(1/5, 1/4, 1/3)
5	Strongly more important	(4, 5, 6)	(1/6, 1/5, 1/4)
6	Strongly to very strongly more important	(5, 6, 7)	(1/7, 1/6, 1/5)
7	Very strongly more important	(6, 7, 8)	(1/8, 1/7, 1/6)
8	Very strongly to extremely more important	(7, 8, 9)	(1/9, 1/8, 1/7)
9	Extremely more important	(9, 9, 9)	(1/9, 1/9, 1/9)

3.5. Fuzzy analytic hierarchy process computation

Fuzzy pairwise comparison matrices were first collected from individual experts using TFNs to represent the linguistic assessments. These individual matrices were then aggregated into a single group matrix through the geometric mean method, ensuring a coherent and representative synthesis of expert opinions.

Data processing was conducted using a combination of tools: Microsoft Excel was used for structuring the matrices and performing consistency

checks, while Python – with libraries such as NumPy, Pandas, and scikit-fuzzy – was utilized for fuzzy arithmetic operations, defuzzification procedures, and alpha-cut sensitivity analysis.

4. RESULTS

Tables 4-6 present the fuzzy weights (TFNs) and the corresponding defuzzified weights of the three main criteria using Buckley's method, Chang's Extent method, and alpha-cut method, respectively.

Table 4. Priority weights of main criteria using Buckley’s method

Code	Main criteria	Fuzzy weight	Defuzzified weight	Ranking
C1	Enterprise characteristics	(0.190, 0.330, 0.571)	0.3466	2
C2	Tax authority efficiency	(0.307, 0.508, 0.794)	0.522	1
C3	External environment factors	(0.102, 0.162, 0.306)	0.1761	3

Table 5. Priority weights of main criteria using Chang’s extent method

Code	Main criteria	Fuzzy weight	Defuzzified weight	Ranking
C1	Enterprise characteristics	(0.173, 0.328, 0.605)	0.3482	2
C2	Tax authority efficiency	(0.286, 0.510, 0.862)	0.5311	1
C3	External environment factors	(0.108, 0.163, 0.298)	0.176	3

Table 6. Priority weights of main criteria using the alpha-cut method ($\alpha = 0.3, 0.5, 0.7$)

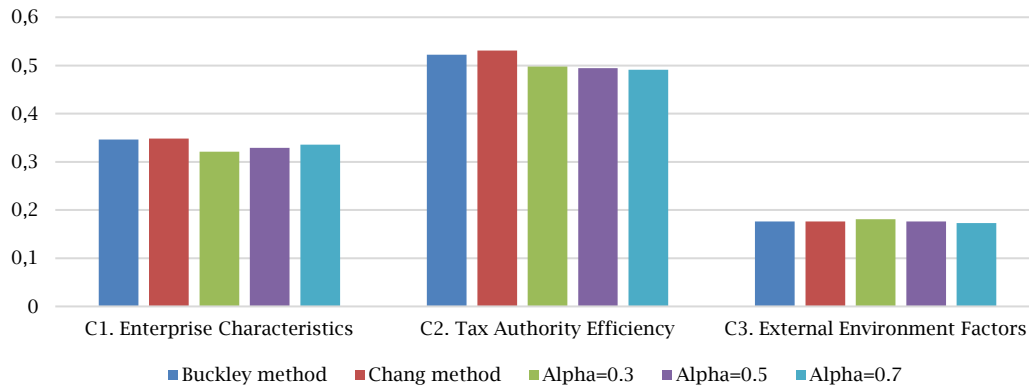
Code	Main criteria	$\alpha = 0.3$	$\alpha = 0.5$	$\alpha = 0.7$	Rank
C1	Enterprise characteristics	0.3213	0.3292	0.3355	2
C2	Tax authority efficiency	0.4976	0.4942	0.4914	1
C3	External environment factors	0.1811	0.1766	0.173	3

Figure 2 provides a comparative visualization of the defuzzified priority weights assigned to the three main criteria – *enterprise characteristics* (C1), *tax authority efficiency* (C2), and *external environment factors* (C3) – using three different FAHP methods: Buckley’s method, Chang’s extent analysis, and the alpha-cut method at varying α levels (0.3, 0.5, and 0.7). Across all methods, *tax authority efficiency* (C2) consistently emerges as the most influential factor, followed by *enterprise characteristics* (C1), and lastly, *external environment factors* (C3). This consistency across computational

approaches reinforces the robustness of the ranking results and highlights the critical role of institutional performance and capacity in enhancing tax administration for IT enterprises.

The evaluation of the three main criteria – *enterprise characteristics* (C1), *tax authority efficiency* (C2), and *external environment factors* (C3) – across Buckley’s method, Chang’s extent analysis, and the alpha-cut method (with $\alpha = 0.3, 0.5,$ and 0.7) reveals a striking convergence in ranking outcomes, despite methodological differences in fuzzy processing.

Figure 2. Comparison of priority weights for main criteria across FAHP methods



The priority weights of the sub-criteria under each main criterion were computed using Buckley’s FAHP method. First, fuzzy local weights of each sub-criterion were derived based on expert judgments. Then, these were multiplied by

the defuzzified weight of the corresponding main criterion to obtain global weights. The global weights reflect the relative importance of sub-criteria in the overall structure (Table 7).

Table 7. Buckley’s method – Priority weights of sub-criteria

Code	Sub-criteria	Local weight	Global weight	Ranking
C11	Digital business model adoption	0.079	0.028	14
C12	Tax compliance behavior	0.152	0.053	10
C13	Cost of tax compliance	0.185	0.064	8
C14	Firm size and transparency	0.128	0.044	11
C15	Use of digital tools in financial management	0.039	0.013	16
C16	Managerial tax literacy	0.239	0.083	4
C17	Legal risk awareness in tax practice	0.212	0.074	6
C21	Clarity of tax laws and regulations	0.334	0.175	1
C22	Professional competence of tax officers	0.278	0.145	2
C23	Digitalization of tax administration	0.157	0.082	5
C24	Audit transparency and fairness	0.199	0.104	3
C25	Effectiveness of taxpayer services	0.071	0.037	13
C31	Legal consistency across regulatory systems	0.331	0.058	9
C32	International tax cooperation	0.215	0.038	12
C33	Sectoral competition and informality	0.382	0.067	7
C34	Public perception and CSR in taxation	0.108	0.019	15

Using Chang’s extent analysis, the local weights of sub-criteria were computed from fuzzy synthetic extent values. These local weights were multiplied by

the defuzzified main criterion weights obtained from Chang’s method to yield the global weights. The results are shown in Table 8.

Table 8. Chang’s method – Priority weights of sub-criteria

Code	Sub-criteria	Local weight	Global weight	Ranking
C11	Digital business model adoption	0.079	0.027	14
C12	Tax compliance behavior	0.151	0.053	10
C13	Cost of tax compliance	0.180	0.063	8
C14	Firm size and transparency	0.125	0.043	11
C15	Use of digital tools in financial management	0.039	0.014	16
C16	Managerial tax literacy	0.249	0.087	4
C17	Legal risk awareness in tax practice	0.219	0.076	6
C21	Clarity of tax laws and regulations	0.346	0.184	1
C22	Professional competence of tax officers	0.278	0.148	2
C23	Digitalization of tax administration	0.152	0.081	5
C24	Audit transparency and fairness	0.200	0.106	3
C25	Effectiveness of taxpayer services	0.072	0.038	12
C31	Legal consistency across regulatory systems	0.325	0.057	9
C32	International tax cooperation	0.215	0.038	13
C33	Sectoral competition and informality	0.401	0.071	7
C34	Public perception and CSR in taxation	0.108	0.019	15

To examine how the level of fuzziness influences the priority weights, we applied the alpha-cut method with three confidence levels: $\alpha = 0.3$, $\alpha = 0.5$, and $\alpha = 0.7$. Each alpha-cut transforms the fuzzy triangular weights into crisp

values by narrowing the fuzzy intervals according to the decision-makers’ risk tolerance. Table 9 displays the fuzzy weights (l, m, u) of each sub-criterion and their corresponding defuzzified global weights under all three alpha levels.

Table 9. Global weights of sub-criteria using the alpha-cut method ($\alpha = 0.3, 0.5, 0.7$)

Code	Sub-criteria	$\alpha = 0.3$		$\alpha = 0.5$		$\alpha = 0.7$		Rank
		Local weight	Global weight	Local weight	Global weight	Local weight	Global weight	
C11	Digital business model adoption	0.074	0.024	0.078	0.026	0.082	0.028	14
C12	Tax compliance behavior	0.146	0.047	0.146	0.048	0.145	0.049	10
C13	Cost of tax compliance	0.174	0.056	0.171	0.056	0.169	0.057	8
C14	Firm size and transparency	0.118	0.038	0.121	0.040	0.124	0.042	11
C15	Use of digital tools in financial management	0.040	0.013	0.039	0.013	0.039	0.013	16
C16	Managerial tax literacy	0.237	0.076	0.236	0.078	0.236	0.079	4
C17	Legal risk awareness in tax practice	0.211	0.068	0.208	0.068	0.206	0.069	6
C21	Clarity of tax laws and regulations	0.325	0.162	0.326	0.161	0.327	0.161	1
C22	Professional competence of tax officers	0.265	0.132	0.262	0.129	0.260	0.128	2
C23	Digitalization of tax administration	0.143	0.071	0.148	0.073	0.152	0.075	5
C24	Audit transparency and fairness	0.194	0.097	0.192	0.095	0.190	0.094	3
C25	Effectiveness of taxpayer services	0.073	0.036	0.072	0.036	0.071	0.035	13
C31	Legal consistency across regulatory systems	0.310	0.056	0.305	0.054	0.301	0.052	9
C32	International tax cooperation	0.200	0.036	0.209	0.037	0.216	0.037	12
C33	Sectoral competition and informality	0.380	0.069	0.377	0.067	0.376	0.065	7
C34	Public perception and CSR in taxation	0.111	0.020	0.109	0.019	0.108	0.019	15

Figure 3 illustrates the global priority weights of the 16 sub-criteria derived from the three FAHP approaches — Buckley’s method, Chang’s extent analysis, and the alpha-cut method ($\alpha = 0.3, 0.5$, and 0.7). The comparison shows a high level of consistency in the ranking of sub-criteria across methods. Notably, clarity of tax laws and regulations (C21), professional competence of tax officers (C22), and audit transparency and fairness (C24) are consistently identified as the top three sub-criteria, highlighting the critical role of institutional quality in tax administration. Enterprise-side factors such as managerial tax literacy (C16) and legal risk

awareness in tax practice (C17) also rank highly, reinforcing the importance of both administrative capacity and taxpayer capability. The figure confirms the robustness of the findings and provides a clear basis for prioritizing policy interventions.

The comparison of sub-criteria rankings across the three FAHP approaches — Buckley’s method, Chang’s extent analysis, and the alpha-cut method ($\alpha = 0.3, 0.5, 0.7$) — reveals a high level of consistency in the identification of the most critical factors influencing tax administration effectiveness.

Notably, clarity of tax laws and regulations (C21), professional competence of tax officers (C22), and audit transparency and fairness (C24) are consistently ranked within the top three across all methods and alpha levels. This convergence strongly reinforces the centrality of institutional quality and procedural fairness as drivers of compliance, irrespective of the computational nuances of each method.

Similarly, enterprise-level factors such as managerial tax literacy (C16) and legal risk awareness in tax practice (C17) also show stable upper-middle rankings, highlighting their importance in complementing institutional efforts. These sub-criteria demonstrate only minor variation in defuzzified global weights ($\pm 0.01-0.02$), indicating a shared expert perception about their relative importance.

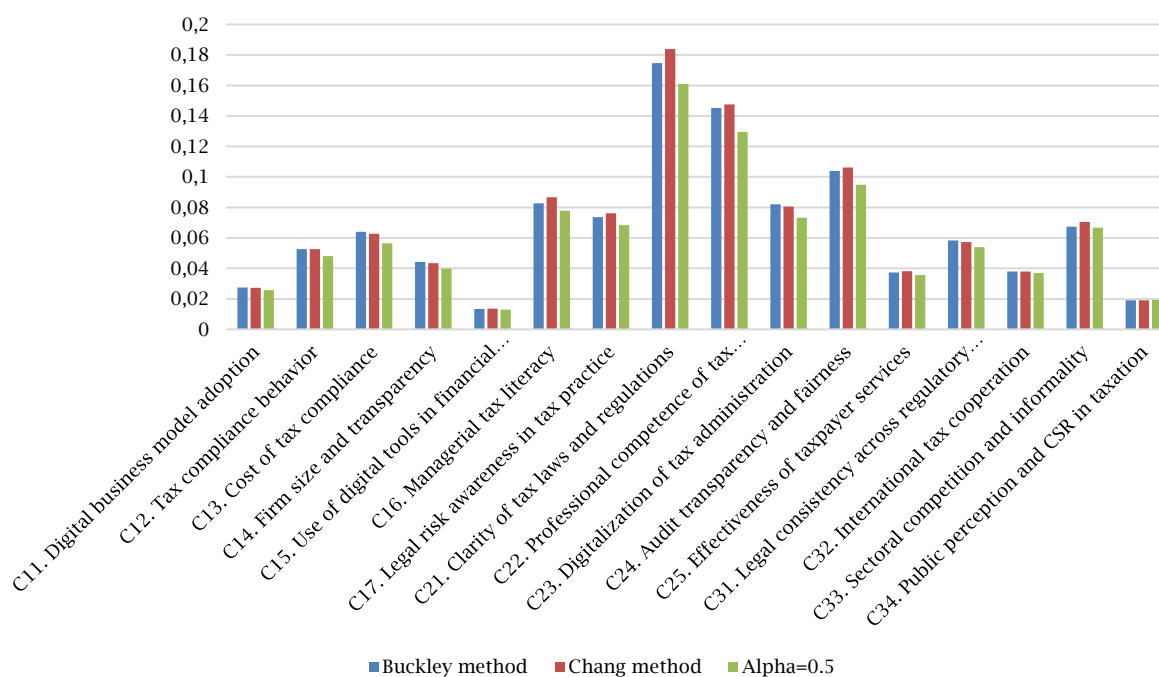
In contrast, sub-criteria like use of digital tools in financial management (C15) and digital business model adoption (C11) consistently occupy the lower

ranks. This suggests that while these elements reflect digital maturity, they are not perceived as primary enablers of tax compliance without the presence of strong governance and human capital factors.

One interesting observation is the slight fluctuation in rankings under different alpha levels in the alpha-cut method — for instance, the global weight of audit transparency and fairness (C24) shows a small but consistent decline as alpha increases, indicating that confidence levels can modestly influence ranking stability. However, such differences do not alter the overall hierarchy of priorities.

Overall, the high degree of alignment between methods enhances the robustness and reliability of the results, offering a credible foundation for policy prioritization. It also validates the suitability of applying multiple FAHP techniques in tandem to triangulate expert judgments under uncertainty.

Figure 3. Comparison of global weights for sub-criteria under FAHP methods



5. DISCUSSIONS

The results of the FAHP analysis offer critical insights for enhancing tax administration in Hanoi's dynamic IT sector. Across all three computational techniques — Buckley's method, Chang's extent analysis, and the alpha-cut method — tax authority efficiency (C2) consistently emerged as the dominant determinant, reinforcing the strategic role of public institutions in shaping tax compliance outcomes in digitally intensive industries.

Among sub-criteria, clarity of tax laws and regulations (C21), professional competence of tax officers (C22), and audit transparency and fairness (C24) ranked highest. These findings indicate that institutional credibility and procedural integrity are central to building a tax environment where IT enterprises perceive compliance as both necessary

and feasible. For example, ambiguities in tax regulations for cross-border software services or cloud subscriptions often deter compliance, while frequent regulatory changes without corresponding capacity-building for officers can lead to inconsistent enforcement. Therefore, legal codification efforts should focus not only on completeness but also on interpretability and stability of tax provisions relevant to digital transactions.

At the enterprise level, managerial tax literacy (C16) and legal risk awareness in tax practice (C17) were also highly ranked, suggesting that internal capacity within firms significantly affects voluntary compliance. In practice, many Vietnamese IT enterprises — particularly start-ups and SMEs — lack in-house tax professionals or rely on outdated compliance procedures. Targeted capacity-building

interventions, such as digital tax clinics, peer-learning networks, and regulatory sandboxing initiatives, can equip firm managers with the knowledge and tools to assess tax risks accurately and engage constructively with tax authorities.

Interestingly, technology-related variables such as the use of digital tools in financial management (C15) and digital business model adoption (C11) received lower weights. This implies that digitalization, while a structural enabler, is not a direct predictor of compliance. Instead, how both public institutions and private firms adapt to the digital context — through regulation, training, and mindset shift — determines the actual outcomes. This nuance highlights the danger of over-reliance on e-tax platforms or automation without accompanying behavioral and institutional reforms.

Comparing these findings to international studies, such as those in Nigeria (Oladipo et al., 2022) and Hungary (Gangl et al., 2020), reaffirms that tax authority performance is a universal driver of compliance, but the Vietnamese case adds the unique dimension of rapid digital transformation under institutional constraints. As such, a one-size-fits-all policy approach is insufficient. Instead, a dual pathway strategy — simultaneously enhancing regulatory capacity and enterprise engagement — is essential for sustainable tax governance in the digital economy.

Beyond its empirical findings, this study contributes to the theoretical discourse on tax administration and compliance in the digital economy in several important ways.

First, it extends the “institutional-behavioral” framework of tax compliance (Kirchler et al., 2008; Alm & Torgler, 2011) by demonstrating that digital transformation reshapes the interaction between institutional capacity and enterprise behavior. The results suggest that compliance effectiveness in IT enterprises depends not only on taxpayer attitudes but also on the synergistic alignment between regulatory clarity, officer competence, and managerial literacy — thereby advancing the understanding of compliance as a co-produced outcome rather than a unilateral administrative process.

Second, by employing the FAHP, the study enriches decision-theoretic approaches to tax administration research. It shows that fuzzy multi-criteria methods can systematically capture uncertainty and subjectivity in expert judgment, offering a theoretical bridge between cognitive decision models and administrative evaluation frameworks in public finance.

Finally, the study contributes to emerging digital governance theories by illustrating how institutional performance mediates the relationship between technological readiness and compliance outcomes. These findings nuance existing assumptions in e-government and digital taxation literature, which often treats digitalization as an automatic driver of efficiency, highlighting instead the theoretical need to account for human and organizational capabilities within digital systems.

6. CONCLUSION

This study set out to identify and prioritize the factors influencing tax administration effectiveness for IT enterprises in Hanoi — a sector at the forefront of Vietnam’s digital economy. Using a robust FAHP framework, the research delivers a multi-dimensional ranking of institutional, behavioral, and contextual factors shaping tax compliance outcomes.

The key finding is unequivocal: tax authority efficiency, particularly the clarity of regulations, officer competence, and audit transparency, is the most critical enabler of effective tax administration. These institutional qualities directly affect how IT firms perceive the tax system’s fairness and operability, which in turn shapes their compliance behavior. Accordingly, tax authorities should prioritize:

- legal codification initiatives that reduce ambiguity in rules related to intangible assets, platform-based revenues, and cross-border digital services;
- professional training programs for tax officers that integrate digital economy principles, platform economics, and client-centric service delivery;
- audit reforms that increase transparency and standardize procedures across cases to minimize discretion and build taxpayer trust.

On the enterprise side, high-ranked sub-criteria such as managerial tax literacy and legal risk awareness highlight the need for taxpayer empowerment strategies. These include:

- customized tax education programs for IT entrepreneurs and SMEs;
- guidelines tailored to common digital business models (e.g., SaaS, subscription services);
- online diagnostic tools for self-assessment of tax compliance risks.

While digital transformation is often assumed to improve tax administration, the results caution against techno-solutionism. Variables related to digital tool usage received relatively low importance scores, implying that technology is necessary but not sufficient. Effective governance requires integrating technological platforms with institutional readiness and taxpayer capacity.

By focusing on Vietnam’s IT sector within the broader Southeast Asian context, this research contributes region-specific evidence to the global discourse on digital taxation, highlighting how administrative efficiency and enterprise capability interact under rapid digitalization.

Theoretically, the study expands the tax compliance literature by integrating institutional capacity and digital transformation within a unified analytical hierarchy. It demonstrates that administrative performance and managerial literacy jointly underpin effective tax governance, providing a conceptual lens applicable to other developing digital economies. Furthermore, by integrating governance and regulatory perspectives, the study reframes tax administration as a component of broader tax governance, where institutional design, enforcement mechanisms, and taxpayer engagement interact dynamically. This lens contributes to the journal’s discourse on governance and regulation, particularly within emerging digital

economies. From a policy design perspective, these insights offer a practical roadmap for Hanoi's tax administrators and broader fiscal policy makers across Vietnam and Southeast Asia. Future research should extend this framework to other sectors undergoing digital transition and incorporate causal modeling (e.g., DEMATEL, ANP) to unpack interdependencies between institutional, behavioral, and environmental factors.

By advancing a structured, evidence-based understanding of the drivers of effective tax governance, the study contributes not only to academic discourse on digital taxation but also to the development of smarter, fairer, and more resilient tax systems in the 21st-century economy.

Despite its contributions, this study has several limitations that provide opportunities for further research. First, the use of expert-based judgments in the FAHP approach, while valuable for capturing qualitative insights, may introduce subjectivity that

could differ across contexts or over time. Expanding the expert sample and integrating quantitative performance indicators would enhance the robustness of the results. Second, the study focuses on IT enterprises in Hanoi, which may limit the generalizability of findings to other sectors or regions in Vietnam. Comparative studies across provinces or within ASEAN countries could offer a broader understanding of tax governance dynamics in digital economies.

Future research could also combine FAHP with advanced analytical techniques such as SEM, machine learning, or fuzzy-TOPSIS to validate the ranking of determinants and explore causal mechanisms. By addressing these limitations, subsequent studies can deepen the theoretical and practical understanding of tax governance and its implications for sustainable fiscal policy in the digital era.

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