KYC Platform - Complete User Requirement Specification (URS)

Document Information

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1. Executive Summary

1.1 Purpose

This document specifies the user requirements for a comprehensive Know Your Customer (KYC) platform that facilitates invitation-based supplier onboarding, buyer facility management, and ongoing operational relationships in a financial services ecosystem.

1.2 Scope

The KYC platform encompasses:

- **Buyer-Initiated Supplier Onboarding**: Invitation-based supplier registration, KYC processing, and relationship establishment
- **Buyer Facility Management**: Company registration, comprehensive KYC documentation, facility agreements, and operational capabilities
- **Administrative Management**: Document review workflows, decision-making processes, user management, and relationship oversight
- **Operational Features**: Invoice management, buyer-supplier relationships, banking verification, and analytics

1.3 Business Objectives

- **Regulatory Compliance**: Meet KYC/AML requirements for financial services
- **Relationship Management**: Facilitate buyer-supplier business relationships through controlled onboarding
- **Risk Management**: Comprehensive vetting of all platform participants with proper agreement execution
- **Operational Efficiency**: Streamlined invitation-based onboarding and document processing
- **User Experience**: Intuitive interfaces for all user types with role-appropriate functionality
- **Scalability**: Support growing user base, invitation networks, and transaction volumes

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2. System Overview

2.1 Platform Architecture

The KYC platform operates as a multi-tenant SaaS solution supporting three primary user flows:

1. **Buyer Flow**: Registration → KYC → Agreement → Dashboard → Supplier Invitation & Management
2. **Supplier Flow**: Invitation → Registration → KYC → Banking → Agreement → Dashboard → Operational Relationship
3. **Admin Flow**: Intake → Review → Decision → Banking Verification → Relationship Management

2.2 Core Business Entities

- **Companies**: Supplier and buyer organizations with invitation relationships
- **KYC Records**: Application status and compliance tracking with invitation context
- **Documents**: Uploaded files with verification status and audit trails

- **Invitations**: Buyer-initiated supplier invitation management with token-based security

- **Agreements**: Digital signature-based legal document management

- **Banking Details**: Financial account information with admin verification

- **Relationships**: Buyer-supplier operational relationships with status tracking

- **Facility Agreements**: Credit facilities for buyers

- **Invoices**: Transaction documents between related buyer-supplier pairs

2.3 Status Engines

Document Lifecycle: uploaded/pending → under_review → verified/rejected **KYC Lifecycle**: pending → under_review → ready_for_decision → approved/rejected **Invitation Lifecycle**: sent → opened → registered → completed/expired **Relationship Lifecycle**: invited → onboarding → active → suspended/terminated

3. User Categories and Roles

3.1 Supplier Users (Invitation-Based)

Primary Role: Business entities invited by buyers to participate as suppliers in the platform ecosystem

Key Characteristics:

- Can only register via valid buyer invitations

- Small to medium enterprises with limited technical expertise

- Require clear guidance through invitation-based onboarding process

- Need visibility into buyer relationship and invitation context

Access Levels:

- Own company data and invitation details

- Own KYC status and documents

- Buyer relationship information and communication

- Banking information (post-approval)

- Buyer-specific invoices and transactions

3.2 Buyer Users (Invitation Initiators)

Primary Role: Organizations seeking credit facilities and comprehensive supplier management capabilities

Key Characteristics:

- Larger enterprises with complex supplier networks

- Financial sophistication and supplier relationship management needs

- Require comprehensive operational tools and supplier oversight

- Need invitation management and supplier onboarding tracking

Access Levels:

- Facility agreement management and credit capabilities

- Comprehensive supplier invitation and management tools

- Invoice processing and approval workflows

- Supplier relationship analytics and performance tracking

- Real-time supplier onboarding progress visibility

3.3 FM Admin Users

Primary Role: Platform administrators responsible for KYC review, decision-making, and relationship oversight

Key Characteristics:

- Financial services professionals with compliance expertise

- Compliance and risk management accountability

- High-volume document processing and relationship monitoring

- Regulatory oversight and audit trail management

Access Levels:

- All user applications, documents, and invitation activities

- Review and approval workflows for all user types

- Banking verification and relationship oversight

- System analytics, reporting, and invitation monitoring

- User management and relationship status control

Required Permissions: `admin`, `fm_admin`, or `fa_admin` roles

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4. Functional Requirements

4.1 Authentication and User Management

4.1.1 User Registration with Email OTP Verification

REQ-AUTH-001: The system SHALL implement multi-step user registration with email OTP verification

- **Step 1**: Email and password capture with validation
- **Step 2**: OTP generation and delivery via email
- **Step 3**: OTP verification and account activation
- Email format validation and password strength requirements
- Email uniqueness constraint enforcement
- Role assignment based on registration flow (supplier via invitation/buyer direct)

REQ-AUTH-002: The system SHALL implement email OTP generation and delivery mechanism

- Generate 6-digit numeric OTP with 10-minute expiration
- Email delivery via SMTP service with HTML template formatting
- Maximum 3 OTP generation attempts per email address per hour
- Secure OTP storage with hashing and automatic cleanup
- Resend OTP capability with 60-second cooldown period

REQ-AUTH-003: The system SHALL enforce email OTP verification requirements

- Account activation only after successful OTP verification
- Maximum 3 verification attempts per OTP
- Account lockout after 5 failed OTP attempts (24-hour cooling period)
- Clear error messages for failed verification attempts
- Audit logging of all OTP generation and verification activities

REQ-AUTH-004: The system SHALL support secure user login with credential verification

- JWT token-based authentication with configurable expiration
- Session management with automatic timeout and refresh capabilities
- Failed login attempt tracking and progressive lockout (3, 15, 60 minutes)
- Account lockout notifications via email
- Secure password reset functionality with email OTP verification

REQ-AUTH-005: The system SHALL provide comprehensive user profile management

- Profile information retrieval and updates

- Email address management with re-verification capability

- Onboarding status indicators and progress tracking

- KYC status visibility with detailed progression information

- Account security settings and authentication method management

4.2 Supplier Flow Requirements (Invitation-Based)

4.2.1 Supplier Invitation Process

REQ-SUP-001: The system SHALL support buyer-initiated supplier invitations

- Buyers can invite suppliers by providing supplier company name and email address

- System generates unique invitation tokens with expiration (7 days)

- Invitation emails sent with branded templates and registration links

- Invitation tracking and status management (sent, opened, registered, expired)

- Multiple invitation attempts allowed with different expiration periods

REQ-SUP-002: The system SHALL handle supplier invitation acceptance

- Invitation link validation and token verification

- Pre-filled registration form with buyer-provided company information

- Invitation-specific registration flow with buyer-supplier relationship establishment

- Automatic relationship preparation upon successful registration

- Expired invitation handling and re-invitation capabilities

4.2.2 Company Registration (Invitation-Based)

REQ-SUP-003: The system SHALL capture supplier company information via invitation flow

- Pre-populated fields from buyer invitation (company name, initial contact info)

- Required fields: Company name, registration number, tax number, email, phone, address

- Field validation and format checking with real-time feedback

- Auto-fill capabilities from external data sources where available

- Invitation context preservation throughout registration process

REQ-SUP-004: The system SHALL provide invitation-aware application management

- Save and continue functionality with invitation context

- Pre-population from invitation data and previous submissions

- Application status tracking with buyer visibility

- Buyer notification of supplier registration progress

- Invitation expiry and renewal management

4.2.3 KYC Process (Invitation-Linked)

REQ-SUP-005: The system SHALL create KYC records linked to supplier applications and buyer invitations

- Unique KYC ID generation with invitation traceability

- Initial status of "pending" with buyer-supplier relationship tracking

- Audit trail creation including invitation source and buyer information

- Automatic buyer notification of KYC milestone progress

REQ-SUP-006: The system SHALL support document upload for required supplier documents

- Required documents: business_registration, mandate, proof_of_address

- File format validation (PDF, JPG, PNG) with size limits (max 10MB per document)

- Virus scanning and security checks for all uploaded documents

- Document versioning and replacement capabilities

- Buyer visibility into document submission status (without accessing content)

REQ-SUP-007: The system SHALL validate minimum document requirements before submission

- Minimum 2 documents required for submission to admin review

- Document type validation and completeness checking

- Status transition to "under_review" with buyer notification

- Automatic buyer dashboard updates on supplier progress

4.2.4 Banking Information and Agreement Signing (Post-Approval)

REQ-SUP-008: The system SHALL collect banking details post-KYC approval with buyer notification

- Required fields: Bank name, account number, routing number, account holder name

- Banking detail submission only permitted after KYC approval by FM Admin

- Encryption of sensitive banking data with secure storage

- Banking submission triggers agreement preparation and buyer notification

REQ-SUP-009: The system SHALL enforce supplier agreement signing workflow with buyer integration

- Agreement presentation only after banking details submission

- Digital signature capability with legal validity and compliance

- Agreement versioning and template management

- Mandatory agreement acceptance before dashboard access

- Buyer notification of supplier agreement completion status

- Comprehensive audit trail with timestamps, IP tracking, and buyer linkage

REQ-SUP-010: The system SHALL provide supplier dashboard access workflow with buyer relationship

- **Level 1** (Pre-KYC Approval): Application management, invitation details, buyer contact info

- **Level 2** (KYC Approved): Banking details submission form, buyer communication

- **Level 3** (Banking Submitted): Agreement signing interface, buyer relationship status

- **Level 4** (Agreement Signed): Full supplier dashboard with buyer-specific features

- **Level 5** (Banking Verified): Premium features, enhanced buyer collaboration tools

REQ-SUP-011: The system SHALL activate buyer-supplier operational relationship

- Automatic relationship activation upon completion of supplier onboarding

- Invoice and transaction capabilities between specific buyer-supplier pairs

- Buyer dashboard updates showing active supplier relationships

- Communication channels and collaboration tools for buyer-supplier interaction

4.3 Buyer Flow Requirements

4.3.1 Facility Application

REQ-BUY-001: The system SHALL capture buyer facility application information

- Required fields: Company name, registration number, tax number

- Optional fields: Contact email, contact phone

- Application reset capability (when not under review)

- Integration with facility agreement preparation systems

4.3.2 KYC Process

REQ-BUY-002: The system SHALL support buyer document upload requirements

- Required documents: business_registration, financial_statement, tax_clearance, bank_confirmation

- All 4 documents required before review consideration

- Document preview capabilities and version management

- Enhanced document verification for financial institutions

4.3.3 Agreement Signing and Post-Approval Operations

REQ-BUY-003: The system SHALL enforce buyer agreement signing workflow

- Agreement presentation immediately after KYC approval by FM Admin
- Digital signature capability with legal validity and compliance
- Agreement versioning and template management system
- Mandatory agreement acceptance before any dashboard or operational access
- Comprehensive audit trail with timestamps, IP addresses, and user identification

REQ-BUY-004: The system SHALL provide facility agreement management post-signing

- Facility agreement creation and tracking capabilities
- Agreement status monitoring and reporting
- Terms and conditions display and management
- Amendment and renewal processes

REQ-BUY-005: The system SHALL support invoice management capabilities

- Invoice listing and filtering with advanced search
- GRN (Goods Received Note) issuance and updates
- Payment approval workflows with multi-level authorization
- Transaction history and audit trails

4.3.4 Enhanced Supplier Relationship Management

REQ-BUY-006: The system SHALL enable comprehensive supplier invitation and management

- Supplier invitation via email with company name and contact information
- Invitation template management with customizable messaging
- Bulk supplier invitation capabilities for multiple suppliers
- Invitation tracking dashboard with status monitoring (sent, opened, registered, completed)
- Re-invitation capabilities for expired or unsuccessful invitations

REQ-BUY-007: The system SHALL provide supplier onboarding visibility and management

- Real-time visibility into invited supplier onboarding progress
- Supplier KYC status monitoring without access to confidential documents

- Automated notifications for supplier milestone completions

- Supplier relationship status tracking and management dashboard

- Communication tools for buyer-supplier interaction during onboarding

REQ-BUY-008: The system SHALL support operational supplier relationship features

- Active supplier directory with status and performance indicators

- Invoice and transaction management for each supplier relationship

- Supplier performance tracking and scoring capabilities

- Communication history and collaboration tools

- Supplier contract and agreement management

4.4 Admin Flow Requirements

4.4.1 Intake and Triage

REQ-ADM-001: The system SHALL provide application overview capabilities

- List all applications with key metrics and invitation context

- Filter by application type, status, date ranges, and invitation source

- Bulk actions for common operations

- Invitation activity monitoring and analytics

REQ-ADM-002: The system SHALL support document review queue management

- Reviewable documents listing with buyer-supplier relationship context

- Priority-based sorting with invitation-based prioritization

- Workload distribution features

- Invitation success rate impact on review priority

REQ-ADM-003: The system SHALL enable user-specific document lookup

- Search by user ID, document type, status, and invitation source

- Advanced filtering options including buyer-supplier relationships

- Content inclusion toggles with privacy protection

- Invitation context and relationship status visibility

4.4.2 Document Review Process

REQ-ADM-004: The system SHALL support individual document review

- Document status transition: uploaded/pending → under_review
- Review notes capture with buyer-supplier context
- KYC status automatic updates with buyer notification triggers
- Invitation-aware review workflows

REQ-ADM-005: The system SHALL enforce review workflow rules

- KYC status: pending → under_review (first document reviewed)
- KYC status: under_review → ready_for_decision (all required documents reviewed)
- Validation guards against invalid state transitions
- Buyer notification triggers for major status changes

4.4.3 Decision Making

REQ-ADM-006: The system SHALL provide final decision capabilities

- Applications ready for finalization listing with invitation context
- Approve/reject decision with notes and buyer impact assessment
- Bulk document status updates based on decision
- Automatic buyer-supplier relationship status updates

REQ-ADM-007: The system SHALL enforce decision workflow rules

- Only applications with all required documents reviewed can be finalized
- Decision effects: KYC status update, all under_review documents → verified/rejected
- Irreversible decision tracking with buyer notification
- Invitation success rate impact tracking

4.4.4 Banking Verification and Supplier Management

REQ-ADM-008: The system SHALL support banking detail verification workflow

- Banking records listing and management for submitted banking details
- Status updates: pending, verified, rejected
- Verification notes and audit trail
- Supplier notification of banking verification results
- Buyer relationship impact assessment

REQ-ADM-009: The system SHALL manage supplier dashboard access levels

- Monitor supplier progression through onboarding stages

- Track banking details submission and verification status

- Provide visibility into supplier operational readiness

- Generate reports on supplier onboarding completion rates

- Invitation-to-completion analytics

REQ-ADM-010: The system SHALL enforce banking verification business rules

- Banking verification is independent of supplier dashboard access

- Suppliers can access dashboard immediately after banking submission

- Banking verification affects trust scores and premium features

- Failed banking verification triggers re-submission workflow

- Buyer relationship status considerations

4.5 Dashboard and Analytics

4.5.1 User Dashboards and Access Control with Agreement Requirements

REQ-DASH-001: The system SHALL provide role-appropriate dashboards with agreement-gated access

- **Supplier Dashboard Levels**:
  - **Level 1** (Pre-KYC): Application status, document checklist, KYC progress, invitation context
  - **Level 2** (KYC Approved): Banking details submission form, agreement preparation, buyer communication
  - **Level 3** (Banking Submitted): Agreement signing interface, terms display, buyer relationship
  - **Level 4** (Agreement Signed): Full dashboard access, invoice management, buyer-specific features
  - **Level 5** (Banking Verified): Premium features, enhanced trust indicators, priority collaboration

- **Buyer Dashboard Levels**:
  - **Level 1** (Pre-KYC): Application status, document checklist, KYC progress
  - **Level 2** (KYC Approved): Agreement signing interface, terms and conditions
  - **Level 3** (Agreement Signed): Full dashboard access, facility management, supplier invitation capabilities

- **Admin Dashboard**: Review queue, decision pipeline, agreement management, invitation analytics

REQ-DASH-002: The system SHALL implement agreement-based access gates and transitions

- Automatic access level progression based on agreement completion

- Prevention of dashboard functionality without signed agreements

- Clear visual indicators of current access level and requirements

- Real-time status updates for agreement signing progress

- Contextual guidance for completing required agreement actions

4.5.2 Analytics and Reporting

REQ-DASH-003: The system SHALL generate comprehensive platform analytics

- Document processing statistics with invitation context

- Application pipeline metrics including invitation success rates

- Performance benchmarks (review times, approval rates, invitation-to-completion)

- User engagement analytics with buyer-supplier relationship insights

- Invitation campaign effectiveness and ROI analysis

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5. Non-Functional Requirements

5.1 Performance Requirements

REQ-PERF-001: The system SHALL support concurrent user loads

- Minimum 500 concurrent users across buyer and supplier roles

- Response time < 2 seconds for standard operations

- Document upload < 30 seconds for 10MB files

- Invitation email delivery < 30 seconds

REQ-PERF-002: The system SHALL provide high availability

- 99.9% uptime service level agreement

- Maximum 4 hours planned maintenance window

- Disaster recovery capabilities with <2 hour RTO

- Geographic redundancy for global accessibility

5.2 Security Requirements

REQ-SEC-001: The system SHALL implement comprehensive security measures

- Role-based access control (RBAC) with invitation-aware permissions

- Data encryption at rest and in transit (AES-256, TLS 1.3)

- Audit logging for all user actions including invitation activities

- Document virus scanning and malware protection

REQ-SEC-002: The system SHALL protect sensitive financial data

- PCI DSS compliance for banking information

- PII data protection measures with tokenization

- Secure document storage with access controls

- Invitation token security with expiration and single-use policies

5.3 Compliance Requirements

REQ-COMP-001: The system SHALL meet regulatory compliance requirements

- KYC/AML regulation adherence with invitation audit trails

- Document retention policies (minimum 7 years)

- Audit trail completeness including buyer-supplier relationships

- Regulatory reporting capabilities with relationship context

5.4 Usability Requirements

REQ-UI-001: The system SHALL provide intuitive user interfaces

- Mobile-responsive design for all user types

- Accessibility compliance (WCAG 2.1 AA)

- Multi-language support capability

- Clear progress indicators and status updates

- Context-aware interfaces based on invitation status and relationships

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6. System Workflows

6.1 Supplier Onboarding Workflow (Invitation-Based)

1. Buyer Invites Supplier (via email invitation)

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2. Supplier Receives Invitation Email with Registration Link

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3. Supplier Registration (Email + Password)

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4. OTP Generation and Email Delivery

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5. OTP Verification and Account Activation

 ↓

6. User Login (Activated Account)

 ↓

7. Company Application Creation (pre-filled from invitation)

 ↓

8. KYC Record Initialization

 ↓

9. Document Upload (min 2 docs)

 ↓

10. Application Submission

 ↓

11. Admin Review Process (Document Review)

 ↓

12. Final KYC Approval/Rejection by FM Admin

 ↓ (if approved)

13. Banking Details Submission by Supplier

 ↓

14. Supplier Agreement Signing (Digital/Electronic)

 ↓

15. Full Supplier Dashboard Access

 ↓ (parallel process)

16. Banking Details Verification by Admin

 ↓

17. Premium Features Unlocked

 ↓

18. Buyer-Supplier Relationship Activated

6.2 Buyer Onboarding Workflow

1. User Registration (Email + Password)

  ↓

2. OTP Generation and Email Delivery

  ↓

3. OTP Verification and Account Activation

  ↓

4. User Login (Activated Account)

  ↓

5. Facility Application Creation

  ↓

6. KYC Record Initialization

  ↓

7. Document Upload (all 4 required docs)

  ↓

8. Admin Review Process

  ↓

9. Final KYC Approval/Rejection by FM Admin

  ↓ (if approved)

10. Buyer Agreement Signing (Digital/Electronic)

  ↓

11. Full Buyer Dashboard Access

  ↓

12. Supplier Invitation Capabilities Enabled

  ↓

13. Facility Agreement Setup and Management

  ↓

14. Operational Access (invoices, suppliers)

6.3 Admin Review Workflow

1. Application Intake and Triage (with invitation context)

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2. Document-by-Document Review

  ↓

3. All Required Documents Reviewed

  ↓

4. Final Decision (Approve/Reject)

  ↓

5. Post-Decision Actions (buyer notifications)

  ↓

6. Banking Verification (suppliers)

  ↓

7. Relationship Status Management

  ↓

8. Ongoing Monitoring and Analytics

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7. Data Requirements

7.1 Core Data Entities

7.1.1 Enhanced User Entity

- id (UUID, Primary Key)
- email (String, Unique, Required)
- password_hash (String, Encrypted, Required)
- role (Enum: supplier, buyer, admin, fm_admin, fa_admin)
- account_status (Enum: pending_verification, active, locked, suspended)
- email_verified (Boolean, Default: false)
- created_at (Timestamp)
- updated_at (Timestamp)
- last_login (Timestamp)
- failed_login_attempts (Integer, Default: 0)
- lockout_until (Timestamp, Nullable)

7.1.2 Email OTP Verification Entity

- id (UUID, Primary Key)
- user_id (UUID, Foreign Key, Nullable)
- email_address (String, Required)
- otp_code (String, Hashed, Required)
- purpose (Enum: registration, login, password_reset, email_change)
- attempts_count (Integer, Default: 0)
- max_attempts (Integer, Default: 3)
- expires_at (Timestamp, Required)
- verified_at (Timestamp, Nullable)
- email_sent_at (Timestamp, Required)
- email_delivery_status (Enum: pending, sent, delivered, failed)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.3 Company Entity

- id (UUID, Primary Key)
- user_id (UUID, Foreign Key)
- company_name (String, Required)
- registration_number (String, Required)
- tax_number (String, Required)
- email (String)
- phone (String)
- address (Text)
- company_type (Enum: supplier, buyer)
- status (Enum: draft, submitted, approved, rejected)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.4 KYC Record Entity

- id (UUID, Primary Key)
- user_id (UUID, Foreign Key)
- company_id (UUID, Foreign Key)
- invitation_id (UUID, Foreign Key, Nullable)
- status (Enum: pending, under_review, ready_for_decision, approved, rejected)
- submitted_at (Timestamp)
- reviewed_at (Timestamp)
- decided_at (Timestamp)
- decision_notes (Text)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.5 Document Entity

- id (UUID, Primary Key)
- kyc_id (UUID, Foreign Key)
- document_type (Enum: business_registration, mandate, proof_of_address, financial_statement, tax_clearance, bank_confirmation)
- filename (String)
- file_path (String, Encrypted)
- file_size (Integer)
- mime_type (String)
- status (Enum: uploaded, pending, under_review, verified, rejected)
- upload_date (Timestamp)
- review_date (Timestamp)
- review_notes (Text)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.6 Agreement Entity

- id (UUID, Primary Key)
- user_id (UUID, Foreign Key)
- agreement_type (Enum: supplier_terms, buyer_terms, facility_agreement, cession_agreement)
- agreement_version (String, Required)
- template_id (UUID, Foreign Key)
- agreement_content (Text, Required)
- status (Enum: pending, presented, signed, expired, superseded)
- presented_at (Timestamp)
- signed_at (Timestamp)
- signature_method (Enum: digital, electronic, wet_signature)
- signatory_name (String)
- signatory_title (String)
- signatory_ip_address (String)
- signature_data (Text, Encrypted) // Digital signature hash
- witness_required (Boolean, Default: false)
- witness_name (String, Nullable)
- witness_signature (Text, Nullable)
- expiry_date (Timestamp, Nullable)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.7 Agreement Template Entity

- id (UUID, Primary Key)
- template_name (String, Required)
- template_type (Enum: supplier_terms, buyer_terms, facility_agreement)
- version (String, Required)
- content_template (Text, Required)
- variables (JSON, Nullable) // Template variables for customization
- is_active (Boolean, Default: true)
- effective_date (Timestamp, Required)
- created_by (UUID, Foreign Key to User)
- approved_by (UUID, Foreign Key to User)
- approval_date (Timestamp)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.8 Enhanced Supplier Dashboard Access Entity

- id (UUID, Primary Key)
- user_id (UUID, Foreign Key)
- kyc_id (UUID, Foreign Key)
- access_level (Enum: pre_kyc, kyc_approved, banking_submitted, agreement_signed, banking_verified)
- dashboard_features (JSON, Array of enabled features)
- last_level_change (Timestamp)
- banking_submission_date (Timestamp)
- agreement_signing_date (Timestamp)
- banking_verification_date (Timestamp)
- agreement_id (UUID, Foreign Key to Agreement)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.9 Enhanced Buyer Dashboard Access Entity

- id (UUID, Primary Key)
- user_id (UUID, Foreign Key)
- kyc_id (UUID, Foreign Key)
- access_level (Enum: pre_kyc, kyc_approved, agreement_signed)
- dashboard_features (JSON, Array of enabled features)
- last_level_change (Timestamp)
- agreement_signing_date (Timestamp)
- agreement_id (UUID, Foreign Key to Agreement)
- facility_agreement_id (UUID, Foreign Key, Nullable)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.10 Supplier Invitation Entity

- id (UUID, Primary Key)
- buyer_id (UUID, Foreign Key to User)
- invited_company_name (String, Required)
- invited_email (String, Required)
- invitation_message (Text, Nullable)
- invitation_token (String, Unique, Required)
- status (Enum: sent, opened, registered, completed, expired, cancelled)
- expires_at (Timestamp, Required)
- sent_at (Timestamp, Required)
- opened_at (Timestamp, Nullable)
- registered_at (Timestamp, Nullable)
- completed_at (Timestamp, Nullable)
- supplier_user_id (UUID, Foreign Key to User, Nullable)
- email_delivery_status (Enum: pending, sent, delivered, bounced, failed)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.11 Enhanced Buyer-Supplier Relationship Entity

- id (UUID, Primary Key)
- buyer_id (UUID, Foreign Key to User)
- supplier_id (UUID, Foreign Key to User)
- invitation_id (UUID, Foreign Key to Supplier Invitation)
- relationship_status (Enum: invited, onboarding, active, suspended, terminated)
- established_at (Timestamp, Nullable)
- cession_agreement_id (UUID, Foreign Key, Nullable)
- performance_score (Decimal, Nullable)
- total_transactions (Integer, Default: 0)
- total_transaction_value (Decimal, Default: 0)
- last_transaction_date (Timestamp, Nullable)
- communication_preferences (JSON)
- created_at (Timestamp)
- updated_at (Timestamp)

7.1.12 Enhanced Banking Details Entity

```
- id (UUID, Primary Key)
- user_id (UUID, Foreign Key)
- bank_name (String, Required)
- account_number (String, Encrypted, Required)
- routing_number (String, Encrypted, Required)
- account_holder_name (String, Required)
- status (Enum: pending, verified, rejected, resubmission_required)
- submission_date (Timestamp, Required)
- verification_date (Timestamp)
- verification_notes (Text)
- admin_verifier_id (UUID, Foreign Key to User)
- resubmission_count (Integer, Default: 0)
- created_at (Timestamp)
- updated_at (Timestamp)
```

7.2 Data Validation Rules

7.2.1 Enhanced Business Rules with Invitation-Based Supplier Onboarding

- Email addresses must be unique across the system
- **User account activation requires successful email OTP verification**
- **Only verified and activated accounts can access application features**
- **Suppliers can only register via valid buyer invitations**
- **Invitation tokens expire after 7 days and must be renewed if unused**
- **Buyer-supplier relationships are established upon invitation acceptance**
- Registration numbers must be unique per company type
- Documents can only be uploaded for active KYC records
- **Banking details can only be submitted after KYC approval by FM Admin (Suppliers only)**
- **Agreement signing is mandatory before dashboard access for both suppliers and buyers**
- **Suppliers must complete: Invitation → Registration → KYC → Banking → Agreement → Dashboard Access**
- **Buyers must complete: KYC → Agreement → Dashboard Access → Supplier Invitation Capability**
- **Banking verification by admin does not block supplier dashboard functionality**
- **Banking verification affects trust level and premium feature access**
-