



(REVIEW ARTICLE)



## Governing the Subscription Economy: A critical review of internal controls over SaaS revenue recognition under ASC 606

Adwoa Kwarkoah Gyening \*

*Audit-Technology, Media and Telecom, KPMG LLP, New York City, New York, USA.*

World Journal of Advanced Research and Reviews, 2026, 30(02), 787-796

Publication history: Received on 31 March 2026; revised on 08 May 2026; accepted on 11 May 2026

Article DOI: <https://doi.org/10.30574/wjarr.2026.30.2.1266>

### Abstract

The rapid expansion of the Software-as-a-Service (SaaS) business model has created significant challenges for traditional financial reporting and internal control systems designed for transactional, product-based revenue models. These problems have been compounded by the adoption of ASC 606 (Revenue from Contracts with Customers) because subscription-based, usage-based and hybrid pricing schemes present complex multi-element performance obligation which past control architectures were poorly designed to handle. This study conducts a structured literature review of peer-reviewed research, regulatory filings, and practitioner guidance published between 2020 and 2025. The review also incorporates insights from SEC 10-K filings and SOX 404 disclosures of publicly traded SaaS firms. The thematic areas include the evolution of control architecture, the heterogeneity in the implementation of ASC 606 (Revenue from Contracts with Customers), auditability challenges in cloud-native systems, and model-specific control maturity. The literature consistently identifies five recurring factors associated with material weaknesses in SaaS revenue recognition, namely the lack of disaggregation of performance obligations, limited automation in subscription billing systems, the absence of IT general controls under cloud shared-responsibility models, under-resourced accounting functions in high-growth environments, and systemic weaknesses in contract modification governance. Organizations that have successfully addressed these weaknesses typically implement integrated Order-to-Cash platforms with embedded control checkpoints and real-time auditability. The strong internal controls in the recognition of SaaS revenue demand the paradigm shift of the retrospective and transactional based verification to the continuous and embedded assurance structures in systems. This review proposes practical internal control frameworks and a control maturity model designed to strengthen SaaS revenue recognition governance and reduce material weakness disclosures.

**Keywords:** SaaS revenue recognition; ASC 606; Internal controls over financial reporting (ICFR); SOX 404 material weakness; Subscription business models

### 1. Introduction

The software industry has shifted toward cloud-based, subscription delivery models, known as the SaaS transition. This represents one of the most fundamental structural changes in contemporary financial reporting. The U.S. SaaS market grew from approximately \$108 billion in 2020 to \$329 billion in 2025, driven by subscription, usage-based, and hybrid pricing models (Gartner, 2024; Statista, 2025). This dramatic expansion has outpaced the internal control systems of most companies, revealing widespread material weaknesses that have resulted in financial restatements and delayed SEC filings, putting investors' confidence and the integrity of the market at risk.

Revenue recognition sits at the intersection of accounting theory and operational implementation. The five-step revenue recognition model, developed through the joint FASB and IASB convergence program, forms the basis of ASC 606 under U.S. GAAP and its international equivalent, IFRS 15 (Choi et al., 2023; Hinson et al., 2024). In the case of

\* Corresponding author: Adwoa Kwarkoah Gyening

traditional software vendors who sell discrete product licenses, these requirements can be mapped to rather clear transaction structures. In the case of SaaS-based enterprises where continuous access, consumption price, multi-tenant architecture and enterprise agreements with custom contract modification is provided, the five-step model introduces significantly more complex control requirements than those traditionally designed for product-based software licensing.

The magnitude of the control failures in revenue recognition in SaaS is effectively recorded. The disclosures of revenue disaggregation and the principal-versus-agent determination and the timing of recognition of implementation services associated with platform subscriptions were those areas where SEC comment letters to SaaS registrants were disproportionately focused between 2020 and 2024 (Yu et al., 2025; Strauss et al., 2021). Most often, restatements in the industry have been associated with misallocation of standalone selling prices through performance obligations, misidentification of deferral of contract acquisition costs, and inability to recognize the nature of variable consideration restrictions in usage-based arrangements (Brooks, 2022; Chen, 2024).

The complexity of control is further increased by cloud computing as the underlying delivery infrastructure. With essential revenue generation functions; billing, contract management and subscription lifecycle governance being hosted in cloud environments on shared responsibility models the line between auditable internal controls, and the provider managed infrastructure becomes extremely obscured. One of the first to explicitly document the implications of cloud computing adoption on audit was Banker et al., (2020) who observed that traditional IT general controls do not easily align to cloud computing systems with multi-tenant, geographically dispersed designs. These results were later applied to SOC audit models, where cyber risk and access control gaps can be found as ongoing governance gaps (Schoenfeld, 2024; Lambert et al., 2025).

This narrative review fills a fundamental knowledge gap in academic and practitioner literature: the lack of a theory-to-operations synthesis framework between the ASC 606 theoretical needs and the realities of high-growth SaaS businesses. The available literature is inclined to deal either with the interpretation of accounting standards (Hinson et al., 2024; Choi et al., 2022) or issues associated with technological implementation (Kantipudi, 2025; Puvvada, 2025) in relative isolation. There is a critical need to synthesize insights across accounting, technology, and regulatory disciplines.

This review is explicitly critical and interpretative, not a descriptive listing of individual studies. It combines literature published in 2020-2025 in four thematic areas: (1) heterogeneity in the implementation of ASC 606 and the financial reporting impacts; (2) internal control architecture challenges that are unique to SaaS variants of business model; (3) the role of technology in the creation and remediation of control deficiencies; and (4) SOX 404 patterns of disclosure and material weakness taxonomy. It has given a conclusion based on which the most significant unresolved research questions are determined, and a prospective research agenda is suggested in a field at the core of digitization of the U.S. economy.

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## 2. Emerging Trends and Thematic Analysis

### 2.1. The ASC 606 Implementation Landscape: Heterogeneity and Its Consequences

The implementation of ASC 606 in the SaaS industry is still heterogeneous, almost seven years after its mandatory adoption of public companies, which has material financial reporting implications. Choi, Kim, and Wang (2023) give a highly empirical account of the impacts of the standard, observing a significant amount of variation in the size and nature of the cumulative-effect modifications of software firms. This variance is systematically linked to business model characteristics, including contract length, bundle complexity, and the proportion of revenue derived from embedded professional services. In *The Accounting Review*, Hinson et al., (2024) argue that the disaggregation requirements of the ASC 606, although meant to increase the usefulness of the decision-making, have resulted in extremely varied disclosure decisions. In more complex subscription architecture firms, there is more variance in categories of disaggregation, which makes cross-firm comparisons challenging and means that such conditions are favorable to selective withholding of negative information about revenue trends. This result has direct implications of control: in cases where the management has too much discretion in disaggregation classification, internal controls over disclosure adequacy are weakened. Yu et al. (2025) take this analysis to the correlation between the quality of revenue recognition policy disclosure and the occurrence of restatements. Their high-sample study confirms that vague or templated revenue recognition disclosures (the main characteristics of the 10-K filings of early-stage SaaS firms) are substantial predictors of later restatements, even when firm size, auditor quality, and the complexity of the business model are controlled. This correlation suggests that inadequate disclosure may be associated with underlying control deficiencies rather than merely communication gaps. These consequences on control design are obvious: any decent ASC 606

compliance controls over SaaS settings should go further than journal entry authorization and period-end reconciliation to include systematically governing policy interpretation, application of performance obligation identification criteria, and documented management judgment to support standalone selling price (SSP) allocations. It has been hinted that a significant number of SaaS firms, especially those growing fast by purchasing companies, have not institutionalized these upstream control processes (Adenuga et al., 2022; Choi et al., 2022).

**Table 1** ASC 606 Implementation Challenges by SaaS Business Model Variant. OTC = Order-to-Cash; SSP = Standalone Selling Price

Business Model	Primary ASC 606 Challenge	Control Risk Area	Key Reference
Pure Subscription (SaaS)	SSP allocation for bundled features	Contract inception controls	Brooks (2022)
Usage-Based (Consumption)	Variable consideration estimation	Billing system auditability	Kantipudi (2025)
Hybrid (Sub. + Usage)	Revenue constraint application	OTC process integration	Chejarla (2025)
Enterprise (multi-element)	Identification of distinct obligations	Contract review governance	Hinson et al. (2024)
Freemium-to-Paid	Point-in-time vs. over-time recognition	Conversion event monitoring	Chen (2024)
Marketplace/ multi-sided	Principal vs. agent determination	Disclosure controls	Strauss et al. (2021)

Table 1 highlights that control risks are model-specific, reinforcing the need for tailored internal controls rather than a one-size-fits-all approach. ASC 606 compliance risk is systematically distributed across different SaaS business models. Rather than presenting homogeneous recognition problems, each model concentrates risk at specific control points, for example, judgment over contract inception in pure subscription models, reliability of metering infrastructure in usage-based models, or principal-versus-agent classification in marketplace designs. This heterogeneity underscores the impracticality of uniform control frameworks and supports the principle of model-specific control design in SaaS revenue governance (Brooks, 2022; Kantipudi, 2025; Hinson et al., 2024).

## 2.2. Internal Control Architecture: From Transaction-Based to Continuous Assurance

The prevailing paradigm for internal controls over financial statements is rooted in the COSO Internal Control-Integrated Framework (2013) and operationalized through SOX Section 404 attestation requirements. Both were designed primarily for periodic transaction verification in relatively stable operating environments. The business model of SaaS puts this paradigm to the test: revenue is earned through a continual series of millions of subscription events; contract changes are done dynamically based on enterprise sales negotiations; and, systems that support billing, access provisioning, and usage measurement are hosted on the cloud, and API-integrated and released frequently. The lack of alignment between the rhythms of cloud computing operations and the traditional control structures was already noted by Stein, Campitelli, and Mezzio (2020), who report that data does not occupy the physical perimeter of the entity anymore, the cycle of change is of a shorter time frame, and the segregation of duties in the cloud-based DevOps setting is incompatible with the practice of agile deployment: The case study of SAP itself SaaS migration by Guo (2021) represents how even the companies of the enterprise character with the established control systems were unable to keep the effective IT general controls during the move to the cloud delivery models. The critical input made by Lambert et al. (2025) is the analysis of the way the activities of the COBIT 2019 IT controls should be defined between cloud service providers (CSPs) and cloud service users (CSUs). The fact that they have found that the existing standards leave ambiguous gaps in accountability, especially when it comes to change management, logical access and data integrity controls, is specifically true to revenue recognition standards where the changes in billing systems and access provisioning can have a direct impact on the reported revenue rates. Kiiskinen (2024) further adds to this demonstrating that Order-to-Cash processes are often based on CRM, billing, ERP and financial reporting systems with poor automated reconciliation with an error risk and audit trail gaps. The case study of Finnish SaaS startups by Hannula-Backa (2024) gives valuable information that the financial management control systems in subscription businesses are often implemented in reaction to investor diligence requirements or audit reports as opposed to implemented proactively as scalable financial reporting enablers. Such reactive tendency is correlated with an increased

level of control deficiencies in later audit cycles which indicate that control architecture choices made at early stages of growth have a discontinued effect on the material weakness environment at IPO.

Table 2 maps COSO framework components to SaaS-specific control challenges and recommended responses.

**Table 2** COSO Framework Adaptation for SaaS Revenue Recognition Internal Controls

COSO Component	SaaS-Specific Challenge	Recommended Control Response
Control Environment	Understaffed accounting teams; engineering-dominant culture	Revenue accounting function resourcing; tone-at-the-top communications
Risk Assessment	Contract modification frequency; estimation uncertainty in variable consideration	Dynamic risk registers; quarterly obligation re-measurement protocols
Control Activities	Fragmented OTC data flows; manual billing-to-GL reconciliation	Integrated OTC platforms with embedded automated controls
Information & Communication	Multi-system data flow integrity across CRM/CPQ/ERP	API-level data validation; real-time exception dashboards
Monitoring	Periodic audit sampling insufficient for continuous revenue events	AI-assisted continuous monitoring; real-time KRI dashboards

Table 2 aligns each of the COSO Internal Control-Integrated Framework components with its challenge specific to SaaS and the response aligned with SaaS control. In every one of the five elements, there is a shared trend: the traditional control methods, aimed at periodic and transactional operational settings, are structurally inadequate to support cloud-native SaaS operations that operate at a high rate of contract changes, multi-system data flows, and incessant revenue formation. The use of AI-supported continuous assurance, dynamic monitoring protocols, and integrated Order-to-Cash architectures can help move towards the effectiveness of adaptation by stopping the use of static risk assessments and manual reconciliation (Adenuga et al., 2022; Puvvada, 2025; Zhou, 2025).

### 2.3. Technology as a Double-Edged Sword: Auditability in Cloud-Native Revenue Systems

Current technology implementations to SaaS revenue operations present both new control opportunities, as well as new control risks, a paradox that characterizes one of the main contradictions in the modern SaaS financial reporting governance. At the remediation level, AI-driven revenue recognition systems and cloud-based ERP systems have significantly increased the possibilities of embedded automated controls in the billing and revenue calculation processes (Puvvada, 2025). The article by Zhou (2025) on the accounting-instruction tuning of financial report risk identification proves that the large language model applications can be guided to conduct regulation-compliant risk identification in revenue recognition disclosures with high precision based on the standard ASC 606 compliance criteria. These features indicate a paradigm change in the control monitoring structure: instead of periodical verification of the consolidated financial information, AI-enhanced monitoring provides control on a transactional level, that is, validating the recognition date, qualification of the obligation provision, and the sufficiency of disclosures. The analysis of observability and auditability of SaaS monetization systems conducted by Kantipedi (2025) offers the most technically specific description of the control capabilities that can be used in contemporary usage-based billing architecture. Event streaming in real time can be designed with immutable audit logs and an API based access controls to build a continuous audit trail of consumption event to recognized revenue a feature that is completely lacking in the old billing architecture. This is not an automatic result of cloud deployment but a planned architectural investment. The analysis of voluntary SOC audits by Schoenfeld (2024) is a valuable regulatory aspect. The Type II reports that are primarily used to demonstrate the effectiveness of the controls at cloud-based billing and subscription management platforms do not always address the given ASC 606 control objectives in the areas of revenue recognition. This poses a false assurance risk to the auditors who will use these reports. The result of Maghakyan et al. (2025) that audit partner digitalization knowledge is linked to reduced audit costs indicates that the competency gap between the auditor and their cognition of cloud-native revenue recognition failures can be a systemic risk factor leading to failure to identify SaaS revenue recognition failures.

The domain of blockchain and smart contracts has an apparent boundary. The technical description of smart contract-controlled SaaS infrastructure by Decker (2025) opens up the potential of adding revenue recognition logic to the contract execution protocols of a contract, which would inherently enforce ASC 606 criteria and can be verified through audit and cannot be manipulated. According to Stratopoulos, Wang, and Ye (2020/2022), most of the SaaS companies

are still in their infancy with blockchain in their corporate financial reporting, and the direction is set. An alternative theoretical basis of formalization of recognition rules in machine-executable formats is offered by Blums and Weigand (2025). Monetization playbook is shifting to infrastructure level governance (Brij, 2025).

#### **2.4. SOX 404 Disclosures and Material Weakness Patterns in SaaS Companies**

The 2020-2025 synthesis of SOX 404 disclosure reports, SEC comment letters, and scholarly research demonstrate that five material weakness categories of SaaS revenue recognition are dominant and constitute a structured taxonomic taxonomy with definite control design implications. To begin with, the absence of sufficient segregation of responsibilities on the subscription billing and revenue calculation application does not change since early-stage public SaaS firms, indicating that the accounting staffing is often understaffed in relation to the number of revenue transactions they have to process (Adenuga et al., 2022). Second, the most mentioned category of technical deficiencies is IT general controls, where change management processes regulating billing system change and access controls over systems containing revenue-relevant financial data are involved (Banker et al., 2020; Lambert et al., 2025). Third, insufficient documentation and review on the management estimates of SSP allocations and variable consideration constraints is a common theme, as the ASC 606 that is judgment-intensive in multi-element arrangements (Brooks, 2022; Hinson et al., 2024). Fourth, the weaknesses associated with the accounting of non-standard terms of contracts, concession, changes, and side-agreements negotiated at the time of selling an enterprise have become more noticeable in the post-2022 period. Yu et al. (2025) confirm that vague disclosures predict future restatements, consistent with this trend. Fifth, the automated population of the deferred revenue balances and the reconciliation of the data in the billing system to those in the general ledger are failures in the financial close process that are reported in numerous case studies on the company level (Kiiskinen, 2024; Chejarla, 2025). The analysis by Rahiminejad (2025) of the existence of large negative differences between book-taxes in S&P 500 companies is applicable to the degree that the aggressive deferral of revenue and capitalization of costs by SaaS companies generate some of the largest book-tax divergences that can raise regulatory concerns and would signal the timing of recognition manipulation. Sreseli and Sreseli (2025) note that the extra accounting complexity in contractual asset and liability recognition becomes especially relevant to SaaS firms whose balances of material contract acquisition costs are subject to ASC 340-40.

#### **2.5. Business Model Variation and Control Maturity: A Comparative Synthesis**

The SaaS market has high levels of heterogeneity in revenue structure, and internal control systems should be tuned to the heterogeneity and not applied in a homogenous way. The theoretical approach of Lindstrom et al. (2024) to subscription-based business models in tech companies offers a taxonomy of the model variants that can be projected to differentiated requirements on control. According to Chejarla (2025), the case-study of transitioning between transactional and subscription-based revenue models to usage-based revenue methods sees the issues of control that arise specifically during model transitions which are a phase when the residual control infrastructure of the old model is insufficient to accommodate the recognition needs of the new model. With pure subscription (seat-based) models, the most important control issue is the accuracy of proration calculations between periods of subscription, the management of upgrade/downgrade events, and the systematic detection of contractual changes that necessitate the re-measurement of performance obligations. In the case of usage-based models, which are rapidly becoming common in infrastructure, communication, and AI-driven SaaS, the control concern changes radically to the extent of metering infrastructure reliability and the auditing nature of consumption event information (Kantipudi, 2025; Brij, 2025). Hybrid models that combine subscription floors with usage-based overages are the most complex to control, both in terms of governing the fixed-consideration recognition (ratably over the subscription period) and the variable-consideration recognition (was subject to the probable reversal criterion). The analysis on the subscription economy by Chen (2024) records the effects of such complexity that promote the earnings management risk at the recognition boundary between these two revenue streams.

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### **3. Applications of Control Frameworks in SaaS Revenue Governance**

#### **3.1. COSO Framework Adaptation for SaaS Environments**

Although intended to apply to a wide scope of entity types, the COSO Internal Control-Integrated Framework offers the basic architecture to SOX 404 evaluations. However, it does not apply to SaaS revenue governance. Each of the five framework elements must be methodologically adapted to be effective in a cloud-native operating environment using subscriptions. The Control Environment element should deal with organizational tone and resource investment required by technically advanced revenue accounting functions; a problem with high-growth firms where engineering and commercial teams prevail in the cultural concern. The Risk Assessment component should consider SaaS-specific recognition risks, such as frequency of contract modification, uncertainty in estimation of variables in consideration and data integrity risks on system-levels in cloud-hosted billing architecture. Control Activities should be reorganized based

on the SaaS transaction lifecycle, which involves executing a contract and generating a billing event, OTC processing, roll-forward deferred revenue disclosure and disclosure period-end disaggregation, as opposed to the point-in-time transaction model implicit in traditional models. The Monitoring element will need to change its internal audit sampling to a systematic automated revenue recognition of input and output monitoring, relying on the data infrastructure that cloud-based SaaS operations are inherent. These adaptations are operationalized in Table 2 above in all five COSO components.

### **3.2. Order-to-Cash Process Controls: Best Practice Architecture**

The order-to-Cash (OTC) process, which consists of customer acquisition, contract execution, billing, cash collection, and revenue recognition, is the key field of operations where SaaS revenue recognition controls need to be integrated. The analysis of remediated SaaS companies indicates that convergences on an integrated OTC architecture where five features are present: (1) centralized contract repository where the extraction of performance obligation attributes is automated; (2) Revenue Recognition Engine where the application of the ASC 606 criteria is programmed at the initiation and modification of contracts; (3) real-time reconciliation between the events of the billing system and the general ledger deferred revenue accounts; (4) exception-driven workflows where non-standard contract terms are escalated to accounting scrutiny; and (5) The architecture is a direct response to the five most common categories of material weaknesses in Section 2.4, where the points of manual intervention in the billing-to-revenue data flow are removed and the management judgment documentation is institutionalized in the system of record (Kantipudi, 2025; Puvvada, 2025; Kiiskinen, 2024).

### **3.3. SOC Audit Frameworks and Third-Party Revenue System Risk**

The key mechanism to have evidential support of the IT general controls as applied to financial reporting is the SOC 1 Type II reports where the third-party cloud platform hosts the critical revenue recognition processes. Nonetheless, according to the records provided by Schoenfeld (2024), there is often no perfect fit between the scope of SOC report and the control objectives of ASC 606. The SOC reports obtained by SaaS companies using a billing platform like Stripe Billing, Zuora, or Salesforce Revenue Cloud must be obtained and critically assessed by the companies, and the covered control objectives are to be mapped to recognition risks in their reporting environment. The COBIT 2019 roles identified in the work of Lambert et al., (2025) can be used to do this mapping exercise as it outlines the primary responsibilities of CSUs in ASC 606 compliance when underlying billing infrastructure is provider managed.

### **3.4. Control Maturity Model for SaaS Revenue Recognition**

Based on the synthesized evidence, this review offers a five-stage SaaS Revenue Recognition Control Maturity Model (SaaS-RRMM). Stage 1 (Ad Hoc): Stage 1 is primarily manual in nature; there is little system integration and no formal control documentation and is typical with pre-Series B companies. Stage 2 (Reactive): The controls are done due to the findings of an audit or investor requirements; high occurrence of material weakness at IPO. Stage 3 (Defined): Formal control structure, policy records, restriction of responsibility and quarterly management recession of recognition estimates. Level 4 (Integrated): OTC process controls are programmed and system-integrated; real-time reconciliation is running; SOC report alignment has been tested. Stage 5 (Optimized): Unlimited AI-powered monitoring, predictive warnings of contract changes, and event to financial statement audit trails are operational. Stage 2-3 SaaS companies are mostly in the Stages 2-3, with leaders in Stage 4. Stage 5 capabilities are mostly aspirational. Collectively, these findings suggest that effective SaaS revenue governance depends not only on compliance with ASC 606 technical guidance but also on the redesign of internal control architectures to reflect cloud-native operational environments.

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## **4. Benefits, Limitations, and Ethical Considerations**

### **4.1. Benefits of Robust SaaS Revenue Recognition Controls**

Robust internal controls over SaaS revenue recognition generate significant value for multiple stakeholders, particularly investors, management, and regulators. Reliable control structures enhance the credibility of financial reporting by ensuring that revenue is recognized in accordance with the requirements of ASC 606. This reliability is particularly important in the SaaS industry, where investors rely heavily on forward-looking performance indicators such as Annual Recurring Revenue (ARR), Net Revenue Retention (NRR), and Remaining Performance Obligations (RPO) to evaluate firm growth and sustainability. Effective revenue recognition controls therefore play a critical role in strengthening investor confidence and improving the informational quality of financial disclosures (Brij, 2025; Puvvada, 2025).

From a managerial perspective, well-designed internal control systems improve operational governance across the SaaS revenue lifecycle. Accurate recognition processes allow firms to produce more reliable revenue forecasts, identify

contract performance issues earlier, and monitor the operational drivers that affect revenue timing and contract profitability. In addition, integrated control architectures enhance transparency within Order-to-Cash (OTC) processes, enabling better coordination between sales, finance, and technical teams responsible for subscription management.

Automated and system-embedded controls also provide substantial scalability advantages. Unlike manual control procedures, which increase proportionally with transaction volume, automated revenue recognition systems can process large numbers of subscription events without requiring equivalent increases in accounting personnel. Embedded controls within billing platforms, revenue recognition engines, and enterprise resource planning (ERP) systems allow firms to manage rapid customer growth while maintaining compliance with financial reporting standards. This scalability is particularly important for high-growth SaaS companies transitioning toward public market financing, where robust internal controls are a prerequisite for regulatory compliance and investor trust.

#### **4.2. Limitations and Current Challenges**

Despite these benefits, several structural limitations continue to constrain the effectiveness of internal controls in SaaS revenue recognition environments.

One persistent challenge involves the complexity of system integration across the technology stack that supports subscription operations. SaaS revenue processes often rely on multiple interconnected platforms, including customer relationship management (CRM) systems, configure-price-quote (CPQ) applications, subscription billing engines, and enterprise resource planning systems. Ensuring data integrity and synchronization across these systems remains a difficult operational problem. Even when automated integrations exist, inconsistencies in contract data, pricing configurations, or billing events can generate reconciliation challenges between operational systems and financial reporting outputs (Kiiskinen, 2024; Adenuga et al., 2022).

A second limitation relates to human capital constraints within accounting and financial reporting functions. The implementation of ASC 606 in SaaS environments requires specialized expertise that combines technical accounting knowledge with familiarity with subscription business models and cloud-native system architectures. However, such hybrid expertise remains scarce. Many rapidly growing SaaS firms operate with relatively small accounting teams that must manage complex revenue recognition judgments involving performance obligation identification, standalone selling price estimation, and variable consideration constraints. These capacity limitations can weaken control effectiveness even when formal policies exist.

A third challenge arises from the pace of innovation in SaaS business models. Pricing mechanisms such as usage-based billing, AI-driven consumption pricing, and platform marketplace monetization introduce new revenue recognition scenarios that are not always directly addressed by existing control frameworks. As firms experiment with new monetization strategies, accounting systems and control procedures must continually evolve to reflect emerging contractual structures and recognition patterns (Chejarla, 2025; Chen, 2024).

Finally, current external assurance mechanisms do not fully resolve governance risks associated with cloud-hosted revenue systems. Although SOC 1 Type II reports provide assurance over certain control activities performed by third-party service providers, these reports do not always align precisely with ASC 606 revenue recognition objectives. As a result, auditors and management may face assurance gaps when evaluating controls over subscription billing platforms and other outsourced revenue infrastructure (Schoenfeld, 2024; Lambert et al., 2025).

#### **4.3. Ethical Considerations**

The judgment-intensive nature of ASC 606 implementation in SaaS environments also raises important ethical considerations. Revenue recognition decisions frequently involve management estimates regarding performance obligations, variable consideration, contract modifications, and standalone selling price allocations. While these estimates are necessary to reflect economic reality, they can also create opportunities for earnings management if appropriate governance mechanisms are not in place.

Empirical evidence suggests that disclosure practices may serve as early indicators of underlying governance risks. For example, Yu et al. (2025) find that vague or generic revenue recognition disclosures are associated with a higher likelihood of future financial restatements, suggesting that weak transparency may reflect deeper control deficiencies. Similarly, large book-tax differences associated with aggressive revenue deferral or cost capitalization policies may signal attempts to manage reported financial performance (Rahiminejad, 2025).

To mitigate these risks, internal control frameworks must incorporate governance mechanisms that go beyond purely technical compliance. Effective safeguards include independent review of management judgments, strong whistleblower protections that cover financial reporting concerns, and enhanced oversight by audit committees with expertise in SaaS-specific accounting practices. Strengthening board-level understanding of subscription revenue models can improve the monitoring of management discretion in recognition decisions.

Emerging digital auditing tools may also play an increasingly important role in promoting ethical financial reporting. Technologies such as AI-based anomaly detection systems and blockchain-enabled audit trails have the potential to improve transparency by creating tamper-resistant records of revenue-related transactions and contract modifications. Although these technologies remain in early stages of adoption, they are attracting growing attention from both accounting standard-setters and audit practitioners seeking to strengthen assurance in cloud-based financial reporting environments (Zhou, 2025; Decker, 2025; Stratopoulos et al., 2020).

Taken together, these ethical considerations highlight that effective SaaS revenue governance requires not only robust technical controls but also strong institutional oversight and evolving audit methodologies capable of addressing the unique risks of subscription-based digital business models.

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## **5. Future Directions and Research Gaps**

### **5.1. Control Maturity Modeling for SaaS Business Model Variants**

A key gap in the current literature is the absence of empirically validated control maturity models tailored to the unique properties of SaaS business models. Existing maturity frameworks provide general guidance but fail to address SaaS-specific dimensions such as billing system auditability, performance obligation governance, and management of variable consideration estimates. Future research should build upon the SaaS Revenue Recognition Control Maturity Model (SaaS-RRCMM) proposed in Section 3.4, developing stage-specific benchmarks for seat-based, usage-based, hybrid, and marketplace models. Such studies could enable firms to assess their current control state, prioritize remediation investments, and communicate control maturity to investors and auditors in a standardized manner.

### **5.2. AI and Machine Learning in Revenue Recognition Controls**

The use of artificial intelligence (AI) and machine learning (ML) in SaaS revenue recognition remains in its early stages. Zhou (2025) demonstrates the potential for AI to perform continuous, regulation-compliant risk detection using large language models. While promising, the reliability, interpretability, and auditability of AI-generated outputs must be rigorously assessed before they can be integrated into SOX 404 attestations. Future research should focus on designing AI-based control applications that meet audit evidentiary requirements, including documenting model assumptions, ensuring quality of training datasets, and handling exceptions systematically. Of particular importance is understanding how auditors rely on AI-generated revenue estimates and the potential implications for audit risk (Maghakyan et al., 2025).

### **5.3. Standard-Setter Response to Emerging SaaS Revenue Complexity**

Although heterogeneity in ASC 606 application has been documented for SaaS models, FASB has issued limited interpretive guidance addressing subscription and usage-based arrangements. Empirical studies could examine the gap between current guidance and emerging SaaS business models, including AI-consumption pricing, outcome-based contracts, and embedded finance capabilities. The ongoing FASB project on software revenue recognition provides a timely opportunity to document operational and reporting challenges, evaluate the adequacy of current guidance, and propose targeted amendments. Additionally, Sreseli and Sreseli (2025) highlight the urgent need for guidance on accounting for contract asset and liability interactions in multi-performance-obligation arrangements.

### **5.4. IPO-Stage Control Design and Post-IPO Remediation**

The transition from private to public ownership is a critical stage for SaaS revenue recognition controls. Evidence from Hannula-Backa (2024) indicates that early-stage SaaS firms often implement reactive rather than proactive controls, leaving many companies with materially insufficient control architectures at the time of IPO. Longitudinal research tracking control design decisions from Series B/C financing through S-1 filings and first-year 10-K reporting could provide actionable benchmarks. Comparing remediation measures adopted by firms that reported material weaknesses, post-IPO would help identify best practices and optimal sequencing of control investments.

### **5.5. Cross-Border and Multi-Jurisdictional Control Challenges**

International expansion introduces additional layers of complexity for SaaS revenue recognition. Firms must navigate IFRS 15 adoption, foreign currency transactions, transfer pricing considerations, and local statutory reporting requirements. Current literature on multi-jurisdictional control models is limited. Initial analyses, such as Rahiminejad (2025), highlight book-tax variances arising from subscription business models, but comprehensive frameworks for multi-jurisdictional SaaS revenue governance are lacking. Future research should focus on developing integrated control structures that address these international compliance challenges.

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## 6. Conclusion

This review demonstrates that internal controls over SaaS revenue recognition remain misaligned with the complexity of subscription-based business models under ASC 606. Material weaknesses consistently emerge in five areas: performance obligation governance, billing system auditability, cloud IT general controls, management estimate documentation, and Order-to-Cash process integration. These weaknesses reflect structural characteristics of SaaS operations rather than isolated failures. Evidence indicates a shift toward continuous, system-integrated control architectures as the emerging paradigm for cloud-native SaaS environments, leveraging AI-assisted monitoring, real-time audit trails, and integrated OTC platforms.

The SaaS-RRCMM framework proposed herein provides a foundation for benchmarking control maturity, guiding remediation, and communicating internal control quality to investors and auditors. Researchers are invited to validate maturity models, examine AI-aided control monitoring, and investigate IPO-stage control design and multi-jurisdictional compliance. Practitioners are urged to invest in proactive, scalable controls and ensure alignment between SOC audits and ASC 606 objectives. Strengthening these controls is critical to safeguarding financial reporting integrity, maintaining investor trust, and supporting sustainable growth in the rapidly expanding U.S. SaaS market.

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