

Developing an Integrated Framework for Managing the Technical and Implementation Challenges of Value-Added Tax Administration within Iran's Taxpayer System

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Abstract: This study aimed to develop and empirically validate an integrated framework for managing the technical and implementation challenges of value-added tax administration within Iran's Taxpayer System. This study employed an exploratory sequential mixed-methods design. In the qualitative phase, semi-structured interviews were conducted with 18 experts in taxation, accounting, the Taxpayer System, financial management, and tax-related information technology using purposive sampling until thematic saturation was achieved. The qualitative data were analyzed through thematic analysis and used to identify the principal dimensions and components of the conceptual framework. In the quantitative phase, a researcher-made questionnaire derived from the qualitative findings was administered to 250 tax experts, taxpayers, accounting and auditing professionals, financial specialists, and technical professionals familiar with the Taxpayer System. Content, construct, and convergent validity were examined, while reliability was assessed using Cronbach's alpha and composite reliability. Quantitative data were analyzed using SPSS and structural equation modeling. The structural model demonstrated acceptable fit indices ($\chi^2/df = 2.41$, RMSEA = 0.075, SRMR = 0.054, CFI = 0.936, TLI = 0.928, IFI = 0.937, NFI = 0.914). Technical infrastructure challenges ($\beta = 0.34$, $p < 0.001$), executive and procedural challenges ($\beta = 0.29$, $p < 0.001$), human and organizational readiness ($\beta = 0.25$, $p < 0.001$), and taxpayer-centered challenges ($\beta = 0.27$, $p < 0.001$) significantly predicted integrated management capacity. Technical infrastructure challenges ($\beta = -0.23$), executive and procedural challenges ($\beta = -0.28$), and taxpayer-centered challenges ($\beta = -0.19$) negatively predicted implementation effectiveness, whereas human and organizational readiness positively predicted it ($\beta = 0.21$); all effects were significant at $p < 0.001$. Integrated management capacity was the strongest positive predictor of implementation effectiveness ($\beta = 0.48$, $p < 0.001$). The model explained 57% of the variance in integrated management capacity and 63% of the variance in implementation effectiveness. Effective VAT administration within Iran's Taxpayer System requires an integrated governance approach that simultaneously addresses technical infrastructure, procedural complexity, organizational readiness, taxpayer heterogeneity, stakeholder coordination, and adaptive management.

Keywords: Value-Added Tax, Taxpayer System, Tax Administration, Digital Taxation, Technical Challenges, Implementation Challenges, Integrated Management, Structural Equation Modeling.

1. Introduction

Value-added tax (VAT) has become one of the most widely used forms of indirect taxation because of its broad tax base, revenue-generating capacity, relative neutrality across production stages, and compatibility with modern

fiscal administration. Unlike turnover taxes that may generate cascading effects, VAT is typically structured to tax the incremental value created at successive stages of production and distribution while allowing taxpayers to credit the tax paid on eligible inputs. This mechanism has made VAT an important source of public revenue and a central component of fiscal systems in many countries. Its significance extends beyond revenue generation, however, because the effectiveness of VAT administration can influence transparency, taxpayer behavior, business formalization, regional development, and the broader capacity of governments to finance economic and social objectives. Evidence from different national contexts indicates that VAT performance can be closely connected to macroeconomic conditions and public development outcomes, although these effects are contingent upon the quality of tax policy design and administrative implementation [1-3].

The macroeconomic importance of VAT makes the quality of its implementation particularly consequential. When the system functions efficiently, VAT can provide a relatively stable revenue stream, expand the formal tax base, and support public expenditure. At the same time, poorly designed or weakly implemented VAT arrangements can increase compliance costs, distort business behavior, generate administrative disputes, and create unintended inflationary or distributional effects. In the Iranian context, the relationship between value-added taxation and macroeconomic variables has also been examined, highlighting the need to evaluate VAT not merely as a legal tax instrument but as a system whose practical functioning can influence economic outcomes [3]. This perspective is particularly important because the operational performance of VAT depends on how effectively tax rules are translated into registration, invoicing, reporting, payment, verification, audit, refund, and data-management processes.

The growing digitalization of tax administration has fundamentally transformed these processes. Tax authorities increasingly rely on electronic taxpayer identification, real-time or near-real-time invoicing, automated data matching, digital filing, risk-based audit systems, and integrated databases to improve the accuracy and efficiency of tax collection. These developments have shifted VAT administration from a primarily document-based and retrospective model toward a technology-intensive system in which compliance information can be captured, validated, and compared electronically. In Iran, the Taxpayer System represents a major component of this digital transformation. Its implementation has been intended to increase transparency, facilitate electronic invoicing, improve the traceability of transactions, strengthen tax supervision, and reduce opportunities for concealment or manipulation of taxable activity. Accordingly, the Taxpayer System should be understood not simply as a technical platform, but as an institutional infrastructure through which legal, financial, informational, and administrative processes are increasingly integrated [4].

The potential benefits of digital tax systems are substantial, but their implementation also introduces a new layer of complexity. The effectiveness of an electronic VAT system depends simultaneously on technological reliability, regulatory clarity, organizational readiness, taxpayer capabilities, information quality, software interoperability, cybersecurity, administrative coordination, and the availability of professional and technical support. A technically sophisticated system may still perform poorly if taxpayers cannot use it effectively, if accounting systems are incompatible with it, if regulatory instructions are unclear, or if administrative units apply procedures inconsistently. Conversely, strong legal rules alone cannot ensure implementation success in the absence of stable digital infrastructure and reliable information exchange. This interdependence suggests that the challenges of electronic VAT administration are systemic rather than isolated and therefore require an integrated analytical and managerial approach [4, 5].

A major concern in this regard is the technical infrastructure required to support digital VAT administration. Electronic invoicing and taxpayer reporting depend on stable servers, adequate processing capacity, secure databases, reliable communication networks, and effective interoperability between tax platforms and the accounting systems used by firms. System interruptions, slow processing, data synchronization problems, incompatible software, weak interfaces, and inadequate technical support can undermine confidence in electronic tax administration and increase the operational burden placed on taxpayers. These problems become especially significant when businesses are legally required to submit information electronically within specified timeframes. Technical failures may therefore produce not only inconvenience but also compliance risks, financial penalties, and disputes concerning responsibility for delayed or incorrect reporting. The rapid expansion of advanced digital technologies in taxation has consequently generated growing interest in how technologies such as artificial intelligence and blockchain can improve the reliability, automation, traceability, and fraud-detection capacity of VAT systems [6, 7].

Artificial intelligence, for example, offers the possibility of using large volumes of taxpayer and transaction data for classification, anomaly detection, audit selection, and identification of suspicious patterns. Automated systems may reduce the dependence of tax authorities on manual review and enable more targeted compliance interventions. Research on artificial intelligence systems for VAT collection has demonstrated the potential of computational techniques to improve the organization and analysis of tax information [6]. Nevertheless, the incorporation of advanced technologies also creates implementation challenges related to data quality, system architecture, transparency, technical competence, and institutional trust. Consequently, technology should not be treated as an autonomous solution; its effectiveness depends on the institutional and operational context into which it is introduced.

Blockchain technology has attracted particular attention in VAT administration because of its potential to improve traceability, reduce information asymmetry, strengthen transaction verification, and provide tamper-resistant records. Research has examined blockchain-based VAT systems both conceptually and empirically, emphasizing their potential role in improving transparency and reducing fraud while also noting the technical, legal, organizational, and governance barriers that may constrain implementation [7, 8]. Systematic assessments of blockchain applications in VAT environments indicate that successful adoption requires more than technological feasibility. Interoperability, regulatory compatibility, governance arrangements, infrastructure preparedness, stakeholder acceptance, and data-management standards all influence whether such technologies can be effectively incorporated into tax administration [8].

Comparable findings have emerged from research in other jurisdictions. Studies of blockchain adoption in VAT systems have identified a combination of technological, organizational, environmental, regulatory, and strategic factors that shape implementation success. Evidence from Indonesia, for instance, suggests that technological readiness and organizational capability must be accompanied by appropriate institutional support and coordinated implementation strategies [9]. Similarly, research on the critical factors influencing blockchain adoption in VAT systems has emphasized the importance of technological maturity, compatibility, stakeholder readiness, and governance conditions [10]. These findings reinforce the argument that digital tax reform cannot be reduced to the acquisition or deployment of new technology. Instead, it requires the alignment of technological systems with organizational processes, taxpayer behavior, professional practices, and public policy structures.

This issue is particularly relevant in VAT because compliance depends heavily on taxpayers' ability and willingness to operate within the administrative system. Tax compliance is influenced not only by enforcement and

the probability of detection but also by perceived fairness, trust in government, procedural clarity, and the costs associated with meeting tax obligations. Experimental evidence has shown that trust in government and compliance costs can significantly shape VAT compliance behavior, suggesting that administrative systems that are perceived as expensive, complex, or burdensome may weaken voluntary compliance even when enforcement mechanisms are strong [11]. In an electronic VAT environment, compliance costs may include not only financial payments but also the costs of software adaptation, professional consultation, employee training, information preparation, technological infrastructure, and the time required to resolve system errors.

The diversity of taxpayers further complicates the implementation of digital VAT systems. Large corporations may possess sophisticated accounting departments, integrated enterprise software, and access to professional tax advisors, while small and medium-sized enterprises may operate with limited technical resources and lower levels of digital preparedness. A uniform electronic compliance framework can therefore create unequal burdens across taxpayer groups. This concern is particularly important from the perspective of tax justice. A tax system should not only collect revenue efficiently but should also avoid imposing disproportionate procedural and compliance burdens on taxpayers with weaker technological or organizational capacity. Justice-oriented assessments of tax systems therefore require attention to the relationship between legal tax obligations and taxpayers' actual ability to comply with them [12].

The broader political and institutional environment also shapes VAT implementation. Tax policy is not developed or administered in a vacuum; it reflects political priorities, administrative structures, institutional bargaining, and relationships between governments and taxpayers. Analysis of VAT policy in Ghana, for example, demonstrates the political dimensions of VAT design and implementation and shows that tax reforms may be influenced by institutional and political considerations beyond purely technical efficiency [13]. Such findings are relevant to the Iranian context because the success of the Taxpayer System depends on coordination among tax authorities, businesses, accounting professionals, technology providers, policymakers, and other institutional actors. Where responsibilities are fragmented or regulations are interpreted inconsistently, technological modernization may fail to produce the expected improvements in tax administration.

Regulatory complexity becomes even more important as economic activity increasingly includes digital assets and technologically mediated transactions. The development of cryptocurrencies and other digital financial instruments has created new questions regarding VAT classification, taxable events, transaction identification, and regulatory oversight. European regulatory discussions concerning VAT and cryptocurrency speculation illustrate how technological change can challenge conventional tax categories and require adaptation of existing legal frameworks [14, 15]. Although the specific institutional context differs from Iran, these studies demonstrate a broader principle: tax administration must continuously adapt to technological innovation, and the effectiveness of such adaptation depends on coordination between legal rules, digital infrastructure, and enforcement mechanisms.

The need for adaptability is also evident in emerging conceptual approaches to VAT administration. Rather than treating the VAT system as a static set of rules and procedures, recent research has emphasized the value of viewing it as an ecosystem composed of interacting legal, technological, organizational, economic, and stakeholder elements. An agile VAT ecosystem requires the capacity to respond to changing regulations, technological developments, taxpayer needs, and operational risks. A model developed through grounded theory and interpretive structural modeling has highlighted the importance of agility, coordination, adaptability, and structured relationships among the components of VAT administration [5]. Such an ecosystem perspective is

especially relevant to the Iranian Taxpayer System because the implementation challenges observed in electronic VAT administration often arise from interactions among multiple components rather than from the failure of a single element.

The significance of effective VAT administration should also be considered in relation to broader economic and development objectives. Tax revenue can support public investment, social services, and regional development when it is efficiently collected and allocated. Evidence from Nigeria indicates that VAT revenue transfers can influence regional social development, illustrating the connection between tax administration and broader societal outcomes [1]. Likewise, VAT has been examined as a contributor to economic development, although its effects depend on the quality of fiscal institutions and the way tax revenue is managed [2]. These considerations suggest that improving VAT administration is not solely an administrative objective; it can contribute to fiscal stability, public accountability, and development capacity.

At the same time, effective taxation operates within a broader economic environment that includes employment, entrepreneurship, production, and regional economic disparities. Research on entrepreneurship and employment across Iranian provinces has demonstrated the importance of structural and regional economic conditions in shaping economic outcomes [16]. Although this work does not directly examine VAT implementation, it underscores the heterogeneity of the economic environment within which tax policies are applied. Taxpayers operating in different provinces, sectors, and organizational settings may face very different levels of access to technology, professional expertise, financial resources, and institutional support. Consequently, an integrated framework for VAT implementation should be sufficiently flexible to account for diverse taxpayer capacities and regional economic realities.

Taken together, the literature indicates that contemporary VAT administration is increasingly shaped by the interaction of fiscal policy, digital technology, regulatory design, taxpayer behavior, organizational readiness, and governance capacity. Studies of digital transformation in Iran highlight the central role of the Taxpayer System in modernizing VAT administration while simultaneously revealing important technical and implementation requirements [4]. Research on blockchain and artificial intelligence demonstrates the potential of advanced technologies to improve transaction traceability, data analysis, and administrative efficiency, but also shows that technological solutions require organizational, legal, and strategic readiness [6-10]. Research on taxpayer compliance further emphasizes that trust, administrative burden, and compliance costs influence taxpayer responses to VAT systems [11], while justice-oriented perspectives highlight the importance of ensuring that tax administration does not impose disproportionate burdens on different taxpayer groups [12].

Despite these contributions, an important gap remains. Much of the existing literature examines individual dimensions of VAT administration separately, focusing on technological innovation, compliance behavior, economic consequences, regulatory issues, or specific administrative reforms. This fragmented approach provides valuable knowledge about individual challenges but is less effective in explaining how these challenges interact during the practical implementation of an electronic VAT system. For Iran's Taxpayer System, technical instability may interact with procedural complexity, regulatory ambiguity may intensify taxpayer confusion, weak organizational preparedness may amplify software problems, and inadequate stakeholder communication may reduce the effectiveness of otherwise appropriate technological reforms. An integrated framework is therefore needed to identify these interdependencies and to clarify the managerial mechanisms through which technical and executive challenges can be addressed simultaneously.

Such a framework should also distinguish between the existence of implementation challenges and the capacity of the tax administration to manage them. Technical problems, procedural difficulties, differences in taxpayer capabilities, and organizational limitations may not be fully eliminable, particularly during periods of digital transformation. The critical question is therefore whether institutional mechanisms exist to identify problems rapidly, coordinate technical and regulatory responses, communicate effectively with taxpayers, provide targeted support, monitor implementation outcomes, and adapt procedures as new difficulties emerge. This distinction is consistent with the concept of agile and adaptive VAT administration, in which system performance depends not only on the absence of problems but also on the capacity to respond to them effectively [5].

Accordingly, the present study seeks to bridge the gap between fragmented analyses of VAT implementation and a comprehensive management perspective. By combining qualitative insights from experts with quantitative validation among tax specialists, taxpayers, accounting professionals, and technical stakeholders, the study conceptualizes VAT implementation as a multidimensional system involving technical infrastructure challenges, executive and procedural challenges, human and organizational readiness, taxpayer-centered challenges, and integrated management capacity. This approach enables the identification of both the principal barriers affecting implementation and the managerial mechanisms capable of mitigating their consequences. It also provides a basis for evaluating how coordinated governance, continuous monitoring, stakeholder communication, organizational preparedness, and adaptive implementation can contribute to greater effectiveness of value-added tax administration within Iran's Taxpayer System.

Therefore, the aim of this study was to develop and empirically validate an integrated framework for managing the technical and implementation challenges of value-added tax administration within Iran's Taxpayer System.

2. Methods and Materials

This study employed an exploratory sequential mixed-methods design to develop and empirically evaluate an integrated framework for managing the technical and implementation challenges associated with value-added tax administration within Iran's Taxpayer System. The use of an exploratory mixed-methods approach was considered appropriate because the technical, organizational, administrative, and operational challenges associated with implementing value-added tax through an electronic taxpayer platform constitute a multidimensional phenomenon that cannot be adequately understood through quantitative measurement alone. Accordingly, the research was conducted in two consecutive phases. The first phase was qualitative and focused on identifying, exploring, and organizing the principal dimensions, components, challenges, and managerial requirements associated with the implementation of value-added tax in the context of Iran's Taxpayer System. The findings generated during this phase provided the conceptual foundation for the development of the quantitative measurement instrument and the subsequent empirical assessment of the proposed framework. The second phase was quantitative and was designed to examine the validity of the identified dimensions and components and to evaluate the relationships among the constructs incorporated into the conceptual framework.

In the qualitative phase, the study population consisted of experts and professionals with specialized knowledge and practical experience in taxation, accounting, value-added tax, the Taxpayer System, electronic taxation, and tax-related information technology. Participants were selected through purposive sampling because the purpose of this phase was to obtain information-rich perspectives from individuals capable of providing detailed insights into the technical and implementation challenges of the Taxpayer System. Eligibility criteria included relevant academic or professional expertise, substantial experience in taxation or related financial and technological fields,

practical familiarity with value-added tax processes, and sufficient knowledge of the structure, operation, requirements, or implementation of Iran's Taxpayer System. Particular attention was given to recruiting participants who could provide perspectives from different aspects of the tax administration process, including tax administration, accounting and financial reporting, taxpayer compliance, electronic invoicing, information systems, database integration, and implementation of tax regulations. Semi-structured interviews were continued until theoretical and thematic saturation was achieved, meaning that additional interviews no longer produced substantively new concepts, categories, or themes relevant to the research objectives. The qualitative findings were subsequently used to identify the major dimensions and components of the proposed integrated framework.

The quantitative phase was conducted after completion of the qualitative analysis and development of the preliminary conceptual framework. The statistical population in this phase consisted of individuals directly or indirectly involved in the implementation and operation of value-added tax procedures within the Taxpayer System, including tax experts, taxpayers and their professional representatives, accounting and financial specialists, and technical professionals familiar with the Taxpayer System and related electronic tax infrastructures. A sample of 250 participants was considered for the quantitative phase. Participants were selected from individuals who possessed sufficient familiarity with value-added tax procedures and the operational characteristics of the Taxpayer System to provide informed responses to the research questionnaire. The inclusion of respondents from both administrative and taxpayer perspectives was intended to ensure that the quantitative assessment reflected not only institutional and regulatory concerns but also practical difficulties encountered by users of the system. The two-phase research process therefore facilitated the integration of expert-generated qualitative evidence with quantitative evidence obtained from a larger group of stakeholders, enabling the development of a framework grounded in practical experience while also being subjected to empirical validation.

Data collection in the qualitative phase was conducted through semi-structured interviews. An interview guide was developed in accordance with the objectives of the study and was designed to elicit participants' experiences and professional assessments regarding the implementation of value-added tax through Iran's Taxpayer System. The interview questions addressed the principal technical and operational problems encountered during implementation, difficulties associated with electronic registration and reporting, information-system compatibility, electronic invoicing, data quality and data transmission, system accessibility and stability, integration between organizational and tax information systems, user-related difficulties, organizational preparedness, procedural complexities, regulatory requirements, implementation barriers, and potential managerial strategies for improving the effectiveness of the system. The semi-structured format allowed the researchers to maintain consistency across interviews while providing sufficient flexibility to explore emerging issues in greater depth. Follow-up and probing questions were used whenever clarification or further explanation was required. The interview process continued until sufficient conceptual depth was achieved and no meaningful new themes emerged from additional interviews.

Following transcription and thematic analysis of the qualitative interviews, the identified themes, subthemes, and conceptual components were transformed into measurable indicators and used to develop a researcher-made questionnaire for the quantitative phase. The questionnaire was constructed to operationalize the dimensions of the emerging integrated framework and to assess respondents' perceptions of the relative importance and relationships of the identified factors. Items were formulated on the basis of the qualitative findings and were reviewed to ensure conceptual consistency with the themes obtained from the expert interviews. A Likert-type

response format was used to quantify participants' levels of agreement with the questionnaire statements, thereby permitting statistical evaluation of the proposed constructs and relationships.

The psychometric properties of the researcher-made questionnaire were examined before testing the structural model. Content validity was assessed through expert review. Specialists with relevant knowledge in taxation, accounting, tax administration, information systems, and the Taxpayer System evaluated the questionnaire items in terms of relevance, clarity, comprehensiveness, and correspondence with the conceptual dimensions identified during the qualitative phase. Their comments were used to revise ambiguous, redundant, or insufficiently representative items. Construct validity was subsequently examined through appropriate factor-analytic procedures to determine whether the observed indicators adequately represented their respective latent constructs. Convergent validity was also assessed using commonly accepted measurement-model criteria to determine whether indicators belonging to the same construct demonstrated an adequate degree of shared variance. Depending on the structural equation modeling approach employed, indicators such as standardized factor loadings and average variance extracted were considered in evaluating convergent validity.

The reliability of the measurement instrument was evaluated using Cronbach's alpha coefficient and composite reliability. Cronbach's alpha was calculated to assess the internal consistency of the questionnaire dimensions, while composite reliability was used to provide an additional assessment of construct-level reliability within the structural equation modeling framework. Acceptable values for these indices were interpreted as evidence that the indicators associated with each latent construct consistently measured the same underlying concept. The combined assessment of content validity, construct validity, convergent validity, Cronbach's alpha, and composite reliability was intended to ensure that the quantitative instrument possessed sufficient validity and reliability for testing the proposed integrated framework.

Data analysis was conducted separately for the qualitative and quantitative phases and was subsequently integrated in accordance with the exploratory sequential mixed-methods design. In the qualitative phase, interview data were analyzed using thematic analysis. After each interview was transcribed, the transcripts were reviewed repeatedly to develop familiarity with the data and identify meaningful units associated with the technical and implementation challenges of value-added tax administration within the Taxpayer System. Initial codes were generated from statements, experiences, perceptions, and explanations provided by the participants. Conceptually similar codes were then compared and grouped into preliminary categories. Through an iterative process of constant comparison, refinement, integration, and abstraction, related categories were organized into broader subthemes and major themes. Particular attention was paid to relationships among technical infrastructure, system functionality, organizational processes, human factors, legal and regulatory requirements, taxpayer-related issues, interorganizational coordination, and managerial mechanisms. Themes were continuously reviewed against the original interview data to ensure that they accurately represented participants' perspectives. The final thematic structure was used to specify the dimensions and components of the conceptual model and to generate the items included in the quantitative questionnaire.

Quantitative data were analyzed using appropriate descriptive and inferential statistical procedures. Initially, the collected questionnaires were screened for completeness and suitability for statistical analysis. Descriptive statistics were calculated to summarize the demographic and professional characteristics of the participants and to describe the distribution of responses for the principal study variables. Measures such as means and standard deviations were used to provide an overall description of the quantitative constructs. Prior to inferential analysis, relevant statistical assumptions and measurement characteristics were evaluated to determine the suitability of the

data for subsequent analyses. The reliability and validity of the measurement model were then examined through internal consistency coefficients and factor-analytic indicators.

SPSS was used for data management, descriptive statistical analysis, preliminary analyses, and relevant inferential statistical procedures. To evaluate the relationships among the latent constructs and assess the empirical adequacy of the conceptual framework developed from the qualitative findings, structural equation modeling was employed. Depending on the characteristics of the measurement model, distributional properties of the data, complexity of the structural framework, and analytical requirements of the study, covariance-based structural equation modeling using AMOS or partial least squares structural equation modeling using SmartPLS was considered appropriate. In the structural analysis, the measurement model was first examined to determine whether the observed indicators adequately represented the proposed latent constructs. Subsequently, the structural model was assessed to examine the magnitude, direction, and statistical significance of the hypothesized relationships among the identified dimensions.

For a covariance-based approach using AMOS, overall model fit was assessed through commonly reported absolute, incremental, and parsimonious fit indices, together with the standardized factor loadings and structural path coefficients. If SmartPLS was employed, evaluation emphasized measurement-model reliability and validity, path coefficients, explained variance of endogenous constructs, predictive relevance, and statistical significance of the estimated relationships using resampling procedures such as bootstrapping. The final interpretation integrated the qualitative themes with the quantitative model results. This integration enabled the study to move beyond the identification of isolated technical or administrative problems and toward the development of a coherent, empirically supported framework specifying the major dimensions and mechanisms required for managing the technical and implementation challenges of value-added tax administration within Iran's Taxpayer System.

3. Findings and Results

The findings were analyzed in accordance with the sequential structure of the study. In the qualitative phase, semi-structured interviews were conducted with 18 experts, at which point thematic saturation was achieved. The qualitative participants included senior tax experts, certified accountants and auditors, specialists familiar with the Taxpayer System, financial managers, and information technology professionals working in taxation-related environments. Of the 18 qualitative participants, 13 were male and 5 were female. Their professional experience ranged from 8 to 27 years, with the majority having more than 10 years of relevant professional experience. Seven participants had specialized experience in taxation and value-added tax administration, four had backgrounds in accounting and auditing, four specialized in information systems and tax-related information technology, and three had managerial or policy-related experience involving the Taxpayer System and electronic tax administration. Their educational qualifications ranged from bachelor's degrees to doctoral degrees, although most held master's or doctoral-level qualifications in accounting, taxation, financial management, information technology, economics, or related fields.

In the quantitative phase, 250 usable questionnaires were obtained and included in the final analysis. Among the respondents, 161 participants (64.4%) were male and 89 (35.6%) were female. In terms of age, 38 respondents (15.2%) were younger than 30 years, 82 (32.8%) were between 30 and 39 years, 79 (31.6%) were between 40 and 49 years, and 51 (20.4%) were 50 years of age or older. Regarding educational attainment, 41 respondents (16.4%) held bachelor's degrees, 153 (61.2%) held master's degrees, and 56 (22.4%) held doctoral or equivalent professional

qualifications. With respect to occupational background, 74 participants (29.6%) were tax experts or tax administration employees, 68 (27.2%) were taxpayers, financial managers, or representatives of business entities, 62 (24.8%) were accountants, auditors, or tax consultants, and 46 (18.4%) were information technology specialists or technical professionals associated with electronic taxation systems. Professional experience was also relatively high, with 46 participants (18.4%) reporting less than 5 years of relevant experience, 77 (30.8%) reporting 5 to 10 years, 79 (31.6%) reporting 11 to 20 years, and 48 (19.2%) reporting more than 20 years of experience. These characteristics indicated that the quantitative sample incorporated perspectives from both the administrative and user sides of value-added tax implementation and included respondents with sufficient experience to evaluate the technical and executive functioning of the Taxpayer System.

Table 1. Themes, Components, and Representative Indicators Identified in the Qualitative Phase

Main Theme	Components	Representative Indicators Identified in the Interviews	Number of Related Initial Codes
Technical Infrastructure Challenges	System stability and accessibility	Service interruptions, slow response time, temporary unavailability, inadequate capacity during peak periods, instability of online services	31
Technical Infrastructure Challenges	System integration and interoperability	Weak integration with accounting software, incompatibility between organizational systems and the Taxpayer System, limited API coordination, duplication of data entry	27
Technical Infrastructure Challenges	Data quality and information processing	Errors in transferred data, inconsistent records, delayed synchronization, problems in correcting submitted information, incomplete validation mechanisms	24
Technical Infrastructure Challenges	Information security and technical support	Concerns about data protection, access authorization, technical troubleshooting, insufficient real-time support, uncertainty in resolving system errors	19
Executive and Procedural Challenges	Complexity of implementation procedures	Multiple operational steps, complexity of electronic invoicing, difficulty in registration and reporting, unclear implementation workflow	29
Executive and Procedural Challenges	Regulatory ambiguity and frequent changes	Frequent amendments, unclear operational instructions, different interpretations of tax regulations, inconsistency between legal requirements and system procedures	26
Executive and Procedural Challenges	Administrative coordination	Inadequate coordination between tax units, insufficient communication among responsible institutions, inconsistent implementation across administrative units	20
Executive and Procedural Challenges	Compliance burden	Increased administrative workload, time required for data submission, cost of adapting accounting procedures, additional compliance responsibilities for taxpayers	23
Human and Organizational Readiness	User knowledge and digital competency	Insufficient familiarity with system functions, inadequate understanding of electronic invoicing, limited digital skills, errors caused by insufficient training	28
Human and Organizational Readiness	Training and professional support	Need for practical training, shortage of specialized guidance, insufficient educational materials, limited consultation during implementation	25
Human and Organizational Readiness	Organizational preparedness	Inadequate internal procedures, weak adaptation of financial processes, limited allocation of technical and human resources, lack of implementation planning	21
Human and Organizational Readiness	Resistance and acceptance	Resistance to procedural changes, distrust of electronic mechanisms, preference for traditional procedures, uncertainty regarding system benefits	17
Taxpayer-Centered Challenges	Diversity of taxpayers' capabilities	Differences in technological capacity, organizational size, accounting maturity, access to professional expertise, and financial resources	22
Taxpayer-Centered Challenges	Usability and user experience	Difficult navigation, complicated interface, unclear error messages, lengthy procedures, limited user-oriented design	24

Taxpayer-Centered Challenges	Cost of technological adaptation	Cost of software modification, need for new accounting solutions, technical consulting expenses, training costs, infrastructure investment	18
Governance and Integrated Management	Policy and regulatory coordination	Alignment of technical requirements with tax regulations, coordinated policy development, consistency of implementation instructions	24
Governance and Integrated Management	Integrated technical-executive management	Joint management of technological and administrative challenges, coordination among tax, financial, and technical actors, establishment of cross-functional mechanisms	30
Governance and Integrated Management	Monitoring and continuous improvement	Performance monitoring, identification of recurrent errors, feedback collection, system updates based on user experience, continuous process improvement	26
Governance and Integrated Management	Stakeholder communication and support	Structured communication with taxpayers, responsive support channels, expert consultation, publication of clear implementation guidelines	23
Governance and Integrated Management	Adaptive implementation strategy	Gradual implementation, prioritization of high-risk problems, differentiated support for taxpayer groups, flexible responses to emerging technical and procedural issues	21

The thematic analysis resulted in 478 initial meaningful codes. After repeated comparison, consolidation, and conceptual refinement, these codes were organized into 20 components and ultimately classified under five overarching themes: technical infrastructure challenges, executive and procedural challenges, human and organizational readiness, taxpayer-centered challenges, and governance and integrated management. As shown in Table 1, technical problems were not limited to system failures or access problems; participants repeatedly emphasized interoperability, data consistency, technical support, and the ability of accounting systems to communicate effectively with the Taxpayer System. The qualitative evidence therefore suggested that the technical dimension should be conceptualized as a broader infrastructure and information-processing challenge rather than merely as software performance. Executive challenges similarly extended beyond regulatory compliance and included ambiguity of operational procedures, frequent regulatory changes, inconsistent interpretations, administrative coordination problems, and the compliance burden imposed on taxpayers. Human and organizational readiness emerged as a separate theme because interviewees consistently distinguished technological deficiencies from problems arising from insufficient training, limited digital competency, internal organizational unpreparedness, and resistance to procedural change. Taxpayer-centered challenges reflected heterogeneity among users, particularly differences in organizational size, digital capabilities, professional resources, and capacity to absorb technological adaptation costs. Finally, governance and integrated management emerged as the central managerial dimension linking the other themes. Participants argued that technical difficulties could not be addressed independently of regulatory, administrative, educational, and organizational issues. Accordingly, the proposed framework positioned integrated management as the mechanism through which technical, procedural, human, and taxpayer-related challenges could be coordinated, monitored, and progressively reduced.

Table 2. Descriptive Statistics and Distributional Characteristics of the Main Quantitative Constructs

Construct	Number of Items	Mean	SD	Skewness	Kurtosis	Minimum	Maximum
Technical Infrastructure Challenges	12	3.86	0.63	-0.41	-0.18	2.08	5.00
Executive and Procedural Challenges	12	3.79	0.67	-0.36	-0.29	1.92	5.00
Human and Organizational Readiness	10	3.62	0.61	-0.28	0.17	1.90	4.90
Taxpayer-Centered Challenges	9	3.71	0.66	-0.33	-0.21	1.78	5.00
Integrated Management Capacity	12	3.91	0.58	-0.47	0.36	2.17	5.00
Implementation Effectiveness	8	3.54	0.64	-0.19	-0.14	1.75	5.00

Table 2 presents the descriptive characteristics of the principal constructs included in the quantitative model. The mean score for technical infrastructure challenges was 3.86 (SD = 0.63), indicating that respondents generally perceived technical difficulties as a substantial obstacle to effective implementation of value-added tax through the Taxpayer System. Among the challenge-related dimensions, technical infrastructure obtained the highest mean score, followed by executive and procedural challenges (M = 3.79, SD = 0.67), taxpayer-centered challenges (M = 3.71, SD = 0.66), and issues associated with human and organizational readiness (M = 3.62, SD = 0.61). The relatively high scores across all challenge dimensions supported the qualitative finding that implementation problems were multidimensional and could not be attributed to a single technological or administrative factor. Integrated management capacity had the highest overall mean among the framework constructs (M = 3.91, SD = 0.58), suggesting strong agreement regarding the importance of coordinated governance, monitoring, stakeholder support, and adaptive implementation mechanisms. Implementation effectiveness had a comparatively moderate mean of 3.54 (SD = 0.64), indicating that respondents did not perceive the current implementation process as completely ineffective, but identified substantial room for improvement. The absolute values of skewness ranged from 0.19 to 0.47, and the absolute values of kurtosis ranged from 0.14 to 0.36. Because all values were well within commonly accepted limits for approximate univariate normality, no serious deviation from normality was identified. Examination of response ranges also showed adequate variability across all constructs, suggesting that the questionnaire was capable of distinguishing among respondents with different levels of perceived challenges and implementation evaluations.

Table 3. Measurement Model, Reliability, and Convergent Validity of the Research Constructs

Construct	Standardized Loading Range	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Technical Infrastructure Challenges	0.68–0.86	0.91	0.93	0.58
Executive and Procedural Challenges	0.66–0.84	0.90	0.92	0.55
Human and Organizational Readiness	0.69–0.87	0.89	0.92	0.59
Taxpayer-Centered Challenges	0.67–0.85	0.88	0.91	0.56
Integrated Management Capacity	0.71–0.89	0.93	0.94	0.62
Implementation Effectiveness	0.72–0.88	0.90	0.92	0.60

The results presented in Table 3 supported the adequacy of the measurement model. Standardized factor loadings were generally strong and ranged from 0.66 to 0.89 across the six constructs. All retained indicators therefore demonstrated acceptable relationships with their intended latent variables. Integrated management capacity showed particularly strong measurement properties, with factor loadings ranging from 0.71 to 0.89, indicating that the indicators derived from the qualitative themes of coordination, monitoring, stakeholder communication, continuous improvement, and adaptive management represented a coherent latent construct. Internal consistency was also satisfactory across all dimensions. Cronbach's alpha values ranged from 0.88 for taxpayer-centered challenges to 0.93 for integrated management capacity, and all exceeded the conventional minimum criterion of 0.70. Composite reliability coefficients ranged from 0.91 to 0.94, providing further evidence of satisfactory construct reliability. Convergent validity was supported because the average variance extracted values ranged from 0.55 to 0.62 and therefore exceeded the recommended threshold of 0.50 for every construct. The

results demonstrated that each latent variable accounted for more than half of the variance in its associated indicators. Taken together, the factor loadings, Cronbach's alpha coefficients, composite reliability coefficients, and average variance extracted values indicated that the researcher-made questionnaire possessed satisfactory internal consistency and convergent validity and was suitable for evaluating the structural relationships proposed in the integrated framework.

Discriminant validity was additionally examined by comparing the square root of the average variance extracted for each construct with its correlations with other constructs and by examining cross-construct relationships. The square root of AVE for each latent variable was greater than its corresponding inter-construct correlations, indicating that each construct shared more variance with its own indicators than with other constructs in the model. The strongest relationships among the challenge variables were observed between technical infrastructure challenges and executive and procedural challenges and between executive challenges and taxpayer-centered challenges, which was theoretically reasonable given the interconnected nature of electronic tax implementation. Nevertheless, these correlations remained below levels that would indicate construct redundancy. Accordingly, the measurement results supported the conceptual distinction among technical, executive, organizational, taxpayer-related, integrated management, and implementation effectiveness dimensions.

Table 4. Goodness-of-Fit Indices for the Structural Model

Fit Index	Obtained Value	Recommended Criterion	Evaluation
Chi-square (χ^2)	824.73	—	—
Degrees of freedom (df)	342	—	—
χ^2/df	2.41	< 3.00	Acceptable
RMSEA	0.075	< 0.08	Acceptable
SRMR	0.054	< 0.08	Good
GFI	0.912	> 0.90	Acceptable
AGFI	0.887	> 0.85	Acceptable
CFI	0.936	> 0.90	Good
TLI	0.928	> 0.90	Good
IFI	0.937	> 0.90	Good
NFI	0.914	> 0.90	Acceptable

As presented in Table 4, the structural model demonstrated an acceptable overall fit to the observed data. Although the chi-square statistic was significant, which is common in structural equation models with moderately large samples and complex measurement structures, the normed chi-square value provided a more informative assessment of relative model fit. The obtained χ^2/df ratio was 2.41, remaining below the commonly recommended threshold of 3.00. The root mean square error of approximation was 0.075, indicating an acceptable degree of approximation error, while the standardized root mean square residual was 0.054, demonstrating a good correspondence between the observed and model-implied covariance structures. The goodness-of-fit index was 0.912, and the adjusted goodness-of-fit index was 0.887, both indicating an acceptable absolute fit. Incremental fit indices also showed strong results: CFI = 0.936, TLI = 0.928, IFI = 0.937, and NFI = 0.914. All of these indices reached or exceeded their respective recommended criteria. Taken collectively, these results indicated that the conceptual structure generated from the qualitative phase was adequately reproduced in the quantitative data. The model therefore provided empirical support for treating the implementation of value-added tax within the Taxpayer System as an interconnected system in which technical, procedural, human-organizational, and taxpayer-related

conditions influence implementation outcomes directly and through the coordinating role of integrated management capacity.

Table 5. Standardized Structural Path Coefficients for the Integrated Model

Structural Relationship	Standardized β	SE	Critical Ratio	p	Result
Technical Infrastructure Challenges → Integrated Management Capacity	0.34	0.061	5.72	<0.001	Significant
Executive and Procedural Challenges → Integrated Management Capacity	0.29	0.058	4.96	<0.001	Significant
Human and Organizational Readiness → Integrated Management Capacity	0.25	0.055	4.31	<0.001	Significant
Taxpayer-Centered Challenges → Integrated Management Capacity	0.27	0.057	4.58	<0.001	Significant
Technical Infrastructure Challenges → Implementation Effectiveness	-0.23	0.052	-4.16	<0.001	Significant
Executive and Procedural Challenges → Implementation Effectiveness	-0.28	0.055	-4.89	<0.001	Significant
Human and Organizational Readiness → Implementation Effectiveness	0.21	0.050	3.87	<0.001	Significant
Taxpayer-Centered Challenges → Implementation Effectiveness	-0.19	0.048	-3.54	<0.001	Significant
Integrated Management Capacity → Implementation Effectiveness	0.48	0.063	7.86	<0.001	Significant

The structural coefficients reported in Table 5 demonstrated that all proposed paths were statistically significant. Technical infrastructure challenges had a significant positive relationship with the need for integrated management capacity ($\beta = 0.34$, $p < 0.001$), representing the strongest effect among the four antecedent dimensions. This finding indicated that as technical difficulties involving system stability, interoperability, information exchange, data quality, and technical support increased, the necessity for stronger integrated managerial mechanisms also increased. Executive and procedural challenges were likewise positively associated with integrated management capacity ($\beta = 0.29$, $p < 0.001$), suggesting that procedural complexity, regulatory ambiguity, implementation inconsistency, and coordination difficulties increased the need for coordinated managerial interventions. Taxpayer-centered challenges also had a significant positive effect on integrated management capacity ($\beta = 0.27$, $p < 0.001$), while human and organizational readiness demonstrated a significant positive association with integrated management capacity ($\beta = 0.25$, $p < 0.001$). These results supported the qualitative finding that the management architecture required for VAT administration must respond simultaneously to technological, procedural, organizational, and taxpayer-related requirements.

Direct relationships with implementation effectiveness further clarified the practical consequences of these factors. Technical infrastructure challenges had a statistically significant negative effect on implementation effectiveness ($\beta = -0.23$, $p < 0.001$), indicating that instability, interoperability problems, data-processing errors, and technical support deficiencies reduced the efficiency and reliability of VAT implementation. Executive and procedural challenges produced an even stronger negative direct effect ($\beta = -0.28$, $p < 0.001$), demonstrating that regulatory ambiguity, procedural complexity, inconsistent administrative interpretation, and compliance burden represented particularly important barriers to successful implementation. Taxpayer-centered challenges also negatively affected implementation effectiveness ($\beta = -0.19$, $p < 0.001$), confirming that differences in taxpayers' technological capabilities, system usability problems, and the financial cost of adaptation could undermine effective participation in electronic VAT procedures. In contrast, human and organizational readiness showed a positive effect on implementation effectiveness ($\beta = 0.21$, $p < 0.001$). This direction was theoretically consistent with the operationalization of this construct, in which higher scores represented stronger digital competency, organizational preparedness, training capacity, and willingness to adapt to electronic procedures.

The most substantial structural effect in the model was the positive relationship between integrated management capacity and implementation effectiveness ($\beta = 0.48$, $p < 0.001$). This coefficient indicated that improvements in regulatory coordination, cross-functional technical-administrative management, monitoring, continuous system improvement, stakeholder communication, and adaptive implementation were strongly associated with more effective VAT administration through the Taxpayer System. The magnitude of this coefficient supported the central assumption of the proposed framework that implementation problems should not be managed as isolated technical or legal deficiencies. Instead, an integrated managerial capability is required to coordinate different forms of intervention and translate technical, administrative, organizational, and taxpayer-level information into corrective action. The structural model explained 57% of the variance in integrated management capacity and 63% of the variance in implementation effectiveness, indicating substantial explanatory power for a multidimensional organizational and administrative model.

Indirect effects were also examined in order to determine whether integrated management capacity functioned as an intermediary mechanism through which implementation challenges were related to implementation effectiveness. The indirect effect of technical infrastructure challenges through integrated management capacity was significant ($\beta = 0.16$, $p < 0.001$). Executive and procedural challenges also demonstrated a significant indirect effect through integrated management capacity ($\beta = 0.14$, $p < 0.001$), while taxpayer-centered challenges showed a significant indirect effect of $\beta = 0.13$ ($p < 0.001$). The indirect pathway associated with human and organizational readiness was likewise significant ($\beta = 0.12$, $p < 0.001$). These findings indicated that integrated management capacity did not merely function as an additional independent predictor of implementation effectiveness; rather, it represented a central mechanism through which the system could respond to identified problems and transform organizational preparedness into effective implementation practices. For the challenge constructs, the positive indirect effects should be interpreted as evidence that stronger integrated management mechanisms can partially offset the adverse consequences of technical, executive, and taxpayer-related problems. In other words, the existence of technical or procedural difficulties does not automatically determine poor implementation outcomes when effective monitoring, coordination, communication, support, and adaptive management mechanisms are present.

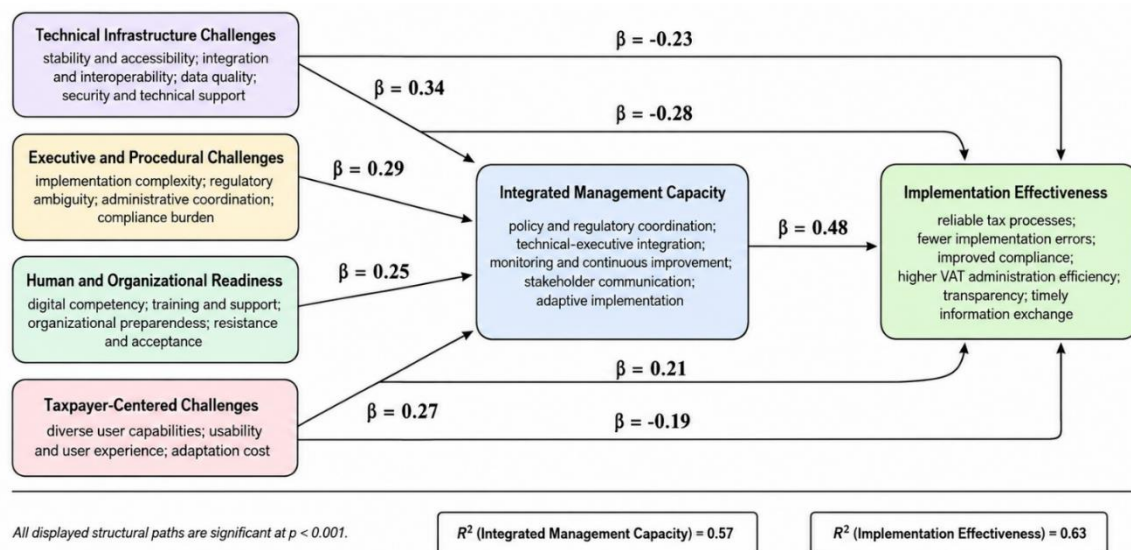


Figure 1. Integrated Framework for Managing the Technical and Implementation Challenges of Value-Added Tax Administration within Iran's Taxpayer System

The final model illustrated in Figure 1 integrates the qualitative and quantitative findings of the study. At the first level of the framework, four primary domains shape the implementation environment: technical infrastructure challenges, executive and procedural challenges, human and organizational readiness, and taxpayer-centered challenges. Technical infrastructure challenges encompass the stability and accessibility of the Taxpayer System, system interoperability, data quality, information exchange, security, and technical support. Executive and procedural challenges include regulatory ambiguity, procedural complexity, inconsistent implementation, interorganizational coordination, and compliance burden. Human and organizational readiness represents the extent to which users and organizations possess the knowledge, digital competency, training, internal resources, implementation procedures, and willingness necessary to operate effectively within an electronic tax environment. Taxpayer-centered challenges capture differences in technological capability, usability requirements, financial adaptation costs, accounting maturity, and access to professional support. The second and central level of the framework is integrated management capacity, which incorporates policy and regulatory coordination, technical-executive integration, stakeholder communication, continuous performance monitoring, feedback mechanisms, and adaptive implementation strategies. The final outcome is implementation effectiveness, reflected in reliable tax processes, reduction of implementation errors, improved taxpayer compliance, greater efficiency of VAT administration, increased transparency, timely information exchange, and improved interaction between taxpayers and the tax authority.

Overall, the integration of the qualitative and quantitative findings demonstrated that the technical and executive challenges associated with implementation of value-added tax in Iran's Taxpayer System form an interdependent structure rather than a set of isolated operational problems. The qualitative phase showed that experts consistently connected system instability with regulatory ambiguity, inadequate training, accounting-system incompatibility, taxpayer diversity, weak support mechanisms, and insufficient administrative coordination. The quantitative findings confirmed these relationships by demonstrating significant structural effects and satisfactory explanatory power for the proposed model. Among the antecedent dimensions, technical infrastructure challenges were the strongest predictor of the need for integrated management, whereas executive and procedural challenges exerted the strongest negative direct effect on implementation effectiveness. More importantly, integrated management capacity emerged as the strongest positive predictor of effective implementation. Consequently, the empirical evidence supported the central proposition of the study that sustainable improvement in value-added tax administration requires simultaneous management of technical infrastructure, executive procedures, organizational readiness, and taxpayer-related conditions through a coordinated and adaptive governance framework.

4. Discussion and Conclusion

The present study aimed to develop and empirically validate an integrated framework for managing the technical and implementation challenges of value-added tax administration within Iran's Taxpayer System. The findings demonstrated that the implementation of VAT through the Taxpayer System is a multidimensional process shaped by the interaction of technical infrastructure, executive and procedural conditions, human and organizational readiness, taxpayer-centered challenges, and integrated management capacity. The qualitative phase identified five overarching themes and 20 components, while the quantitative phase confirmed the reliability and validity of these dimensions and supported the structural relationships proposed in the conceptual model. Among the principal challenge dimensions, technical infrastructure challenges received the highest mean score,

followed by executive and procedural challenges, taxpayer-centered challenges, and human and organizational readiness. Moreover, technical infrastructure challenges were the strongest predictor of the need for integrated management capacity, executive and procedural challenges had the strongest negative direct effect on implementation effectiveness, and integrated management capacity emerged as the strongest positive predictor of implementation effectiveness. These findings indicate that the success of electronic VAT administration cannot be attributed to technological development alone and instead depends on the coordinated management of technological, procedural, organizational, regulatory, and taxpayer-related factors.

The first major finding concerned the substantial role of technical infrastructure challenges in VAT implementation. Respondents reported relatively high levels of concern regarding system stability, accessibility, interoperability, information processing, data quality, information security, and technical support. In the structural model, technical infrastructure challenges significantly increased the need for integrated management capacity and simultaneously had a negative direct effect on implementation effectiveness. This finding is consistent with research emphasizing that the digital transformation of VAT administration requires a robust technological infrastructure capable of processing large volumes of transaction-level data reliably and continuously. In the context of Iran's Taxpayer System, the transition from conventional reporting procedures toward electronic invoicing and digitally integrated tax administration creates a strong dependence on information-system performance [4]. Therefore, system outages, incompatibility between accounting software and tax platforms, delayed data synchronization, or insufficient technical support can directly disrupt taxpayers' ability to fulfill their statutory obligations and can reduce administrative efficiency.

This result also aligns with studies examining advanced technologies in VAT systems. The application of blockchain technology to VAT administration has been proposed as a mechanism for improving data integrity, transaction traceability, transparency, and resistance to manipulation [7]. Similarly, systematic research on blockchain-based VAT systems has shown that technological capability, interoperability, data standards, organizational infrastructure, and institutional readiness are among the critical requirements for successful implementation [8]. Pellegrino and Stasi also emphasized that the adoption of blockchain in VAT administration depends not merely on the technological properties of the system but on the broader organizational and institutional conditions that support implementation [10]. The findings of the current study extend these observations by showing that technical problems should not be treated as isolated information technology failures. Instead, their consequences spread across administrative procedures, taxpayer compliance, accounting processes, and institutional trust, thereby increasing the need for integrated managerial responses.

The second important finding concerned executive and procedural challenges. This dimension had a relatively high mean and produced the strongest negative direct effect on implementation effectiveness. It included the complexity of implementation procedures, regulatory ambiguity, frequent changes in operational requirements, insufficient administrative coordination, and the compliance burden imposed on taxpayers. This finding indicates that even when the technological platform is functional, ambiguity in procedures or inconsistency in administrative interpretation can substantially weaken VAT implementation. This result is compatible with the broader literature emphasizing the importance of institutional and policy environments in VAT administration. Kipo-Sunyahzi highlighted the political and administrative dimensions of VAT policy and demonstrated that the effectiveness of VAT implementation is shaped by governance structures, institutional relationships, and the broader policy environment [13]. Thus, electronic tax reform must be accompanied by stable procedures, clearly communicated regulations, and coordinated administrative practices.

The adverse effect of executive and procedural challenges can also be interpreted from the perspective of compliance costs. Alshira'h showed that VAT compliance behavior is influenced by both trust in government and the costs taxpayers incur when attempting to satisfy their obligations [11]. The present findings support this perspective by demonstrating that complicated registration procedures, uncertain operational instructions, frequent regulatory amendments, and additional reporting requirements can reduce implementation effectiveness. These difficulties may require taxpayers to spend additional time and financial resources on professional accounting support, software updates, staff training, and correction of reporting errors. Therefore, procedural complexity may reduce the practical benefits expected from digitalization when the electronic system merely transfers administrative burden from paper-based procedures to technology-based procedures rather than simplifying compliance.

The findings regarding human and organizational readiness further demonstrated that successful implementation depends heavily on the preparedness of both users and organizations. Unlike the challenge dimensions, human and organizational readiness had a positive direct relationship with implementation effectiveness. Higher digital competency, greater familiarity with electronic invoicing, adequate staff training, organizational preparedness, and greater acceptance of technological change were associated with more successful VAT implementation. This finding confirms that digital transformation is partly a human and organizational process rather than merely a technological transition. A technically advanced tax platform may fail to generate its expected benefits when users lack the necessary skills, organizations have not adapted their accounting processes, or staff members remain resistant to new procedures.

The importance of readiness is consistent with research on the implementation of blockchain and other advanced technologies in taxation. Setyowati et al. found that strategic factors influencing blockchain adoption in VAT systems include technological readiness, organizational capacity, environmental support, and institutional conditions [9]. Similarly, Pellegrino and Stasi identified organizational readiness and stakeholder-related considerations among the important determinants of blockchain implementation in VAT environments [10]. Artificial intelligence-based VAT collection systems likewise depend on reliable data, skilled personnel, appropriate computational infrastructure, and the ability of institutions to incorporate analytical technologies into existing administrative processes [6]. The present study therefore reinforces the view that investment in digital infrastructure without parallel investment in human capital, training, process redesign, and organizational adaptation is unlikely to produce optimal results.

Taxpayer-centered challenges also significantly affected VAT implementation. The qualitative findings indicated substantial variation in taxpayers' digital capabilities, access to accounting expertise, technological infrastructure, organizational size, financial resources, and ability to adapt to new reporting requirements. Quantitatively, taxpayer-centered challenges had a significant negative effect on implementation effectiveness and significantly increased the need for integrated management capacity. This result is important because electronic tax systems are frequently designed around standardized administrative procedures, while taxpayers themselves are highly heterogeneous. Larger firms may possess integrated accounting platforms, specialized tax departments, and technical support teams, whereas smaller businesses may face considerable difficulty adapting to electronic invoicing and automated reporting.

This finding also has implications for tax justice. Goudarzi et al. emphasized the importance of justice-oriented indicators in the tax system and the need to consider fairness in the application of direct and value-added taxation [12]. From this perspective, procedural equality does not necessarily imply substantive fairness. Requiring all

taxpayers to comply through an identical technological pathway may create disproportionate burdens when their technological resources and organizational capabilities differ substantially. The current study therefore suggests that taxpayer-centered implementation should include differentiated education, technical assistance, transition periods, and support mechanisms based on the characteristics of different taxpayer groups. The relevance of economic heterogeneity is also supported by evidence indicating substantial differences in economic and entrepreneurial conditions across Iranian provinces [16]. Although these regional differences were not directly tested in the present study, they imply that the capacity to adopt sophisticated electronic tax procedures may vary geographically as well as organizationally.

The most important result of the structural model was the strong positive effect of integrated management capacity on implementation effectiveness. Integrated management capacity had the largest standardized direct coefficient in the model, indicating that policy coordination, technical-executive integration, continuous monitoring, stakeholder communication, responsive support, and adaptive implementation strategies play a central role in improving VAT administration. This result supports the main theoretical proposition of the study: effective management of VAT implementation requires a system-level perspective rather than separate technical, legal, or administrative interventions. The positive indirect effects observed through integrated management capacity also showed that the adverse consequences of technical, procedural, and taxpayer-related challenges may be partially offset when appropriate managerial capabilities exist.

This finding closely corresponds with the concept of an agile VAT ecosystem proposed by Sayadzandi et al. Their model emphasizes that VAT administration should be understood as an interconnected ecosystem requiring adaptability, coordinated relationships, responsiveness, and the capacity to manage changes across different components of the system [5]. The present study provides empirical support for this ecosystem perspective by identifying integrated management capacity as a mechanism connecting the principal implementation domains to overall implementation effectiveness. In practice, technical problems often have administrative consequences, regulatory changes require software modifications, changes in electronic procedures require taxpayer education, and user feedback may reveal deficiencies requiring both regulatory and technological responses. Therefore, isolated decision-making by separate organizational units is unlikely to be sufficient.

The findings also support a broader understanding of digital tax governance. Emerging technologies such as blockchain and artificial intelligence can potentially enhance VAT collection, transaction validation, fraud detection, and administrative transparency [6, 7]. However, these technologies should be introduced within an integrated governance structure capable of defining legal responsibilities, ensuring interoperability, supervising data quality, protecting information, coordinating stakeholders, and continuously evaluating implementation outcomes. Studies from other institutional contexts have similarly shown that advanced technologies create value only when technological design is aligned with institutional arrangements and implementation strategy [9, 10]. Therefore, the value of technological modernization in Iran's VAT system should be assessed not only by the sophistication of the platform but by the extent to which the system improves reliability, reduces reporting errors, facilitates taxpayer compliance, and strengthens administrative transparency.

The regulatory challenges identified in the present study are also relevant in light of the increasingly complex economic environment in which VAT systems operate. Studies examining VAT and cryptocurrency regulation illustrate how technological innovation can generate new legal ambiguities and require continuous adaptation of tax rules [14, 15]. Such developments reinforce the importance of adaptive governance. A rigid tax administration may struggle to respond to rapidly changing business models, digital transactions, new financial technologies, and

evolving accounting practices. Consequently, the proposed integrated framework emphasizes continuous monitoring and adaptive implementation rather than assuming that technical and procedural solutions can remain static after initial deployment.

Finally, the importance of effective VAT administration should be interpreted in relation to its broader fiscal and economic consequences. Previous research has demonstrated that VAT can affect macroeconomic variables and inflation [3], while other studies have linked VAT revenues to social and regional development [1] and broader economic development [2]. These findings indicate that improvements in VAT administration have consequences beyond the internal efficiency of the tax authority. More reliable collection, reduced evasion, improved compliance, and greater transparency can strengthen government revenues and potentially improve the capacity to finance economic and social programs. Conversely, inefficient implementation may increase compliance burdens without producing corresponding improvements in fiscal performance. The integrated framework developed in this study therefore contributes to both tax administration and broader fiscal governance by showing how technical, procedural, organizational, and taxpayer-centered challenges can be systematically coordinated through an integrated management mechanism.

Overall, the findings demonstrate that the effectiveness of VAT implementation within Iran's Taxpayer System depends on the interaction of multiple dimensions rather than on any single technological or regulatory factor. Technical infrastructure challenges create substantial operational risks, executive and procedural complexities directly weaken implementation performance, taxpayer heterogeneity introduces unequal adaptation burdens, and human and organizational readiness strengthens the capacity to use the system successfully. Most importantly, integrated management capacity provides the principal mechanism for coordinating these dimensions and improving implementation effectiveness. The results therefore support a transition from fragmented problem-solving toward a comprehensive governance model in which technological improvement, regulatory coordination, taxpayer support, organizational readiness, monitoring, and adaptive decision-making are treated as mutually dependent components of effective VAT administration.

This study has several limitations that should be considered when interpreting the findings. First, although the mixed-methods design enabled the integration of expert perspectives with quantitative evidence, the qualitative phase was based on a relatively limited group of specialized participants, and other stakeholder groups may have emphasized different implementation problems. Second, the quantitative data were obtained through self-report questionnaires, which may be affected by individual perceptions, response tendencies, and differences in respondents' experiences with the Taxpayer System. Third, the cross-sectional design limits the ability to determine how technical and executive challenges change over time as the system evolves and taxpayers become more familiar with electronic procedures. Fourth, although the sample incorporated tax experts, taxpayers, accounting professionals, and technical specialists, the study did not separately model differences between economic sectors, firm sizes, provinces, or taxpayer categories. Finally, the proposed structural model focused on major managerial and implementation dimensions and did not directly incorporate several potentially important external variables, including organizational culture, tax morale, enforcement intensity, perceived fairness, digital literacy at the societal level, and differences in technological infrastructure across regions.

Future research should evaluate the proposed framework using longitudinal designs to determine whether the relationships among technical challenges, organizational readiness, integrated management capacity, and implementation effectiveness change as the Taxpayer System matures. Comparative studies across provinces, industries, and organizational sizes would help identify whether different taxpayer groups experience distinct

technical and procedural barriers. Future studies could also examine small and medium-sized enterprises separately because their technological and financial capacity may differ considerably from that of large organizations. Additional research should incorporate variables such as taxpayer trust, perceived fairness, tax morale, digital literacy, organizational culture, technological readiness, and perceived compliance costs into the structural model. Multi-group structural equation modeling could be used to compare taxpayers, tax professionals, accountants, and information technology specialists. Future research could also evaluate actual administrative data, such as error rates, electronic invoice rejection rates, reporting delays, system downtime, audit outcomes, or compliance records, rather than relying exclusively on perceptual measures. Experimental and quasi-experimental designs may further determine whether targeted training, technical support, simplified interfaces, or adaptive regulatory interventions produce measurable improvements in implementation outcomes.

From a practical perspective, tax authorities should manage the Taxpayer System through an integrated governance mechanism that formally coordinates technical, legal, administrative, and taxpayer-support functions. Continuous monitoring of system stability, data quality, interoperability, user errors, and service interruptions should be combined with rapid corrective procedures and transparent communication with taxpayers. Regulatory instructions should be standardized, simplified, and updated through coordinated channels to reduce inconsistent interpretations. Taxpayers should receive differentiated support according to their technological and organizational capabilities, with particular attention to smaller businesses and users with limited digital expertise. Practical training should focus on real operational tasks such as electronic invoicing, error correction, data submission, software integration, and response to system notifications rather than relying primarily on general informational materials. Tax authorities should also establish structured feedback mechanisms through which taxpayers, accountants, software providers, and technical specialists can report recurrent problems and participate in continuous system improvement. Finally, implementation should be treated as an adaptive process, with system performance indicators regularly reviewed and technical or procedural requirements revised when evidence shows that they create unnecessary compliance burdens or recurring implementation failures.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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References

- [1] C. O. Omodero, "Value-Added Tax Revenue Transfers and Regional Social Development: Evidence from Nigeria," *Sustainability*, vol. 14, no. 21, doi: 10.3390/su142114343.
- [2] O. E. Sowole and M. O. Adekoyejo, "Influence of Value Added Tax on Economic Development (The Nigeria Perspective): Array," *The Journal of Accounting and Management*, vol. 9, no. 3, 03/16 2020. [Online]. Available: <https://dj.univ-danubius.ro/index.php/JAM/article/view/122>.
- [3] N. Abili and S. M. Arfaei Zarandi, "Examining the Effects of Value-Added Tax on Macroeconomic Variables and Inflation," in *Third International Conference on Applied Research in Management, Accounting, Economics, and Industrial Engineering*, 2023.
- [4] I. Esmaeilvand, "The Role of the Taxpayer System in the Digital Transformation of Iran's Value-Added Tax System: Challenges, Consequences, and Implementation Requirements," *Astara*, 2025. [Online]. Available: <https://civilica.com/doc/2462227>.
- [5] H. Sayadzandi, A. Irajpour, and N. Hamidinia, "Designing an Agile Value-Added Tax Ecosystem Model Using a Combined Grounded Theory and Interpretive Structural Modeling Approach," *Development and Transformation Management*, vol. 20, no. 68, pp. 33-47, 2025.
- [6] F. O. Bankole and Z. Vara, "Artificial Intelligence Systems for Value Added Tax Collection via Self Organizing Map (SOM)," 2022, doi: 10.21203/rs.3.rs-2216885/v1.
- [7] V. Ghanuni Shishvan, S. Elahi, A. Yazdian Varjani, and S. Dari Nogarani. "Application of Blockchain Technology in the Value Added Tax System." Tehran. <https://civilica.com/doc/1258253> (accessed).
- [8] V. Qanouni Shishvan, S. Elahi, S. Dorri Nougorani, and A. Yazdian Varjani, "Blockchain-Based Value Added Tax System: A Systematic Review," *Financial Research*, vol. 26, no. 2, pp. 210-231, 2024, doi: 10.22059/frj.2023.353580.1007432.
- [9] M. S. Setyowati, N. D. Utami, A. H. Saragih, and A. Hendrawan, "Strategic factors in implementing blockchain technology in Indonesia's value-added tax system," *Technology in Society*, vol. 72, pp. 102-169, 2023, doi: 10.1016/j.techsoc.2022.102169.
- [10] A. Pellegrino and A. Stasi, "Critical factors in adopting blockchain technology in value-added tax systems," *Journal of Sustainability Research*, vol. 6, no. 2, p. e240023, 2024, doi: 10.20900/jsr.20240023.
- [11] A. Alshira'h, "How can value added tax compliance be incentivized? An experimental examination of trust in government and tax compliance costs," *Journal of Money Laundering Control*, vol. 27, no. 1, pp. 191-208, 2024, doi: 10.1108/JMLC-01-2023-0009.
- [12] A. Goudarzi, Z. Mousavi, and M. Mohammadrezaei Ardakani, "Justice-Oriented Indicators in the Tax System Based on Direct Tax and Value Added Tax Laws," *Tax Research Journal*, no. 110, pp. 76-93, 2024.
- [13] D. D. Kipo-Sunyehezi, "Politics of value-added tax policy in Ghana," in *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Cham: Springer International Publishing, 2023, pp. 9828-9836.
- [14] A. Allahyari Fard and K. Parvin, "Regulation of Value-Added Tax and Cryptocurrency Speculation in the European Union," *Judiciary Law Journal*, vol. 88, no. 126, pp. 139-165, 2024, doi: 10.22106/jlj.2024.2000811.5268.
- [15] A. Elahiyari Fard and K. Parvin, "Regulation of value-added tax and cryptocurrency speculation in the European Union," (in English), *Judiciary Law Journal*, vol. 88, no. 126, pp. 139-165, 2024, doi: 10.22106/jlj.2024.2000811.5268.
- [16] Z. Sepidbar, Y. Mohammadzadeh, and V. Nikpey Pesyan, "Analysis of the effect of entrepreneurship index on employment in Iranian provinces: Spatial econometric approach," (in eng), *The Economic Research (Sustainable Growth and Development)*, vol. 24, no. 1, pp. 285-311, 2024, doi: 10.22034/24.1.285.