CHAPTER 25

BANKING, FINANCIAL MARKETS, AND FINANCIAL TECHNOLOGY

Sixbert SANGWA

African Leadership University | Kigali, Rwanda | ssangwa@alueducation.com

PARENT BOOK

The Business Enterprise: Core Functions, Integrated Management, and Emerging Transformations
https://doi.org/10.65655/ocp.m30

VOLUME EDITOR AND PUBLISHER

Prof. Dr. Placide MUTABAZI
Open Christian Press, imprint of Open Christian University and Center for Faith and Work

CHAPTER IDENTIFIER

10.65655/ocp.m30.c134

COPYRIGHT, LICENCE AND EDITION

© 2026 Sixbert SANGWA | CC BY 4.0

ABSTRACT

Financial systems determine whether economic promises can become reliable transfers of purchasing power, productive investment and protection against uncertainty. Their institutional value cannot be inferred from the number of accounts, the speed of a payment, or the expansion of credit alone. This chapter develops a critical, integrated account of banking, financial markets, insurance and financial technology across twelve approved domains. A transparent documentary synthesis combines theories of delegated monitoring, asymmetric information, liquidity transformation, financial development and innovation with verified international standards and Rwandan regulatory and survey evidence. Rwanda's FinScope 2024 findings, the National Bank of Rwanda's 2024/25 reporting, capital-market developments and a reported central-bank digital-currency proof of concept are interpreted without conflating access, usage, welfare and system resilience. A comparative discussion of Kenyan mobile money and global financial infrastructure examines the transportability of evidence. Original educational instruments include a functional financial-ecosystem diagram, financing-suitability matrix, enterprise–household financial-journey map, and a reproducible digital-lender stress review. The central argument is that sound financial intermediation depends on the simultaneous credibility of claims, information, funding, settlement, consumer remedy and public safeguards. Technological innovation can reduce transaction and information costs, but may also transfer risks or consolidate market power. The integrated framework is a reasoned analytical synthesis, not an empirically validated model; empirical claims, illustrative figures and normative judgments are explicitly separated.

Keywords: financial intermediation; commercial banking; credit rationing; capital markets; payment systems; financial technology; financial inclusion; insurance; central bank digital currency; Rwanda.

LEARNING OUTCOMES AND CONCEPTUAL ROADMAP

Upon completing the chapter, readers should be able to: (LO1) explain and critically compare the functions and theoretical rationales of intermediaries, markets and risk-transfer institutions; (LO2) reconstruct bank balance-sheet and payment-settlement mechanics while identifying binding funding, capital and liquidity constraints; (LO3) evaluate enterprise credit, debt securities, equity and alternative financing against documented business needs; (LO4) distinguish money-market, capital-market, payment and insurance instruments using appropriate calculations and institutional safeguards; (LO5) appraise fintech models, digital-credit decisions and payment interoperability through measurable costs, risks and consumer outcomes; (LO6) interpret Rwanda-specific financial-inclusion and sector evidence with valid denominators and comparative limitations; (LO7) assess financial stability, climate, cyber, data, algorithmic and digital-asset risks without confusing a proposal, pilot and

legal tender; and (LO8) defend an auditable integrated financing-and-payments recommendation with numerical sensitivity analysis, ethical safeguards and appropriate revision triggers.

The chapter first establishes the financial system's functions (25.1) and bank intermediation (25.2), then examines credit (25.3), securities markets (25.4), prudential governance (25.5), payments (25.6), fintech (25.7), inclusion (25.8), insurance (25.9), capital formation (25.10), digital monetary innovation (25.11) and emerging systemic risks (25.12). A Rwanda-centred application, international comparison, constructed digital-lender case, synthesis, research agenda and teaching apparatus follow. Financial statements, management costing and investment valuation belong principally to Chapters 22–24; tax and audit compliance to Chapter 26. The present chapter explains the intermediaries, markets and infrastructures through which enterprise financing and settlement actually occur.

25.0 INTRODUCTION: WHEN A BUSINESS HAS A CUSTOMER BUT CANNOT COMPLETE THE EXCHANGE

A hypothetical Rwandan food-processing enterprise has signed a supply agreement with a national retailer. It must buy packaging today, pay employees weekly, deliver goods within fourteen days and wait thirty days after delivery for the retailer's payment. The owner's bank account displays a positive balance, yet its available funds do not cover the production cycle. A commercial bank requests verified cash flows and acceptable collateral; an invoice-finance provider offers an advance against the buyer's receivable; the supplier will accept a staged payment; a mobile-money channel can collect small retail receipts but imposes transaction costs. The owner must also insure inventory and transport exposure. There is no single 'finance problem': the enterprise faces distinct problems of maturity, risk, evidence, enforceability and settlement.

Financial systems are arrangements of institutions, contracts, markets, information and infrastructures through which economic agents store and transfer value, mobilize resources and redistribute risks. Banks extend credit and offer payment liabilities; securities markets price transferable claims; insurers pool and price specified risks; pensions and investment funds aggregate long-horizon savings; payment systems transfer instructions and effect settlement; authorities establish monetary, prudential and conduct conditions. A company can use several simultaneously, and none is a comprehensive substitute for the others. The central analytical question is not whether finance is modern or expanding, but which arrangements convert scarce savings, credible information and enforceable commitments into beneficial real-sector activity without creating unacceptable fragility.

The chapter employs a critical targeted documentary synthesis rather than claiming a systematic review or new fieldwork. Sources were selected purposively for four purposes: original mechanisms in peer-reviewed theory; evidence on enterprise financing and financial inclusion; primary Rwandan institutional reporting and laws; and international infrastructure and prudential standards. Official sources were prioritized for institution-specific and time-sensitive claims, with their observation periods retained. Study findings are interpreted according to design and population; constructed calculations serve pedagogy, not evidence of Rwandan firm outcomes. This approach supports analytical integration and reproducible arithmetic, but not causal estimation of the entire proposed framework or exhaustive coverage of rapidly changing regulation.

25.0.1 Philosophical foundations: efficiency, trust and distributive legitimacy

The allocation of capital involves at least three distinct kinds of judgment. An instrumental judgment asks whether an intermediary reduces search, verification, monitoring or settlement costs. An epistemic judgment asks whether an estimated default probability, market price or inclusion statistic accurately represents its intended phenomenon. A normative judgment asks whose claims receive priority, who bears residual risk and whether vulnerable participants can understand and contest treatment. These questions are related but irreducible. A fast algorithm may price risk accurately while relying on unjustified personal data; a prudentially

conservative lender may protect depositors while denying viable small firms; a subsidized loan may expand observed access while crowding out more suitable financing or increasing indebtedness.

Neither the proposition that finance always drives development nor the opposing claim that finance is inherently extractive withstands scrutiny. King and Levine (1993) reported broad cross-country associations between financial development and growth, while Rajan and Zingales (1998) examined the differential performance of industries dependent on external financing. Yet identification, reverse causality, and institutional heterogeneity matter: financial deepening may follow productive development as well as facilitate it. Later evidence that smaller firms encounter disproportionate financing and legal constraints supports focused institutional reforms, not indiscriminate credit expansion (Beck et al., 2005). Throughout the chapter, efficiency and inclusion are evaluated jointly with stability, genuine welfare and the distribution of risks.

25.0.2 Historical and institutional evolution of financial intermediation

Financial intermediation has evolved through institutional experimentation rather than a universal progression from barter to bank accounts and then digital platforms. Merchant credit, community-based saving, bills of exchange, organized exchanges, central banks and public debt markets emerged in different historical settings to solve problems of trust, distance, public finance and enforceability. Industrial production subsequently increased demand for long-duration finance, while modern wholesale markets expanded the capacity to distribute claims beyond the originating lender. These developments did not abolish earlier arrangements. Trade credit, rotating savings groups, cooperatives, regulated banks and securities markets continue to coexist because their informational strengths, transaction sizes and risk-bearing arrangements differ.

Historical comparison also cautions against treating financial deepening as synonymous with deregulation. Financial liberalization may improve price discovery and competitive entry, but when funding guarantees, supervision and risk-management capacity are incomplete it can amplify runs and misallocation. Conversely, administratively directed credit may support investments with social returns that private markets undervalue while exposing public finances to political capture and concealed losses. The appropriate institutional comparison therefore asks who allocates capital, who monitors performance, who bears residual loss, and how claims are enforced when projects fail. The resulting answer is contingent upon legal quality, credible information, contestable markets and the distribution of bargaining power.

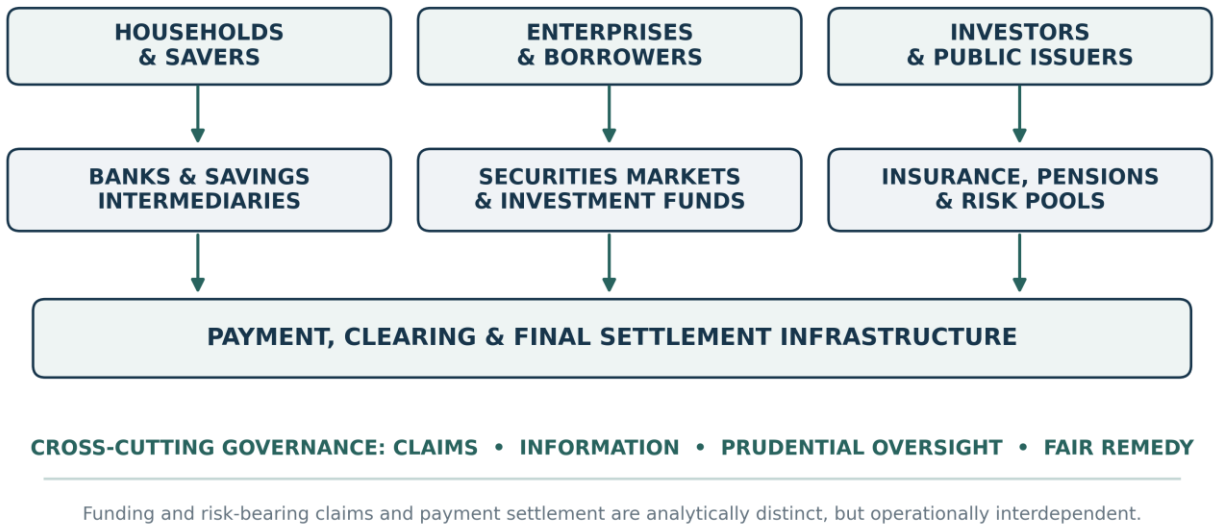
25.1 FINANCIAL SYSTEMS AND THEIR FUNCTIONS

A financial system is best understood by what it accomplishes rather than by a list of institutions. The classical functions are to transfer payments; mobilize and pool savings; allocate capital; monitor recipients of funds; transform maturity and liquidity; diversify or transfer risks; discover prices; and generate information that improves contractual performance (Diamond, 1984; Leland & Pyle, 1977). Institutions vary widely in their combinations of these functions. A SACCO may pool small deposits and lend on the basis of local knowledge; a commercial bank may create deposit money, underwrite business loans and provide settlement access; an investment fund may pool savings without promising deposits redeemable at par; a pension manager invests against long-term liabilities; a fintech provider may deliver an interface while a licensed institution holds the funds.

The distinction between direct and intermediated finance is analytically important. In direct financing, an enterprise issues a security, such as a bond or share, to investors through a market or placement arrangement. In intermediated financing, an institution issues its own liabilities to savers or funders and holds claims on borrowers. In practice, underwriting, custody, clearing, market-making, fund management and credit enhancement often blur this contrast. What remains distinct is the allocation of information-production costs, legal claims, liquidity promises and residual losses. Capital supplied through a market is not thereby unmonitored, and money placed in a bank is not thereby risk-free.

An adequately functioning system must meet both **microeconomic tests**, such as cost, information quality and reliable service, and **system-level tests**, such as resilience to runs and correlated losses. The same liquidity transformation that makes bank deposits convenient exposes banks to withdrawals when loans are illiquid. Diamond and Dybvig (1983) formalized how demandable claims can provide useful liquidity insurance while permitting self-fulfilling runs under particular assumptions. The result explains the rationale for credible deposit protection and liquidity backstops, but does not show that all withdrawals are irrational or that public guarantees should cover every financial claim.

Figure 25.1. The enterprise-centred financial ecosystem.



The conceptual diagram places households, enterprises, public issuers and investors around deposit-taking institutions, capital markets, insurance/pension pools and payment infrastructures. It shows two distinct circulations: funding and risk-bearing claims on one side, payment instructions and final settlement on the other. A third, cross-cutting layer represents information, conduct rules, prudential oversight and dispute resolution. Note. Original analytical synthesis informed by Diamond (1984), the Committee on Payment and Settlement Systems and International Organization of Securities Commissions (2012), and the National Bank of Rwanda (2025). Arrows indicate possible functions, not empirically estimated causal effects.

Table 25.1. Functions, instruments and failure modes in an integrated financial ecosystem

Function	Principal arrangements	Value to enterprise or household	Distinct failure mode
Payment and settlement	Bank deposits, card networks, mobile wallets, real-time rails	Timely discharge of obligations	Fraud, outage, unresolved finality
Savings and liquidity	Deposits, money-market claims, savings groups	Transfer purchasing power across dates	Run risk, inflation or counterparty loss
Capital allocation	Loans, bonds, shares, investment funds	Finance productive capabilities	Adverse selection, mispricing, concentration
Insurance and pooling	Life, health, property, agricultural insurance	Convert uncertain large losses into priced claims	Exclusions, underpricing, disputed claims
Information and monitoring	Credit files, due diligence, audits, alternative data	Reduce uncertainty and costly verification	Bias, surveillance, poor-quality data
Investor exit and discovery	Exchanges, dealers, clearing and custody	Liquidity and transparent price signals	Thin trading, manipulation, settlement failure

Note. Conceptual classification developed for this chapter. Instruments are not interchangeable and protections differ across products and jurisdictions.

The functional approach avoids a common policy error: counting new accounts, loan disbursements or listed instruments as if they directly measured economic improvement. A well-functioning payment account may transform a merchant's collections without increasing its access to medium-term investment finance. Conversely, a large capital market can mobilize investment for established issuers while remaining inaccessible to informal enterprises. This distinction is especially relevant in Rwanda, where mobile-money diffusion and bank-account ownership have moved differently (Access to Finance Rwanda [AFR], 2024).

25.1.1 Financial development, allocation efficiency and causality

The financial-development hypothesis is persuasive only when its proposed channels are specified. Better screening can shift resources toward productive uses; cheaper payment services can support specialization and market exchange; risk pooling can make otherwise unattractive investments tolerable; and institutions that discipline borrowers may improve the use of scarce resources. Such mechanisms offer a stronger explanation than a correlation between the stock of credit and gross domestic product. Cross-country association is vulnerable to omitted institutional quality, reverse causality and shifts in credit composition. Financial deepening directed toward productive working capital and transferable technology is not economically equivalent to leveraged speculation in existing assets (King & Levine, 1993; Rajan & Zingales, 1998).

Two policy risks follow. First, finance can be underprovided where viable borrowers cannot communicate project quality or pledge enforceable assets; here, credit-information systems, collateral reform and proportionate supervision may improve outcomes. Second, finance can be overexpanded when underpriced guarantees, procyclical expectations or weak creditor discipline support risky lending; here, capital and liquidity safeguards matter. Development should thus be assessed across a vector of outcomes, including investment additionality, payment reliability, household consumption protection, distributional access and fiscal exposure. A policy that improves one component need not dominate alternatives on the others. This chapter treats the financial system as an enabling institution, not as an independent engine that guarantees real-sector productivity.

25.2 COMMERCIAL BANKING AND DEPOSIT-LENDING

A commercial bank holds assets such as customer loans, securities, reserves and cash, and finances them with liabilities including deposits and wholesale borrowing, together with shareholders' equity. The accounting identity is **assets = liabilities + equity**. Equity absorbs losses after accounting provisions and other applicable adjustments; deposits ordinarily represent contractual claims payable under agreed terms. Banks generate earnings through interest margins, commissions and services, yet their operating model requires simultaneous control of credit, liquidity, interest-rate, operational, concentration and conduct risks. A bank may be accounting-profitable while vulnerable to a liquidity shock, or liquid while inadequately capitalized following asset impairment.

A fundamental correction to the textbook 'loanable deposits first' story is that, in modern banking, a new loan normally creates a corresponding bank deposit. McLeay et al. (2014) explain that this operation increases the bank's loan asset and deposit liability, rather than transferring an already existing deposit from one named saver to another. Loan creation is not unconstrained: borrowers must be willing and sufficiently creditworthy, capital and risk limits must be met, the bank must obtain settlement liquidity as payments leave, funding remains costly, and central-bank policy affects pricing and balance-sheet demand. The balance-sheet mechanism should therefore be distinguished from a claim that banks can create unlimited purchasing power.

25.2.1 Auditable balance-sheet illustration

Assume a bank initially has RWF 1,000 million of assets, comprising RWF 760 million in loans, RWF 140 million in securities and RWF 100 million in reserves. It has RWF 900 million in deposit liabilities and RWF 100 million of equity. When it approves and credits a RWF 40 million loan into the borrower's deposit account, loans become

RWF 800 million and deposits RWF 940 million; total assets and liabilities plus equity each become RWF 1,040 million. No reserve transfer has yet occurred. If the borrower sends RWF 30 million to a customer of another bank, the originating bank's reserves and deposits each fall by RWF 30 million after settlement. Its final assets are RWF 1,010 million (loans 800, securities 140, reserves 70), and liabilities plus equity are RWF 1,010 million (deposits 910, equity 100). **The illustrative figures demonstrate mechanics only; actual lending is conditioned by profitability, capital, funding, prudential rules and the payments environment.**

The risk transformation created by that transaction is material. A term loan may amortize over three years, while deposits can be transferred within seconds. Assets are further exposed to correlated default when clients share a sector, importer, geographic market or public-sector counterparty. The bank must therefore manage both idiosyncratic loss and collective stress. Interest-rate repricing mismatches mean that a bank with fixed-rate assets and rapidly repricing deposits may suffer declining net interest income or market-value losses even if credit quality is unchanged. Market liquidity, asset liquidity, funding liquidity and central-bank liquidity are related but not identical.

25.2.2 Why banks exist: monitoring and liquidity theories

Diamond's (1984) delegated-monitoring model argues that a diversified intermediary can reduce the duplication involved when many investors independently monitor the same borrower. Its implications depend on the cost of verification, incentive arrangements and the intermediary's ability to diversify. Leland and Pyle (1977) emphasize how entrepreneurs possess information about project quality that prospective funders cannot costlessly observe; signaling and screening mechanisms arise, but may separate borrowers imperfectly. Diamond and Dybvig's (1983) liquidity-insurance model explains a different function: converting illiquid long-duration productive claims into comparatively liquid household claims. These mechanisms complement rather than replace one another, and none establishes that the bank organizational form is always the least-cost arrangement.

Contemporary banks operate amid competition from government instruments, institutional investors, securities markets, fintech partnerships and deposit-like products provided by nonbanks. The material question is whether nonbank substitutes replicate the same guarantees, central-bank access, supervision and loss-absorption capacity. Similar customer interfaces can conceal fundamentally different legal positions, particularly for prepaid e-money versus an insured deposit. Professionals should confirm who owes the customer, where safeguarded balances are held, how insolvency is resolved and when a transfer becomes irrevocable.

25.2.3 Asset-liability management, liquidity resilience and bank failure

A bank's liquidity exposure is governed less by the average maturity of its assets than by the timing and contingency of its obligations. Deposit balances can be stable in ordinary periods and highly mobile under stress. Wholesale funding may appear inexpensive until counterparties shorten tenor or increase collateral requirements; liquid securities may become costly to sell precisely when other institutions seek cash. Asset-liability management therefore requires cash-flow ladders by currency and horizon, behavioral assumptions for deposits, collateral valuation, committed-credit drawdowns and reverse stress tests. The observed balance sheet is a snapshot, while liquidity adequacy is a conditional forecast under plausible withdrawals, drawdowns and market disruptions.

Brunnermeier and Pedersen (2009) distinguish funding liquidity from market liquidity and show how deteriorating funding conditions can force asset sales that further reduce tradable prices and collateral capacity. This feedback links individually rational liquidity protection to collective fragility. For Rwanda, the operational lesson is not that every small institution needs a sophisticated trading model. It is that lenders should know the sources and currency of funding, the concentration of large depositors, the realizable quality of liquid assets, the legal availability of emergency facilities and the responsibilities for deposit communications. A prudential ratio without credible contingency execution may create a false sense of security.

25.3 CREDIT ALLOCATION AND ENTERPRISE FINANCING

The price of credit does not by itself allocate all loan demand. Under asymmetric information, lenders may be unable to identify borrower risk reliably, and raising interest rates can worsen the applicant pool or induce riskier borrower behaviour. Stiglitz and Weiss (1981) showed that credit rationing can occur even where some rejected applicants would accept a higher rate. The formal model is conditional, but its practical warning endures: a refusal is not necessarily evidence of capital scarcity or discriminatory intent, just as a high quoted rate need not perfectly capture a borrower's risk. Credit decisions require explicit examination of information asymmetry, expected recovery, contractual enforcement and lender incentives.

A disciplined enterprise-credit file connects the purpose of borrowing to cash conversion and repayment capacity. It normally includes identity and beneficial-control verification, historical and forecast cash flows, customer and supplier concentrations, existing indebtedness, management quality, industry conditions, collateral or guarantees, security enforceability, covenants and environmental or social exposures where relevant. **Character, capacity, capital, collateral and conditions** remain a helpful mnemonic, not a validated substitute for verifiable underwriting. Relevant transaction data may improve prediction when financial statements are weak, but exclusion of people without a digital history can introduce a different coverage bias.

25.3.1 Repayment structures, pricing and total borrower cost

A revolving overdraft, term loan, invoice finance, factoring, lease and trade-credit instrument solve different problems. An overdraft accommodates uncertain timing of receipts if utilisation and fees remain controlled. A term loan better matches capital equipment with a predictable service schedule. Invoice financing accelerates receivables but can involve recourse, notification and debtor-quality conditions. Factoring may transfer collection activity and, under specified contracts, some default exposure. Supplier credit is often operationally accessible but its implied cost can be large: rejecting a 2% discount for payment at day 10 and instead paying at day 40 implies an approximate 30-day financing rate of 0.02/0.98 = 2.0408%, or a simple annualized approximation of 24.83% using 365/30 periods. This arithmetic does not imply that every supplier discount should be taken; liquidity, contractual conditions, taxes and other financing costs must be compared.

For a fully amortizing loan with fixed periodic rate r, principal P and n equal payments, the installment is A = Pr/[1 − (1 + r)^(−n)]. For example, a **hypothetical** RWF 12 million loan at 1.5% per month for 12 months requires approximately RWF 1.101 million per month (see Appendix A computation protocol). The nominal quoted monthly rate does not by itself disclose processing charges, compulsory insurance, late fees or an annual effective cost. The borrower should construct the dated net-cash-flow schedule and compute the internal rate of those cash flows, then compare alternatives only on matched risk, access and contractual terms. Lenders should test debt-service capacity under delayed collections, margin compression and foreign-exchange exposure rather than merely apply a static income multiple.

In the 2024 Integrated Business Enterprise Survey context, Rwanda's statistical authorities report a business landscape dominated by informal units and identify collateral constraints among reported barriers to finance; these business-survey denominators are not interchangeable with the adult population measured by FinScope (National Institute of Statistics of Rwanda [NISR], 2026). International firm-level research shows financing obstacles tend to be more severe for smaller enterprises, but the numerical magnitudes in a 54-country historical sample should not be transported mechanically to today's Rwandan sector mix (Beck et al., 2005). Meaningful credit deepening may require reliable records, movable-collateral infrastructure, affordable dispute settlement, longer-term funding and borrower capability alongside new lending channels.

25.3.2 Lending technologies, collateral and the financing of smaller firms

Small-enterprise financing is frequently discussed as a single collateral shortage, but Berger and Udell (2006) distinguish lending technologies based on financial statements, credit scoring, asset-based collateral, factoring,

leasing, trade credit and relationship information. The feasibility of each depends on complementary institutions. Financial-statement lending requires credible records and verification. Asset-based lending requires identifiable property and enforceable priority. Factoring requires reliable invoices and trustworthy debtors. Relationship lending draws on accumulated soft information that may be difficult to reproduce in an automated model. A digital identity or repayment record can reduce one information problem without resolving uncertain demand, weak management systems or legally unenforceable security.

Relationship banking can be particularly valuable for businesses with seasonal receipts and incomplete audited accounts, but it creates its own risks. The loan officer may have useful local knowledge unavailable to central models, while discretion can also produce favoritism, concentrated exposures and inconsistent pricing. Digital scoring offers scalability and documentation, but generates model drift and coverage bias when the observed borrowers differ from applicants excluded by the model. A credible SME-finance programme does not choose technology for its appearance of objectivity; it specifies which information gap each method closes, evaluates repayment and borrower welfare over complete credit vintages, and demonstrates how decisions can be contested (Berger & Udell, 2006; Berg et al., 2020).

25.3.3 Borrower affordability, currency risk and responsible restructuring

Credit suitability is a forward-looking property of a borrower's business, not simply a percentage of reported turnover. For a manufacturer buying imported machinery, a Rwandan-franc revenue stream and a foreign-currency liability create exchange-rate exposure even when the interest margin looks favorable. A borrower repaying from seasonal crop or tourism receipts may require an amortization profile unlike that of a salaried borrower. Affordability analysis should therefore compare dated expected free cash flow to all debt-service obligations under downside scenarios, including delayed collections, input-price increases, changes in interest rates and foreign-currency depreciation. Security may improve recovery for a lender, but cannot create operating cash when the underlying business model is unviable.

When distress emerges, restructuring should be evaluated against the economic value of continued operation and the rights of other claimants. A temporary maturity extension may avoid inefficient liquidation if the borrower faces a transitory liquidity shock; repeated capitalization of unpaid interest may instead conceal insolvency and deepen harm. Debt collection must remain proportionate and lawful, with no inference that a borrower who defaults lacks moral character. The appropriate institutional objective is credible screening, feasible terms, prompt recognition of impairment, transparent workouts and accessible appeal. These obligations remain important whether a loan is originated in a branch, through a mobile wallet or by an embedded-finance provider.

25.4 MONEY AND CAPITAL MARKETS

Money markets provide comparatively short-maturity funding and liquidity management through instruments such as treasury bills, interbank claims, repurchase agreements and eligible commercial paper. Capital markets support longer-horizon securities including government and corporate bonds, ordinary shares, investment funds and structured products. The boundary is economic rather than purely administrative: maturity, liquidity, marketability, legal seniority and the investor's capacity to bear loss matter more than product labels. A sovereign bond is a credit exposure, not a universal risk-free asset; a share provides residual ownership, not guaranteed dividends; and an exchange quotation is no assurance of immediate execution at the quoted price.

Bond valuation links future contractual cash flows to required yields. For a plain fixed-coupon bond, **Price = Σ[C/(1+y)^t] + F/(1+y)^n**, where C is the periodic coupon, F the redemption principal, y the period-matched yield and n the number of periods. Price and yield generally move inversely for a standard fixed-coupon bond, holding other features constant. Duration estimates local sensitivity to yield changes, while convexity refines this approximation; neither eliminates credit, inflation, currency or liquidity risk. For equities, expected return is fundamentally uncertain because residual cash distributions and terminal value depend on performance and

governance. Prospectus disclosure, issuer transparency, custody protections and secondary-market depth determine how useful market signals are.

25.4.1 Primary issuance, secondary trading and investor suitability

In a primary issue, new securities raise funds for the issuer, less expenses and with conditions specified in offering documentation. Secondary trades transfer existing holdings between investors; they usually do not deliver new cash to the original issuer, although more liquid secondary trading may reduce future financing costs. Underwriters, brokers, exchanges, registrars, custodians, clearing entities and the central securities depository perform distinct activities. An efficient primary market is possible without a deep secondary market, but exit constraints often increase investor-required returns and complicate long-duration risk-bearing.

Rwanda's Capital Market Authority (CMA) reported that FY2024/25 government bond issuance raised approximately RWF 246 billion and that three corporate bond issuances worth RWF 46 billion received approval, including green and sustainability-linked structures (Capital Market Authority [CMA], 2026). Its March 2026 communication also reported a 3.4% increase in Rwanda Stock Exchange market capitalization to RWF 3.84 trillion and collective-investment-scheme assets under management of RWF 71.4 billion. These are **period-specific regulatory communications**: market capitalization is the market value of included equities, not new financing raised; approved bond issuance is not identical to actual cash deployed; and aggregate fund assets do not disclose the distribution of returns to retail participants. The observations demonstrate an evolving market architecture without establishing equivalent access for small or informal firms.

Table 25.2. Enterprise-financing instrument suitability and competing constraints

Instrument	Principal use	Main suitability condition	Important hidden trade-off
Bank term loan	Equipment or defined investment	Serviceable, verifiable cash flows	Security, repricing and default covenants
Revolving facility	Timing gaps in inventory/receivables	Self-liquidating working-capital need	Renewal risk and fees on unused limits
Trade credit	Short-cycle input procurement	Supplier trust and clear terms	Large implicit cost of forgone discounts
Factoring/invoice finance	Convert approved invoices to cash	Credible debtor and enforceable invoice	Recourse, dilution and concentration
Lease	Use specified equipment	Productive asset with recoverable value	Contract rigidity, maintenance and total cost
Corporate bond	Longer-term debt at scale	Disclosure, governance, investor appetite	Refinancing, coupon and placement costs
Ordinary equity	Loss-absorbing growth capital	Scalable value creation and governance	Dilution, control and investor exit
Venture capital/private equity	High-risk growth/turnaround	Investment thesis and exit prospects	Control rights, time horizon and valuation
Grant or blended finance	Eligible social/market failures	Documented additionality and conditions	Dependence and reporting obligations

Note. Original pedagogical synthesis. Suitability is contingent; legal definitions, disclosure obligations and investor protections must be verified for each jurisdiction and transaction.

25.4.2 Yield curves, valuation and secondary-market liquidity

The yield curve summarizes the yields investors require at different maturities for securities whose credit, liquidity and tax characteristics are sufficiently comparable. It can inform treasury cash management, government debt issuance, the benchmarking of corporate borrowing and discounting of future cash flows.

However, a maturity premium cannot be isolated from observed yields unless expected policy rates, inflation uncertainty, credit exposure and market liquidity are examined. In thin markets, quoted rates may be based on infrequent transactions and might poorly represent the price at which an institution could liquidate a large holding. Securities-market development is therefore not merely the number of listed instruments; it depends on reliable disclosures, market-making, investor diversity and the enforceability of post-trade rights.

For a fully hypothetical three-year bond with face value RWF 100,000, a 12% annual coupon and a 14% required annual yield, the value is $12{,}000/1.14 + 12{,}000/1.14^2 + 112{,}000/1.14^3$ = approximately RWF 95,357. The discount to face value reflects the fact that the contractual coupon is below the required yield. If market yields fall, the price generally increases, assuming the promised cash flows and credit assessment do not change. This calculation is not a Rwandan security quotation, and the quoted yield cannot establish liquidity at the calculated price. A portfolio manager must still examine bid-ask spread, custody, maturity matching, issuer concentration, inflation and the cost of meeting unexpected redemptions.

In Rwanda, the CMA's FY2024/25 material reports active government-bond issuance alongside a still-developing corporate and collective-investment market. The interpretation is institutional rather than celebratory: benchmark government issuance can support price discovery, while investor confidence requires genuine disclosure and secondary-market capacity. Investors should distinguish a bond's face value, traded price, contractual coupon, yield to maturity and realized return after fees and taxation. For enterprise managers, direct market issuance becomes defensible only if expected financing savings exceed disclosure, governance, legal, underwriting and servicing costs, and if investor demand can be sustained across the liability's horizon (CMA, 2026).

25.5 FINANCIAL REGULATION AND STABILITY

Financial regulation operates at multiple, partly competing levels. **Microprudential regulation** seeks the safety and soundness of individual regulated institutions; **macroprudential policy** addresses system-wide amplification and interconnected exposures; **conduct regulation** protects customers and fair markets; and **resolution and deposit-protection arrangements** provide mechanisms for orderly failure. Monetary policy influences inflation and interest rates but is not interchangeable with prudential supervision. The regulatory dilemma is not the maximum possible restriction. It is selecting enforceable safeguards whose expected reduction in harm justifies their administrative and economic costs, including potential displacement into less supervised sectors.

The Basel Committee's internationally agreed risk-based framework specifies minimum common equity tier 1 capital of 4.5% of risk-weighted assets (RWA), tier 1 capital of 6%, and total capital of 8%, with a separate 2.5% common-equity conservation buffer and other applicable requirements (Basel Committee on Banking Supervision [BCBS], 2026). These are **international baseline descriptions**, not statements that a particular Rwanda-chartered institution is subject to identical ratios, calculation methods or phase-in dates. National supervisors specify local requirements, supervisory discretions, capital definitions and reporting. The liquidity coverage ratio addresses a short-horizon severe stress scenario using high-quality liquid assets relative to net outflows; the net stable funding ratio addresses more structural funding stability. Neither is a perfect prediction of crisis survival.

Suppose a bank has RWF 180 billion of eligible total regulatory capital and RWF 1,200 billion of RWA. Its simplified total capital ratio is 180/1,200 = **15%**. A credit deterioration leading to RWF 30 billion of losses recognized directly against eligible capital, with RWA temporarily unchanged, reduces the simplified ratio to 150/1,200 = **12.5%**. This illustration excludes tax effects, provisioning timing, changing risk weights and countervailing capital actions. A 15% headline ratio cannot establish resilience unless the asset mix, hidden losses, concentration, liquidity and governance are examined. The same caution applies to a bank's low non-performing-loan ratio during rapid credit growth: the denominator can expand before newer credit cohorts season.

25.5.1 Regulatory institutional architecture in Rwanda

The National Bank of Rwanda (NBR) has a central role in monetary and financial-system oversight, including regulation and supervision of designated banking and other financial institutions; the CMA oversees applicable capital-market activities. Rwanda adopted a banking-law revision published in the Official Gazette in June 2024, while Law No. 039/2024 of 22 March 2024 established the Deposit Guarantee Fund under an updated statutory basis (Republic of Rwanda, 2024a, 2024b). The existence of deposit protection should never be paraphrased as unconditional insurance of all products, all balances or all institutions. Eligibility, coverage limits, funding and payout arrangements must be established using current legally authoritative texts and relevant implementing regulations before advising a depositor.

NBR's FY2024/25 annual report identified financial-sector assets of approximately RWF 14.3 trillion at June 2025, a reported 22.6% increase over the preceding financial year, with banking assets representing approximately 67.4% of sector assets (NBR, 2025). These are institutional aggregates and not measures of household welfare. In a separate assessment, the International Monetary Fund reported that Rwanda's banking nonperforming-loan ratio had declined below 3% by end-2025, but highlighted rapid credit expansion and concentrated exposures as matters requiring continued attention (International Monetary Fund [IMF], 2026). An improving reported delinquency ratio and a warning about future risk are not contradictory: one describes observed arrears to date, the other prospective vulnerability from loan growth, concentrations and correlated shocks.

Regulatory implementation also involves institutional design. Onsite and offsite supervision, fit-and-proper assessment, consolidated risk surveillance, related-party exposure controls, internal audit, supervisory intervention, bank recovery planning, governance review and enforceable consumer complaints all influence outcomes. International standards provide organizing benchmarks; they are not self-executing local law. The Committee on Payment and Settlement Systems and International Organization of Securities Commissions (2012) establish principles for systemically important financial-market infrastructures, but application depends on designation, national legal powers and the specific risk profile of the infrastructure.

25.5.2 Failure, resolution, and moral hazard

Explicit guarantees may reduce incentives for depositors to run, yet can weaken depositor monitoring and encourage excessive risk-taking when guarantees are poorly designed or perceived as unlimited. This is the classical moral-hazard tension, intensified by opaque assets and incentives tied to short-term growth. Resolution design therefore requires credible loss allocation, continuity of critical services, depositor communication and protection of financial stability without assuming that shareholders, managers and every creditor deserve equal protection. Small institutions need proportionate controls, but proportionality should mean simplified means of meeting substantive outcomes, not exemption from safeguarding customers.

25.5.3 Macroprudential feedback, stress testing and policy proportionality

The microprudential view evaluates the capacity of a particular institution to withstand losses, whereas systemic stability depends on how institutions respond collectively. A bank can satisfy an individual capital target by reducing lending precisely when other banks do the same, amplifying credit scarcity for otherwise viable enterprises. Conversely, rapid credit growth can temporarily improve reported delinquency indicators because recent loans have not seasoned. Countercyclical buffers, concentration limits, loan-to-value constraints, liquidity surveillance and stress tests seek to address these externalities, but each must be applied with attention to market structure, supervisory information and potential diversion of activity into less regulated channels.

A credible stress exercise begins with explicit and differentiated scenarios rather than a single adverse percentage. It should trace the joint movement of exchange rates, collateral values, borrower revenue, deposits, funding spreads and interbank exposures, then examine whether management actions would remain feasible if

competitors took similar actions. Disclosing results is not automatically beneficial when disclosure is misleadingly precise or incentivizes cosmetic balance-sheet changes. Proportionality is justified because a community financial cooperative and a systemically important bank have different organizational capacities; nevertheless, minimum obligations concerning custody, customer complaints, liquidity and honest reporting cannot be dismissed merely because the institution is small.

25.6 PAYMENT SYSTEMS AND DIGITAL INFRASTRUCTURE

A payment has a social meaning, a contractual meaning and a technical lifecycle. A purchaser may regard a mobile-phone notification as payment, yet the underlying arrangement must establish identity, authorization, clearing, settlement, finality, reversibility and the point at which the merchant may safely release goods. **Clearing** determines and communicates interparticipant payment obligations; **settlement** discharges these obligations through the relevant assets and accounts; **finality** concerns the legally effective point beyond which transfer cannot ordinarily be unwound under applicable rules. Real-time user confirmation and final interbank settlement may coincide in some architectures but should not be assumed identical.

Modern systems integrate central-bank payment infrastructure, bank transfers, card networks, telecommunications channels, payment service providers, agents, wallet issuers, merchant acceptance devices and anti-fraud services. Central-bank money provides a settlement asset for eligible participants, while commercial-bank deposit money and appropriately structured e-money support retail use. Interoperability enables value to move between institutions or schemes without requiring users to belong to the same proprietary network. Yet technical connection alone does not ensure affordable access: pricing, network participation, agent liquidity, service reliability, identity requirements, dispute resolution and user interfaces determine whether interoperability is meaningful.

Rwanda's National Bank reported substantial digital-payment growth in FY2024/25, including 57% growth in the value and 44% growth in the volume of mobile payments. In the annual report's distinct reporting series, eKash transactions rose from approximately RWF 30 billion in June 2024 to RWF 105 billion in June 2025, while the reported volume increased from about 8 million to 25 million (NBR, 2025). These two sets of indicators describe different payment categories and should not be added together or treated as direct measures of merchant adoption. A value increase may reflect larger transactions as well as increased participation; growth from a small baseline does not establish universal service access. Enterprise evaluation should therefore rely on channel-specific settlement time, transparent charges, availability and reconciliation quality rather than a national transaction-growth figure alone.

25.6.1 Merchant-level payments economics

For an illustrative RWF 50,000 sale, assume cash handling costs RWF 400 in staff time and expected loss, mobile collection costs a contractual 0.8% (RWF 400), and a card channel charges 1.6% (RWF 800). On the surface, cash and mobile channels cost the same, but the decision also depends on when funds become available, transaction disputes, reconciliation, theft, delivery capability and customer preferences. If a digital channel reduces expected noncollection by RWF 600 per sale relative to a manual arrangement, its higher visible merchant fee could still be economically justified. Conversely, mandatory cashless service can exclude customers lacking a working phone, network or usable identification. Managers need channel-specific total costs and accessibility analysis, not merely a policy preference for digitization.

A basic payment control matrix should separate authorization from settlement confirmation and reconciliation; employ multifactor authentication where feasible; limit administrator rights; monitor unusual transaction patterns; retain tamper-evident logs; reconcile third-party statements against order and bank records; test recovery procedures; and make consumer disputes traceable to an accountable institution. Under the 2012 international principles, operational resilience and legal basis are core attributes of important payment

infrastructures (CPSS-IOSCO, 2012). These practices matter even more where mobile money forms part of routine supply-chain settlement, payroll or microbusiness receivables.

25.6.2 Cross-border payments and regional integration

A regional transfer is affected by currency conversion, compliance checks, messaging standards, local settlement arrangements, banking relationships and receiver access. Currency-translation uncertainty, foreign-exchange spreads, fees and availability can substantially alter effective business cost. A quoted fee of '1%' may conceal differences between the applied FX rate and a transparent benchmark; timing can change both importer liquidity and exporter proceeds. The G20 cross-border payments agenda, supported by the BIS Committee on Payment and Market Infrastructures, seeks improvements in speed, cost, transparency and access, but its benchmarks should not be interpreted as guarantees that a given East African corridor has achieved them (BIS, n.d.). For firms considering AfCFTA or East African expansion, payment reliability complements rather than replaces customs, logistics and contractual obligations developed in Chapter 30.

25.6.3 Fraud, failed payments and operational accountability

Digital payment fraud should be classified by mechanism rather than aggregated into an undifferentiated loss figure. Account takeover, phishing, social engineering, compromised merchants, unauthorized administrator actions, counterfeit transaction confirmations and settlement-message manipulation require different controls. Authentication prevents some unauthorized instructions but cannot alone stop a customer from being deceived into authorizing a fraudulent transfer. Reconciliation detects inconsistencies after an event, while transaction limits and beneficiary verification can prevent or contain particular failures. Controls should be evaluated against prevented harm, error rates, customer inconvenience and the ease with which legitimate users can obtain a correction.

The allocation of responsibility after a failed transaction is as important as prevention. A merchant should distinguish successful authorization, provider acceptance, interparticipant clearing, final settlement and reconciliation to the correct invoice. The consumer should be informed of whether a transfer is pending, reversible or final and which institution owes an investigation. An effective dispute system must identify an accountable operator even where a transaction crosses a bank, telecom platform, agent and merchant interface. The legal classification of the payment product determines safeguarding, liability and insolvency treatment; similar smartphone screens do not create identical customer protections (CPSS-IOSCO, 2012).

25.7 FINTECH BUSINESS MODELS

Financial technology refers to technology-enabled financial products, processes and organizational arrangements, rather than a uniform category of licensed institution. It encompasses digital banks, payments firms, lender platforms, merchant acquiring, embedded finance, insurance technology, digital brokerage, compliance technology and software services for regulated institutions. A fintech application may create clear customer benefits, but the underlying legal entity may be a licensed lender, payment-service provider, technology agent, broker or unregulated supplier. The regulatory perimeter depends on actual activities and legal obligations, not on branding or the visual design of an app.

Business models differ in how revenue and risk are allocated. A digital lender generally earns interest and fees while bearing or arranging credit exposure; a payments platform earns transaction, acceptance or subscription revenue and must manage settlement and operational obligations; a banking-as-a-service provider makes regulated infrastructure available to another brand under contractual arrangements whose legal limits must be clear; embedded finance integrates financial offers within a nonfinancial purchase journey; digital-investment platforms earn fees or spreads while introducing investor-protection, custody and suitability risks. Platform

economics reward scale, network effects and data reuse, but can produce vendor lock-in, information asymmetry and market concentration (Frost et al., 2020).

25.7.1 Information advantage is not the same as responsible underwriting

Berg et al. (2020), using a digital-footprint study, show that certain online behavioural indicators can contain useful default-prediction information comparable with credit bureau measures in their study setting. The result does not authorize unrestricted harvesting of contacts, location, communications or protected characteristics. Predictive performance may decline under population shift, policy change or strategic borrower adaptation. A model trained on existing borrowers may perform poorly for rejected applicants because their realized repayment outcomes were never observed. Even an accurate model may embed disparate outcomes or offer no intelligible route to correction.

An auditable lender must distinguish **data relevance**, **model discrimination**, **calibration**, **credit policy**, **customer welfare** and **ex post outcomes**. For example, an area under the receiver-operating-characteristic curve (AUC) summarizes rank discrimination over possible thresholds; it does not establish that estimated default probabilities are calibrated or that lending decisions are fair. A model with acceptable overall AUC can systematically overestimate risk for a group with thinner data. Default rates among accepted borrowers can fall simply because the lender excludes more customers. Consumer protection therefore requires clear total-cost disclosures, proportionate identity checks, confidentiality, explainable adverse decisions where required, complaints, retention limits, and governance of third-party data and models.

25.7.2 Sustainable fintech unit economics

Customer acquisition cost (CAC) needs to be assessed alongside contribution after variable servicing, expected credit loss, fraud, funding, infrastructure and compliant collections. For a lender, a simple per-loan expected contribution is **contractual income + fees − funding cost − operating cost − expected credit loss − expected fraud loss**, where expected credit loss depends on an explicit probability of default, loss given default and exposure. A high origination count is not profitability if loss recognition is delayed. For a payment platform, transaction scale can improve fixed-cost absorption, but revenue concentration in one merchant or telecom partner can create systemic operational dependency. Banking-as-a-service arrangements also require explicit accountability for customer funds, incident management and the consequences of terminating a platform relationship.

Financial innovation has a complex welfare relationship to competition. By reducing onboarding and transaction costs, fintech can deepen access. By exploiting information asymmetries or borrowing against uncertain future income, it can intensify indebtedness. Evaluation must use credible counterfactuals: did a product enable beneficial transactions that would otherwise not occur, replace a cheaper channel, or change only the mode of recording? The answer depends on behavior, rather than the existence of a digital feature.

25.7.3 Empirical evidence, scale and limits of fintech advantage

Technology can reduce processing time without making underwriting or customer treatment uniformly better. Fuster et al. (2019) found, in a study of United States mortgage origination, that fintech lenders processed applications more quickly while showing no evidence of higher default rates in their observed setting. The authors did not find that these lenders disproportionately targeted borrowers with weak financial access. This evidence supports a process-efficiency mechanism but does not show that a Rwandan digital microcredit platform will have comparable default outcomes, consumer protections or operational costs. Mortgage collateral, standardized records, credit bureaus, infrastructure and borrower selection differ substantially across the settings.

The institutional boundary between a platform and a regulated financial provider becomes more important as scale increases. A small interface failure may inconvenience a few clients; a widely used embedded-finance platform may coordinate borrowing, repayment, customer identity and sales data for thousands of enterprises. Growth therefore raises both economies of scale and the social consequences of operational concentration. Supervisors and boards should examine the full chain of accountable entities, outsourced data processing, customer funds safeguarding, conflicts of interest and the conditions under which the platform can be replaced. The substantive question is not whether the application uses artificial intelligence, but whether new informational and network advantages lead to verifiable improvements after risk and rights are included (Frost et al., 2020).

25.8 FINANCIAL INCLUSION AND CONSUMER PROTECTION

Financial inclusion is commonly operationalized as access to and appropriate use of transactions, savings, credit, insurance and other services, but development outcomes require a further step. Having an account does not demonstrate affordability, active use, financial resilience, informed consent, business productivity or wellbeing. A household may appear included because it uses a mobile wallet to receive transfers while remaining unable to save after essential expenditure. A microenterprise may receive a digital loan but pay a high implicit annual cost that worsens its cash-conversion cycle. The appropriate outcome is whether a suitable service meets an identifiable need at acceptable risk and cost.

Allen et al. (2016) find that proximity, cost, legal rights and country institutions are associated with formal-account ownership in their international analysis, while heterogeneous effects caution against uniform interventions. Global Findex 2025, based on adult surveys conducted in 2024, reports that **79% of adults globally** had a financial account, compared with 74% in 2021 (World Bank, 2025). This global metric is not directly interchangeable with the 2024 Rwandan FinScope measure, which counts people served through a wider range of formal and informal mechanisms under its own survey design. Likewise, 'adults' in the two surveys can differ by eligibility definitions and survey instruments. Comparative analysis must therefore inspect numerator, denominator, timeframe and product classification before reporting a percentage-point advantage.

25.8.1 What Rwanda's FinScope 2024 does, and does not, establish

The Rwanda FinScope 2024 report states that approximately **96% of adults** were financially included through formal or informal products, and **92%** were formally included. About **22%** were banked under the survey's relevant measure, while **86%** owned or had used mobile money; registered mobile-wallet ownership was reported at approximately **77%**. In addition, digital financial-service use had expanded markedly relative to 2020, and the report identified continued gaps in actual access to suitable credit and other products (AFR, 2024; Ministry of Finance and Economic Planning [MINECOFIN], 2024). These indicators measure different behaviours and should not be combined as if categories were mutually exclusive. Banked and mobile-money users overlap; 'own or used' is not identical to registered ownership; financial inclusion is not the percentage holding traditional bank accounts.

The official report also describes differences across gender, residence and customer circumstances. A closing gap in broad financial inclusion may coexist with a larger gap in individual control over a transactional account, savings balances or borrowing conditions. Aggregating adults may conceal differences among informal traders, rural farmers, salaried workers, people with disabilities and refugees. The ethical objective is not to maximize one headline percentage; it is to ensure that products expand agency and practical options without imposing hidden fees, coercion, predatory collections or rights violations.

Consumer protection is therefore a productive institution as well as a moral safeguard. Rwanda's Law No. 017/2021 of 3 March 2021 addresses financial service consumer protection, including proper treatment, transparency, cost and conflicts of interest (Republic of Rwanda, 2021). The existence of a statute does not

establish universal compliance. Enterprise due diligence should test whether providers identify the responsible regulated entity, disclose fees and effective terms before consent, explain complaint channels, and demonstrate safe treatment of customers' personal and financial information. Fraud losses, involuntary debt rollovers, failed redress, service inaccessibility and data misuse should be investigated as outcomes, not dismissed as ancillary issues.

25.8.2 Financial capability, savings groups and inclusion trade-offs

Financial education helps people understand contractual risks, but information alone cannot cure unaffordable services or weak legal enforcement. Rural savings groups and cooperative channels can provide local trust and flexible contributions where bank branches are scarce. Nevertheless, group arrangements also create governance, custody and borrower concentration risks. Formalization may improve recourse but increase documentation and cost. The appropriate intervention depends on the binding constraint, such as access, price, identity, income volatility, product suitability or institutional mistrust. Inclusive finance should be judged against the conditions of beneficial participation, not merely enrollment.

25.8.3 From access to financial health: evidence and contested interventions

The empirical literature on microcredit provides an important corrective to simple inclusion narratives. In a randomized evaluation of a group-lending programme in Hyderabad, India, Banerjee et al. (2015) found evidence of changes in some business investments, but not broad short-run improvements in consumption, health, education or women's empowerment. A hierarchical synthesis across seven randomized studies concluded that average microcredit effects on household consumption and business outcomes were unlikely to be transformative, while allowing for meaningful heterogeneity (Meager, 2019). These are results for particular programmes and populations, not proof that credit is universally ineffective. They demonstrate that access, loan uptake, profitable investment and sustained welfare improvement are separate causal steps.

For Rwandan programme evaluation, the first requirement is to identify the binding constraint. Where households cannot save securely, a transaction or savings product may be more relevant than debt. Where enterprise growth is limited by delayed institutional receivables, better settlement or receivables finance may be more useful than an unsecured consumption-style loan. Where investment is deterred by a catastrophic climate risk, insurance or an appropriately structured contingent instrument may dominate a credit subsidy. Product comparisons should use household- or firm-level outcomes such as consumption volatility, emergency borrowing, net productive assets, delinquency, control over balances and recovery following shocks, with transparent baselines and a credible comparison.

Disaggregated inclusion data are indispensable. Access to Finance Rwanda's gender-focused FinScope 2024 analysis reports a marked difference in bank-account participation between women and men, despite the narrow gap in broad inclusion. Such divergence illustrates why a 96% aggregate rate is not a sufficient equity assessment. Independent control of accounts, usable identification, privacy from coercive household members, accessible product terms and the ability to challenge erroneous charges can determine whether nominal access enlarges agency. Financial capability initiatives are useful only when complemented by appropriate product design and credible consumer protection, rather than used to shift the entire responsibility for harmful products onto users (AFR, n.d.).

25.9 INSURANCE AND RISK TRANSFER FOUNDATIONS

Insurance substitutes an agreed, relatively predictable premium for specified uncertain financial losses under contract. Risk pooling works best where losses are sufficiently identifiable, measurable and not perfectly correlated; underwriting, exclusions, reserves, investments and reinsurance address the remaining uncertainty. Insurers must price both **expected claims** and the costs of capital, administration, distribution, fraud control and

solvency protection. The **principle of indemnity** generally aims to compensate qualifying loss without turning an insured event into a source of profit, although life and other valued-benefit contracts operate differently. Good faith, insurable interest and subrogation have jurisdiction- and policy-specific applications that should not be generalized as identical across products.

A merchant may insure premises, inventory, cargo, commercial vehicles, employees or liability, while households purchase health, life, property, livestock or crop protection. Insurance does not eliminate the underlying hazard or replace safety management. A payout can preserve liquidity after a covered loss; exclusions, deductibles, policy limits, late notification and inadequate documentation can leave the enterprise substantially exposed. Claims quality, product comprehension and insurer solvency are therefore more meaningful than the mere count of policies sold.

25.9.1 A transparent premium and retention illustration

Suppose a Rwandan logistics enterprise faces an estimated 3% annual probability of a cargo loss of RWF 20 million, conditional on a stable exposure definition. Expected gross annual loss is **0.03 × 20,000,000 = RWF 600,000**. A policy requiring an annual RWF 840,000 premium and a RWF 2 million deductible would not be justified or rejected from expected-loss arithmetic alone. Assuming a single event and full coverage above the deductible, the insured firm's expected retained loss is 0.03 × 2,000,000 = **RWF 60,000**; its expected total outlay is RWF 900,000 including the premium, versus RWF 600,000 without insurance. The extra expected cost of RWF 300,000 may be rational if the enterprise faces severe liquidity constraints, covenant default, or a low capacity to absorb a tail loss. If a policy excludes the most likely causes of loss, that conclusion could reverse. Both probabilities and policy assumptions are **constructed**, not estimated from Rwandan claims data.

Underwriting selection can limit insurance access for high-risk customers or regions; subsidies and public-private partnerships may expand protection but create fiscal and governance obligations. Agricultural insurance may face basis risk, whereby a weather index fails to reflect a farmer's actual loss. Insurtech can lower acquisition and claims costs through mobile distribution, satellite or transaction data, yet automated adjudication may deny legitimate claims if models and appeals are inadequate. FinScope 2024 reported a rise in insurance use, which supports attention to the sector but does not by itself demonstrate improved loss recovery or reduced poverty (MINECOFIN, 2024). The core professional requirement is to compare exposure, retained risk, promised coverage, solvency, claims procedure and financing capacity.

25.9.2 Empirical risk protection and agricultural investment in Africa

Risk transfer may affect investment even when no insured loss occurs because it changes the distribution of future outcomes. Karlan et al. (2014) experimentally examined credit and rainfall-index insurance interventions among small-scale farmers in northern Ghana. Their findings indicated that risk protection could induce greater agricultural investment in that setting, while the analysis highlighted trust in payouts, basis risk and changing demand after experienced claims. The study demonstrates a mechanism through which insurance affects ex ante choices, not merely ex post compensation. Its result should not be carried mechanically to Rwandan agricultural districts with different crop mixes, insurance contracts, rainfall measures and institutional histories.

For an enterprise considering index protection, the relevant comparison is between the financial loss caused by an adverse event and the payout generated by the index. Basis risk arises where the enterprise incurs a serious loss without triggering the contractual index, or receives a payout despite limited actual loss. Product design should quantify this mismatch using local historical exposure where credible records exist, verify claims and payout timelines, and explain how deductibles, exclusions and settlement disputes affect residual liquidity needs. Insurance thus complements operating controls, diversification and contingency reserves. Neither premium affordability nor a high enrollment rate alone establishes effective resilience.

25.10 CAPITAL FORMATION AND INVESTMENT ECOSYSTEMS

Capital formation links savings and investors' willingness to bear risk to the acquisition of productive assets and capabilities. The financial system does not create productive returns by relabeling claims; those returns arise from enterprises and public activities whose performance supports interest, dividends, taxes and other benefits. Financial claims can improve allocation by mobilizing dispersed savings, transferring risk and creating exit possibilities, but they can also finance speculative transfers of existing assets with limited new production. Thus, gross market turnover, fundraising commitments, executed investments and eventual benefits must be distinguished.

Venture capital typically accepts high failure risk in exchange for contingent upside, substantial influence over governance and prospects of a future exit. Private equity encompasses growth investments, buyouts and restructuring, each with distinct leverage and control implications. Angel capital, venture debt, development-finance institutions, blended-finance facilities, diaspora financing, cooperative investment and properly regulated crowdfunding may address different gaps. A pension fund's long-duration liabilities can support patient capital, but fiduciary duties, liquidity needs and concentration limits constrain what it should hold. The existence of unmet enterprise credit demand is not itself sufficient justification for allocating pension savings to high-risk private ventures.

25.10.1 Investment-readiness and the financing hierarchy

A business seeking external finance should identify whether its binding need is experimentation, inventory, equipment, export receivables or large-scale expansion. Evidence requirements then follow from the proposed instrument. For venture equity, a credible value proposition, operational traction, ownership clarity, defensible records, governance rights, market uncertainty and an attainable exit path are material. For bank credit, verifiable repayment capacity and security rank more centrally. For a public bond, repeatable cash flows, issuer disclosure, legal documentation, rating or equivalent credit assessment where relevant, investor distribution and servicing infrastructure become decisive. One should not assume that a successful microenterprise must 'graduate' through every financing channel in a universal sequence.

The pecking-order logic from corporate-finance scholarship helps explain why firms may prefer retained earnings and less information-sensitive funding when external providers lack visibility, but it is not an empirical law applicable to all ownership structures. The life-cycle approach similarly suggests that financing options may broaden with records and scale, while obscuring counterexamples such as cooperative capital, asset-rich SMEs or grant-dependent ventures. The relevant concept is **financing fit**: an arrangement must match economic use, loss capacity, decision rights, time horizon, information burdens and social obligations. Chapter 24 supplies the detailed project appraisal; this section focuses on the institutional availability and contractual consequences of the financing sources.

A stylized financing-choice score can compare alternatives, but scores must not conceal fatal conditions. An instrument with low cost but unaffordable required payments should be excluded, regardless of its weighted score. The same applies where the borrower cannot grant a required security interest, protect control rights essential to its purpose, or lawfully meet investor-solicitation conditions. Due diligence therefore has an eligibility stage before ranking: **feasibility first, comparative optimization second**. This order avoids treating a mathematically highest score as an actionable recommendation.

25.10.2 Crowdfunding, digital distribution and green finance

Crowdfunding can aggregate small contributions through donation, reward, lending or securities structures, but these forms have radically different legal rights. Donations do not ordinarily confer repayment claims; reward-based arrangements create delivery obligations; credit crowdfunding exposes lenders to default; equity crowdfunding exposes investors to valuation, illiquidity and governance risk. Digital distribution may expand

reach without improving investment quality. Investment adverts, risk warnings, platform segregation, independent custody, investor caps and supervision must be assessed under the jurisdiction's actual framework.

Green and sustainability-linked financing further illustrates the distinction between financial structure and real outcome. A 'green bond' usually links proceeds to eligible projects under a specified framework; a sustainability-linked bond varies financial or structural terms with performance indicators. Neither label independently certifies additional emissions reductions or appropriate use of proceeds. Rwanda's recent corporate-bond developments provide a documented opportunity to examine instrument diversity, while project additionality, credible baselines, independent verification and transparent reporting remain empirical tasks (CMA, 2026). Sustainability requires examining the underlying investment, not only the security's name.

25.10.3 Patient capital, institutional investors and public additionality

Investment ecosystems depend on more than individual entrepreneurs' willingness to seek funding. Pension funds and insurers hold long-duration claims but remain constrained by fiduciary duties, asset-liability matching, disclosure and the liquidity rights of beneficiaries. Development-finance institutions may accept longer payback periods, provide guarantees or support markets where private institutions cannot internalize knowledge spillovers. Yet public participation carries opportunity costs and demands additionality: the programme should establish why an otherwise similar investment would not proceed on appropriate private terms and whether its social benefits justify fiscal exposure. An announced financing commitment is not equivalent to a disbursement, and a disbursement is not equivalent to an independently demonstrated development benefit.

In a Rwandan enterprise ecosystem, scalable investment capacity may be constrained simultaneously by thin deal pipelines, limited independently verifiable records, governance uncertainty, small expected exit markets and concentration of domestic funding. A financing intervention that supplies capital without improving disclosure, contract enforcement or management capability may displace rather than complement private investment. Conversely, a well-designed guarantee may improve bank incentives only when lenders retain sufficient exposure to screen and monitor borrowers. The correct unit of policy analysis is the financed transaction within its supporting institutional system, including its opportunity cost, expected additionality and eventual distribution of losses.

25.11 DIGITAL ASSETS AND MONETARY INNOVATION

Digital money is not a single object. Balances held in bank accounts are commercial-bank liabilities; electronic money is a claim structured under applicable payment and safeguarding law; a central-bank digital currency (CBDC) would be a digital central-bank liability if issued; tokenized deposits represent specified bank claims in token form; stablecoins may be privately issued claims under diverse reserve and redemption arrangements; and unbacked cryptocurrencies normally do not convey a legally enforceable par-redemption claim against a creditworthy issuer. Distributed-ledger technology is an implementation choice, not a guarantee of monetary stability or legal validity.

A careful analysis must distinguish five questions. **Issuer:** who, if anyone, owes the holder? **Backing:** what assets, if any, support redemption? **Par convertibility:** can holders redeem on demand at a defined value? **Finality:** when is transfer legally irreversible? **Governance:** who may freeze, reverse or modify balances, and which remedies exist? Tokens can reduce reconciliation friction in suitable settings while producing novel custody, operational, liquidity and governance risks. Programmability can automate conditional settlement, but an automated code condition is not a substitute for enforceable contractual interpretation, correction of erroneous data or protection against abuse.

25.11.1 Rwanda's CBDC research: proof of concept is not currency issuance

The National Bank of Rwanda published a report describing a **five-month CBDC proof of concept**, following an earlier feasibility study. According to the report, tests included online and offline payment functionality, USSD access for feature phones and simulated cross-border use cases; the institution described movement toward a more controlled pilot rather than completed general issuance (NBR, 2026). These are noteworthy engineering and user-research findings, not evidence of universal adoption, production resilience under all conditions, legal-tender status or realized cross-border savings. The central bank's technical demonstration must therefore be separated from a final policy decision and from obligations that would arise if a currency were actually launched.

A well-designed CBDC assessment examines at least the additional public value relative to existing payment rails, financial inclusion through feature phones and offline modes, privacy, cybersecurity, fiscal cost, bank deposit substitution, the central bank's operational burden, interoperability, legal authority, user-recovery procedures and resilience to connectivity or power failure. An offline product might strengthen continuity, yet creates limits on double-spend prevention and recovery processes. A direct retail CBDC with large unrestricted holdings could affect commercial-bank funding under stress; tiered access, holding limits or intermediary-based models may alter that risk. These are design trade-offs, not established predictions for Rwanda's eventual architecture.

25.11.2 Digital asset promises and epistemic discipline

Tokenization claims frequently suggest that recording a claim on a distributed ledger automatically makes it liquid. Liquidity, however, requires counterparties willing and able to trade, reliable custody, acceptable transaction costs, clear property rights and credible price discovery. A tokenized interest in illiquid real estate remains exposed to underlying valuation and legal enforcement. Likewise, a stablecoin designed to maintain a fixed value may break its peg if reserve assets, redemption rights or counterparties fail. The correct business question is what economic claim a token represents and what institutions make the claim enforceable and usable, not whether the underlying cryptographic protocol is sophisticated.

The appropriate status labels should be explicit: **enacted legal instrument**, **licensed service**, **regulated pilot**, **proof of concept**, **proposal**, or **speculative design**. Conflating these states can mislead managers into making operational commitments based on non-existing settlement guarantees. Current Rwandan rules concerning private digital assets should be verified before any claim of legality, licensing or permissibility is made. The chapter deliberately does not infer such status from international debates or from NBR's CBDC research.

25.11.3 Custody, redemption and the political economy of programmable finance

Token custody is a legal and operational relationship, not merely possession of a cryptographic key. A user may control a private key yet have no enforceable title to the asset supposedly represented; conversely, a regulated custodian may hold legally recognized claims while relying on centralized record keeping. Redemption risk arises when a token promises exchange for fiat currency or underlying securities that cannot be delivered at par under stress. A credible institutional appraisal therefore traces property rights through issuers, custodians, reserve managers, smart-contract administrators and insolvency procedures. The allocation of recovery rights after a lost key, fraudulent transfer or issuer failure is central to usability.

Programmable money also requires normative scrutiny. Conditions on the use of funds may support targeted disbursement or reduce reconciliation costs, but could be used to impose disproportionate surveillance, restrict legitimate exchange or weaken procedural challenge. An enterprise should ask whether programmability is necessary for the proposed value, who can amend a restriction, whether affected users receive meaningful notice, and what appeal and correction routes exist. These questions apply to public and private instruments alike. They do not establish that any proposed digital currency will necessarily be oppressive or liberating; governance design and observed implementation must determine the assessment.

25.12 EMERGING SYSTEMIC RISKS AND THE RESILIENCE OF DIGITAL FINANCE

Financial risk propagates through balance sheets, contractual dependencies and expectations. Traditional credit and liquidity problems now interact with cloud-service concentration, application programming interfaces, telecom outages, cyber extortion, shared fraud controls, algorithmic decision-making and rapidly transmitted information. An institution can meet minimum reported capital ratios yet lose critical payment capability after a provider incident. It can have robust technology but fail through poor credit underwriting. Resilience consequently requires joint supervision of financial and nonfinancial dependencies rather than a narrow 'cybersecurity department' approach.

The Financial Stability Board's (2025) monitoring of nonbank financial intermediation found that nonbank assets accounted for approximately **51% of total global financial assets in 2024** within its monitored jurisdictional universe. This is not a statement that all those assets pose bank-like risks, nor does it show the same composition in Rwanda. It emphasizes that leverage, liquidity mismatch, concentrated exposures and interconnections can emerge outside the deposit-taking perimeter. Private-credit vehicles, money-market funds, insurers, platforms and asset managers may transmit stress to banks through funding relationships, overlapping holdings and forced sales. Economic substance and network position matter more than institutional labels.

25.12.1 A risk taxonomy for banks, fintechs and enterprises

Financial stability analysis should separate **credit losses**, **liquidity shocks**, **market repricing**, **operational and cyber failure**, **legal and conduct risks**, **concentration and contagion**, **data/algorithm risks**, and **climate or nature-related physical and transition exposures**. Climate risks can affect borrowers through crop failure, floods, transition costs and changing insurance affordability. Yet scenario modeling is inherently dependent on time horizons, geographic exposure, data quality and policy assumptions. A stylized climate stress test may reveal vulnerability and improve questioning without estimating a uniquely correct forecast of future credit losses.

For a lender using an automated score, model risk governance should document the target, training window, source legality, missingness, drift, leakage, subgroup calibration, human review procedures and the consequences of retraining. Approval-rate parity alone is not a sufficient measure of justice or safety, since borrower populations and legitimate risk differences may vary. Conversely, highly predictive digital histories may proxy protected attributes or discriminate through inaccessible connectivity. Protecting human dignity requires proportionate data collection, an intelligible decision process, meaningful appeal and monitoring for unjustified outcome disparities.

25.12.2 Operational resilience, outsourcing and crisis response

An operationally critical provider relationship should be governed by service-level agreements and, more importantly, by testable recovery capacity. Relevant controls include dependency mapping; impact tolerances for critical business services; geographic and technological concentration analysis; backups; fraud and incident reporting; business continuity tests; penetration testing under appropriate supervision; reconciliation after outage; effective customer communications; and legally workable exit or substitution arrangements. A 'multicloud' strategy may reduce exposure to one supplier while increasing integration complexity and shared dependencies. Resilience should therefore be measured by actual service restoration under plausible stress, not by the number of vendors contracted.

An illustrative payment outage demonstrates why functions must cooperate. When a merchant's primary wallet provider becomes unavailable, sales should disclose permissible alternative channels, finance should protect against duplicate collection, operations should not release goods on unverified payment notifications, IT should preserve incident logs, and customer service should provide accessible remedy. The response is stronger when pre-authorized and periodically rehearsed. Cybersecurity and financial risk management are thus operational

business responsibilities linked to governance (Chapter 8), customer promises (Chapter 16), logistics (Chapter 19), capital (Chapter 24) and enterprise-wide crisis preparedness (Chapter 32).

25.12.3 Financial contagion, nonbank leverage and proportional oversight

Systemic risk becomes acute when losses or liquidity demands at one node force responses elsewhere. The same government security may be held by banks, pensions, mutual funds and leveraged dealers. A rise in yields can reduce market values, increase collateral haircuts and induce redemptions, linking apparently distinct institutions through common portfolios. Brunnermeier and Pedersen's (2009) liquidity-spiral mechanism illustrates one path of amplification. The FSB's nonbank financial intermediation monitoring provides a wider institutional map, but total nonbank assets should not be mistaken for the narrower subset of activities with bank-like leverage or run risk (FSB, 2025).

An effective supervisory map records not only regulated entity types but also economic functions: liquidity promises, leverage, maturity mismatch, concentrated counterparties, custody arrangements and operational single points of failure. This is particularly important when banking services are delivered through partnerships with mobile providers, fintech platforms and investment vehicles. Nonetheless, identical rules for all participants can encourage undesirable circumvention or impose prohibitive compliance costs on small providers. The more defensible principle is comparable attention to comparable risk, adjusted for legal powers, operational capacity, materiality and consumer exposure.

25.13 RWANDAN FINANCIAL JOURNEYS: HOUSEHOLDS, ENTERPRISES AND INSTITUTIONS

The Rwandan evidence supports a more discriminating interpretation than either 'universal finance has been achieved' or 'formal finance is still inaccessible'. FinScope 2024 documents wide engagement with financial products and rapid mobile-money reach, while conventional banking participation remains much lower and the quality of outcomes differs by product (AFR, 2024). NBR's 2024/25 report shows growing digital payment activity and financial-sector assets; the CMA documents expansion in securities financing; and the IMF highlights the need to monitor rapid credit growth and concentrated exposures (NBR, 2025; CMA, 2026; IMF, 2026). These findings refer to different populations, dates and units. A meaningful account should preserve those differences rather than combine them into a single national success score.

25.13.1 Constructed household journey: access, saving, borrowing and protection

Consider a **hypothetical** household in a rural Rwandan district. Its income fluctuates between agricultural sales, occasional wages and family transfers. A mobile wallet receives remittances and pays utility charges; a savings group provides small loans; a SACCO offers formal savings; crop or health insurance may cover specified shocks. The household is financially 'included' in a broad access classification, yet may be unable to manage a seasonal cash shortage without expensive borrowing. The decisive policy question becomes whether the service package improves liquidity resilience and control over resources, not how many product categories the household appears in.

A responsible assessment maps its actual transaction journey and decision rights. Who owns the account and controls authentication? Are funds safely stored and accessible during outages? Which channels have cash-in/cash-out agents with enough liquidity? What are effective costs of transfer, overdraft and insurance? Can family members with lower digital literacy understand terms and seek remedy? These are empirical questions for a genuine study; the constructed household generates no survey findings. The example illustrates why individual control, practical use and effective recovery must be evaluated separately from access.

25.13.2 Constructed enterprise journey: from customer invoice to working capital

Consider a **hypothetical** Kigali processor with RWF 90 million annual invoiced sales, a 40-day typical customer collection period and recurring inventory purchases. Its finance manager uses a bank operating account, mobile-money acceptance for small retailers, supplier credit, a possible revolving facility and insurance for selected cargo exposures. It could later use a longer-term loan or investment capital to acquire machinery. The appropriate decision order is to reconcile sales, actual settlements and receivables; forecast cash deficits; quantify counterparty and FX exposure; evaluate whether contract terms can be renegotiated; and only then compare credit offers. A lender's offer to increase debt may be counterproductive if weak collections are the dominant cause of distress.

The same enterprise should test whether customer-channel diversity helps or hinders reconciliation. If 35% of sales arrive by bank transfer, 45% by mobile money and 20% remain on invoice terms, reported revenue cannot be treated as immediately available cash. Payment matching and source records belong to financial control (Chapters 22 and 26), while the credit and settlement infrastructure is the subject here. The business case demonstrates that the value of financial services depends on their synchronization with receivables, procurement, employment and delivery, not on the adoption of any single product.

Table 25.3. Financial-journey diagnostic for a Rwandan household and enterprise

Decision stage	Household diagnostic question	Enterprise diagnostic question	Evidence needed
Receive	Which member controls incoming funds?	Who confirms final customer settlement?	Account ownership, transaction records
Hold	Are safe liquid balances available when needed?	Can wages and suppliers be paid on due dates?	Dated balance and obligation schedules
Borrow	Is total repayment affordable under low-income months?	Is debt service resilient to delayed receivables?	Dated cash flows, APR/effective cost, stress cases
Protect	Which large losses remain uninsured?	Which inventory, cargo and liability exposures are covered?	Policy wording, deductible, claims processes
Invest	Do savings products match life goals and risk capacity?	Does financing duration match productive asset use?	Purpose, horizon, suitability, covenant schedule
Remedy	Who investigates mistaken payments or abusive charges?	Who owns settlement, lender and insurer disputes?	Contracts, logs, complaints and escalation trails

Note. Original teaching instrument. The household and enterprise are constructed; source documents establish the Rwandan institutional context, not individual observations.

25.13.3 Evidence limitations and interpretation protocol

FinScope is primarily a demand-side financial-inclusion survey, not a randomized evaluation of each product's economic effects. NBR annual reports describe institutional and sector activity, not the causal contribution of specific platforms to productivity. CMA issuance data do not demonstrate that participating issuers increased employment because of bond financing. IMF surveillance identifies risks and aggregate tendencies rather than making a credit decision for a particular bank. A doctoral-level interpretation should therefore specify population, date, numerator, operational definition, institutional interest, likely measurement error and viable causal counterfactual before generalizing. This protocol is central to the chapter's contribution: no single source can validate all links between financial access, enterprise investment, stability and welfare.

25.14 COMPARATIVE INTERNATIONAL ANALYSIS AND THE LIMITS OF TRANSFER

Kenya's experience with M-Pesa offers a substantial empirical comparator, but its best-established research question is narrower than 'does mobile money cause development?' Using panel evidence, Jack and Suri (2014) found that access to mobile money improved the capacity of participating households in their study to smooth consumption following adverse shocks, with remittances an important mechanism. In a later study, Suri and Jack (2016) estimated longer-run effects on consumption, poverty and women's occupational choice. These papers provide unusually substantive evidence that transaction-cost reductions can change household outcomes in a particular institutional environment. Their identification strategies, survey waves, geographic variation, program maturity and historical period must nevertheless be examined before borrowing their estimates for another country.

Rwanda differs from Kenya in provider structures, population geography, state-led financial-inclusion strategies, SACCO coverage, institutional sequencing and contemporary digital-payment architecture. Rwanda's 2024 FinScope indicators establish extensive use of mobile money; they do not independently reproduce the Kenyan research design or identify identical welfare effects. It would be methodologically unsound to multiply Kenya's estimated household impact by Rwanda's account coverage and announce a forecast. The appropriate comparative strategy begins with a mechanism: whether a reduction in transfer costs improves timely remittances, savings security or business turnover. It then asks whether uptake is driven by the same constraints, whether fees and agency networks are comparable, whether users face similar shocks, and whether the effect can be identified with credible Rwanda-specific data.

A second comparison comes from international bank regulation and financial-market infrastructure. The Basel framework and CPSS-IOSCO principles provide shared vocabulary for capital, liquidity, operational resilience, legal finality and governance (BCBS, 2026; CPSS-IOSCO, 2012). Their transfer requires due attention to supervisory capacity, smaller institution cost burdens, domestic settlement architecture and the interplay of banks with savings cooperatives and nonbank providers. A small financial institution can adopt strong responsibility for risk without replicating the compliance departments of a major international bank. Equally, reduced complexity must not obscure fraud, consumer claims or correlated lending exposures.

The global Findex comparison offers a third lesson. The World Bank's 2025 report measures adult ownership and use of specified financial services across 141 economies based on 2024 interviews (World Bank, 2025). Rwanda FinScope 2024 offers richer locally designed categories, including inclusion through informal mechanisms. A percentage taken from each report without harmonizing age, ownership/use, formal/informal classification and timing can manufacture a spurious 'performance gap'. Researchers should either harmonize raw or clearly aligned indicators or present results side by side as non-equivalent estimates. Apparent precision does not compensate for a mismatch in constructs.

Table 25.4. Interpreting Rwanda–international evidence without false equivalence

Evidence	Strongest supported use	Unsupported extrapolation	Required qualification
Rwanda FinScope 2024	Distribution of reported financial access and use among surveyed adults	Account ownership causes poverty reduction	Definition, age base, overlap, sampling
NBR FY2024/25 annual report	Sector balances and payment activity over a documented year	Digital payment growth proves enterprise productivity	Value versus volume; sector versus firm
CMA FY2024/25 report communication	Capital-market issuance, market size and fund activity	Listed-market growth benefits every SME	Issuer access, cash raised, liquidity
Kenya mobile-money studies	Context-specific estimates of transactions/risk sharing and longer-run outcomes	Identical effect sizes in Rwanda in 2026	Mechanisms, design, period and transfer conditions

Evidence	Strongest supported use	Unsupported extrapolation	Required qualification
Global Findex 2025	Globally comparable selected adult financial indicators	Same inclusion construct as Rwanda FinScope	Age base, formal/informal and ownership/use
Basel and infrastructure standards	Normative international benchmarks for prudential and settlement design	Unchanged binding requirements in Rwanda	National transposition, scope, implementation

Note. Developed from AFR (2024), NBR (2025), CMA (2026), Jack and Suri (2014), Suri and Jack (2016), World Bank (2025), BCBS (2026) and CPSS-IOSCO (2012).

25.14.1 A mechanism-based comparison of African and high-income financial innovation

Three comparative studies illuminate distinct pathways. The Kenyan mobile-money research of Jack and Suri (2014) concentrates on the effect of lower transfer frictions and improved household risk sharing; Karlan et al. (2014) demonstrate how reducing uninsured agricultural risk can change productive choices in Ghana; and Fuster et al. (2019) examine technology-related processing efficiencies in a data-rich United States mortgage market. None addresses all possible meanings of 'financial inclusion'. Their outcome variables differ, as do their contractual products, institutional environments and identification strategies. Grouping them as evidence that digitization necessarily causes development would conceal rather than explain the evidence.

For analytical transfer to Rwanda, researchers should specify a transportability argument before comparing effect sizes. For mobile payments, test whether agent availability, pricing and remittance networks plausibly match the mechanism under study. For agricultural insurance, test whether index validity, farm input markets and payout credibility are sufficiently similar. For technology-led lending, test whether borrower information quality, collateral, supervisory arrangements and origination economics are transferable. Where these conditions fail, the comparator remains useful as a theoretical challenge, but not as a numerical forecast. This avoids the false choice between dismissing international evidence and importing its conclusions without qualification.

25.15 INTEGRATED TEACHING CASE: A DIGITAL LENDER'S GROWTH DECISION IN RWANDA

25.15.1 Case definition and reproducible assumptions

All enterprise values, portfolios, losses and contractual terms in this section are hypothetical. A fictional licensed-or-license-seeking lender, **Imena Digital Finance**, proposes a six-month microenterprise loan product distributed through a mobile interface. No actual Rwanda-based provider is represented. Management argues that faster application processing and existing mobile-money use justify rapid scale-up. The credit team observes insufficient repayment histories and substantial potential concentration in retail traders. Compliance personnel require evidence of lawful licensing, borrower consent, fee disclosure, reporting, fair collections and accessible remedy before a product launch. The board asks whether contribution remains defensible under plausible default and funding stresses.

To isolate the calculation, assume the pilot would originate 1,000 equal-principal loans of RWF 250,000 each, for a total disbursement of **RWF 250 million**. Contractual six-month interest on fully performing loans is 20% of principal, treated here as a simplified flat amount; an upfront 2% origination fee is assumed fully collected and legally permissible solely for this illustration. The lender expects an 8% six-month probability of default (PD) on a loan-count-weighted, equal-exposure basis, a 65% loss-given-default (LGD) on principal, a simple six-month funding cost equivalent to 4.5% of originations, RWF 7,000 servicing expense per loan, RWF 5,000 customer-acquisition expense per loan and additional expected fraud loss equal to 0.6% of principal. These parameters are not market quotes, regulatory caps or validated Rwanda default forecasts.

For simplicity, interest is assumed collected in full on nondefaulted loans, with no interest recovered on defaulted loans. Fees are assumed collected at origination and not subject to refunds in the hypothetical contract. Recoveries are represented solely in principal LGD. All 1,000 loans are assumed to have comparable exposure and

default probability; no staged amortization, capital charge, tax, inflation, prepayment or recovery-timing effects are modelled. These intentionally restrictive assumptions make the mechanics inspectable, but are not sufficient for a real credit product decision. A professional model would incorporate dated cohort cash flows, collections, net interest recognition, loan aging, regulatory provisioning and capital, borrower affordability, and legally compliant pricing.

25.15.2 Baseline expected contribution and stress analysis

The baseline portfolio's interest income is **RWF 250 million × 20% × (1 − 8%) = RWF 46 million**. Expected fee income is **RWF 250 million × 2% = RWF 5 million**. Expected principal credit loss is **RWF 250 million × 8% × 65% = RWF 13 million**. Funding expense is **RWF 11.25 million**; servicing is **RWF 7 million**; acquisition is **RWF 5 million**; and expected fraud loss is **RWF 1.5 million**. The simplified contribution is therefore **46 + 5 − 13 − 11.25 − 7 − 5 − 1.5 = RWF 13.25 million** before fixed platform overhead, capital charge, taxes, extraordinary losses and other exclusions. The estimated contribution margin on originated principal is **5.3%** over six months; it is not a risk-adjusted return on equity or an annualized borrower yield.

Holding other inputs constant, contribution as a function of default probability p is **C(p) = 50(1 − p) + 5 − 250 × 0.65p − 24.75 = 30.25 − 212.5p**, expressed in RWF millions. Its break-even PD is **30.25/212.5 = 14.24%**, before fixed overhead and capital charges. This threshold is an illustrative accounting break-even under assumed fee collection and loss timing, not a prudent regulatory default tolerance. A product could destroy shareholder value at a much lower default rate once risk capital, time value, operating scale and adverse selection are considered.

Table 25.5. Reproducible hypothetical six-month lender sensitivity analysis (RWF million)

Parameter/result	Baseline PD 8%	Stress PD 14%	Severe PD 16%
Originated principal	250.00	250.00	250.00
Interest received from performing loans	46.00	43.00	42.00
Upfront fees	5.00	5.00	5.00
Expected credit loss on principal	(13.00)	(22.75)	(26.00)
Funding cost	(11.25)	(11.25)	(11.25)
Servicing, acquisition and fraud	(13.50)	(13.50)	(13.50)
Expected contribution before excluded costs	**13.25**	**0.50**	**(3.75)**
Contribution/originations	5.30%	0.20%	(1.50%)

Note. Original constructed teaching data. Interest = 250 × 0.20 × (1 − PD); credit loss = 250 × PD × 0.65; fixed modeled variable costs total 24.75. Parentheses denote expenses or losses. Rates are expressed as decimals in computation. Minor displayed rounding does not affect totals.

The apparently attractive baseline is fragile. If default probability doubles from 8% to 16%, contribution becomes negative even before the excluded fixed and capital costs. A one percentage point increase in PD lowers the modeled contribution by **RWF 2.125 million**; this follows from the slope of C(p) and is not an empirical sensitivity estimate. An increase in funding costs further lowers contribution, while higher origination fees may be legally restricted, unfair or commercially counterproductive. A statistically high-performing credit model might improve estimated PD, but management cannot treat an untested model as evidence that default probabilities will remain below break-even after expansion.

25.15.2.1 Borrower-facing cost and incomplete lender economics

The model must also be read from the customer's side. For a fully performing hypothetical loan of RWF 250,000, a 2% upfront fee of RWF 5,000 leaves RWF 245,000 of net usable proceeds if deducted when funds are advanced. If RWF 300,000 is due six months later, the borrower's effective six-month cost is 300,000/245,000 − 1 = 22.45%; assuming identical six-month compounding, the effective annual rate is approximately 49.94%. This is not equivalent to the advertised 20% flat six-month interest rate, and changes if repayment is amortized, fees are paid on different dates or other charges apply. The scenario deliberately does not assert that this product or charge structure is lawful in Rwanda. It demonstrates why an apparently profitable lender calculation cannot substitute for transparent, locally compliant borrower-cost disclosure.

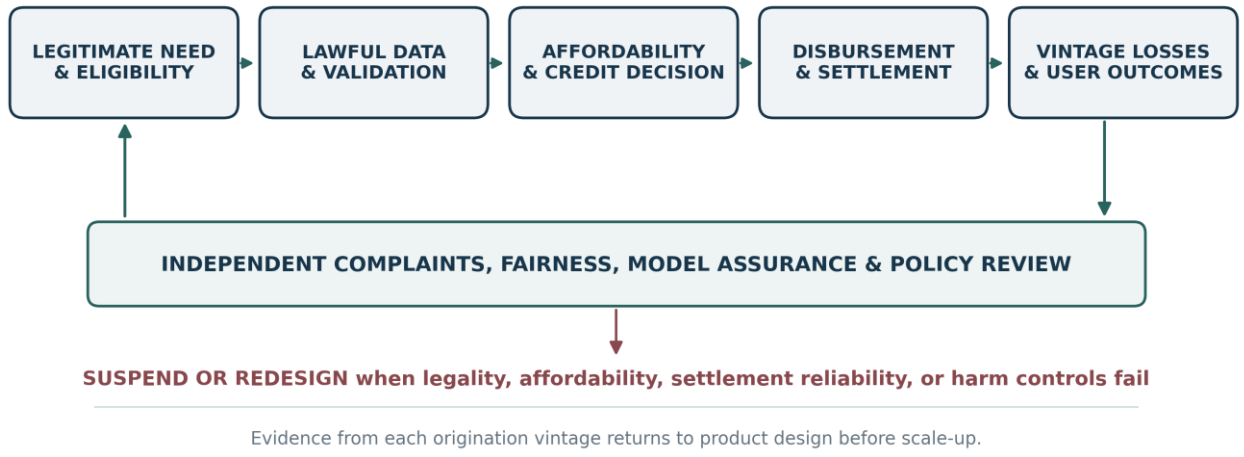
The estimated lender contribution is also narrower than economic profit. It omits platform fixed costs, regulatory capital and liquidity buffers, collection and recovery timing, taxes, the opportunity cost of shareholder funds and possible tail dependence among borrowers. Defaults in one sector may become positively correlated during a common demand or exchange-rate shock, rendering an average expected loss particularly weak as a resilience metric. The board should therefore inspect loss distributions, survival cash flow, vintage performance and downside capital sufficiency before increasing origination. A portfolio can have positive expected contribution while imposing an unacceptable probability of insolvency or disproportionate distress on customers.

25.15.3 From numerical decision to governed pilot

The board should not authorize a full-scale launch solely because expected baseline contribution is positive. Its conditional decision should specify a legally verified operating model; independent sign-off on product disclosures and complaints; audited source-to-settlement processes; suitability and affordability screening; a small staggered pilot; loss recognition against defined vintage cohorts; data minimization; controlled model changes; and escalation when adverse outcomes exceed thresholds. Fraud monitoring and payment reliability should be considered independently of credit quality. A thin data trail is not evidence that a borrower is irresponsible, and a payment delay is not automatically a default due to unwillingness to pay.

A technically credible pilot would pre-register practical decision metrics: six-month default by origination vintage; realized loss-given-default; repayment distress and restructuring; on-time settlement; customer complaints per 1,000 disbursements; fairness metrics with lawful and statistically appropriate subgroup analysis; consent and privacy incidents; total realized customer cost; and contribution after all operating and capital costs. An adequately designed evaluation should compare borrowers with suitable nonborrower groups or, where lawful and ethical, use a carefully governed rollout design. It must not infer a causal welfare benefit from comparing successful borrowers with applicants who were never approved.

Figure 25.2. Digital-lending decision and accountability loop.



The diagram begins with legitimate need and product eligibility, flows through lawful data collection and model validation, affordability and credit decisions, disbursement and settlement, monitoring and recovery, and independent complaints and review, before returning corrected evidence to product design. A separate veto path links unlawful pricing, unreliable settlement, excessive harm or unvalidated models to suspension. Note. Original analytical model based on the risk mechanisms in Stiglitz and Weiss (1981), Berg et al. (2020), Republic of Rwanda (2021), and NBR (2025); not an externally validated impact model.

25.15.4 Professional decision memorandum

A defensible memorandum would state that the product is **not yet suitable for unrestricted expansion** because baseline contribution is insufficient evidence of resilience and consumer benefit. It would authorize, at most, a limited pilot conditional on applicable regulatory approvals, reliable payment infrastructure, verified fee transparency, functioning complaint routes, adequate capital and cash resources, and independent outcome evaluation. It should state why a traditional bank partnership, invoice-based enterprise finance or a savings-linked product was not selected, and should document conditions under which the board would revise the decision. This is a conditional teaching judgment under expressly fictional assumptions, not a recommendation concerning an identifiable institution.

25.16 INTEGRATIVE SYNTHESIS, ETHICAL EVALUATION AND RESEARCH AGENDA

The evidence assembled here suggests a six-part **credible-finance configuration**: an instrument must represent a legally intelligible claim; a provider must obtain information adequate for its decision; funding must match the timing and risk of obligations; settlement must be reliable; customers must have meaningful protection and remedy; and the arrangement must remain resilient under correlated stress. These conditions are necessary analytical questions rather than a proven sufficient formula for success. A product can satisfy each superficially and still fail because the wider economy, technology dependencies, supervisory capacity and stakeholder interests evolve. The framework is consequently a diagnostic method to organize tests and governance, not a prediction engine.

The framework also clarifies disagreements across finance theory. Asymmetric-information models explain why seemingly creditworthy firms may be rejected and why monitoring institutions emerge; liquidity-transformation models explain why deposit-taking is productive but fragile; financial-development arguments explain how improved intermediation could support investment; platform scholarship highlights information economies, network effects and concentration; inclusion research insists that participation and benefits must be differentiated. None can absorb all others without losing an important mechanism. A reliable finance curriculum should therefore resist presenting 'the financial system' as an invariant progression from cash to bank to app to token. Historical institutions, public regulation, informal arrangements and social trust create different viable paths.

25.16.1 Cross-functional consequences for the enterprise

Financial channels are productive only as part of the enterprise system described in Chapter 1. Marketing and sales (Chapters 13–16) set payment promises and determine the diversity and reliability of collections. Procurement and supply-chain management (Chapters 18–19) establish inventory and supplier credit requirements; the resulting cash-cycle risk defines feasible financing maturity. Financial accounting and budgeting (Chapters 22–23) provide the evidence needed to monitor settlement and evaluate borrower affordability. Chapter 24 appraises the investment being financed rather than the intermediary's infrastructure. Strategy and governance (Chapters 6 and 8) authorize risk, ensure accountability and prevent sales incentives from concealing future defaults. Technology chapters (28–29) address information architecture and AI techniques in greater depth, while Chapter 26 develops specialist audit, taxation and internal financial controls. Finance is thus enabling infrastructure, but never a substitute for operating capability or legitimate strategy.

Three ethical conflicts require explicit reasoning. First, a lender owes duties to depositors and its own solvency while borrowers may have legitimate needs unmet by conventional collateral-based models; indiscriminate

approval and indiscriminate rejection are both inadequate. Second, digital personalization can improve accessibility while producing data extraction, opaque discrimination or excessive surveillance; lawful consent and the ability to contest treatment must be meaningful rather than ceremonial. Third, a public institution may promote digital efficiency while imposing exclusion costs on cash users, people without stable connectivity and those requiring assisted service. The appropriate norm is proportionate, evidence-based decision-making that respects dignity and allocates avoidable harms fairly. The fuller theological analysis of business responsibility is reserved for Chapter 34.

25.16.2 Testable research propositions and methodological priorities

A first proposition concerns payment interoperability: conditional on usable acceptance infrastructure and effective reconciliation, greater interoperability should reduce realized collection delays among participating small enterprises. The relevant unit of analysis is the merchant over time; provider-level transaction volumes alone cannot establish a causal effect. A credible design must address selective adoption and changes in customer mix.

A second proposition links the credibility of transaction histories to underwriting. More verifiable records should lower some screening costs, but the magnitude and fairness of any improvement are plausibly moderated by sector informality, borrower selection and data-governance capability. The effect should be evaluated on accepted and rejected applicants where legally and methodologically feasible.

A third proposition distinguishes participation from resilience. More widespread account ownership or service use should improve household recovery after shocks only where products are sufficiently affordable, suitable, reliable and controllable by the account user. It should be tested through independently observed outcomes rather than self-reported enrollment alone.

A fourth proposition addresses the tension between digital scale and concentration. Shared infrastructure can lower costs while creating correlated outage exposure; genuinely independent redundancy and credible recovery arrangements may moderate that risk. Testing requires incident data, dependency mapping and documented recovery performance. These propositions are researchable hypotheses, not findings validated by the present chapter.

A feasible Rwanda-based research programme could combine the 2024 FinScope microdata, where access and permissions permit, with regulator-supplied service statistics and consenting institutional administrative records. Construct harmonized financial-product indicators, geocode access only within lawful safeguards, identify period changes and use staggered infrastructure rollout or exogenous variation only when the assignment mechanism is genuinely defensible. For enterprise outcomes, use audited or validated sales and payment records, examine treatment contamination and selection, and predefine estimands such as days-sales-outstanding, unsuccessful settlement rates or short-term liquidity shortfalls. Qualitative process tracing could illuminate trust, repair and provider incentives but should not be presented as conducted here. Research on CBDCs should separately evaluate technical performance, legal design, monetary implications and user welfare, avoiding the inference that a successful prototype guarantees desirable production deployment.

25.16.3 Chapter conclusion

Banking, securities markets, payment networks, insurers and fintech providers do not compete over a single undifferentiated financial task. They create, exchange, monitor and settle different claims with different rights and vulnerabilities. Rwanda illustrates both the scale of contemporary digital financial participation and the need to distinguish reach from credit quality, market depth, individual control and financial wellbeing. The central conclusion is that financial innovation creates durable enterprise value only when it reduces consequential frictions **without obscuring claims, shifting unrecognized losses to weaker parties, or compromising the**

system's capacity to survive stress. In financial intermediation, the credibility of the obligation is at least as important as the convenience of the transaction.

Seven interconnected conclusions follow from this analysis. Financial services must first be classified by the underlying legal claim rather than by the interface through which they are sold. Banking generates both productive credit and potentially fragile funding promises, making liquidity and solvency controls inseparable from lending decisions. Capital markets enlarge financing and risk-sharing options only when disclosure, custody, secondary-market depth and investor suitability are credible. Payment technology creates genuine value when it lowers the total cost and uncertainty of settlement without excluding legitimate users. Inclusion should be judged by control, affordability, suitable usage and resilience, not enrollment alone. Insurance and patient capital can protect and expand productive activity, but claims quality and additionality require independent evidence. Finally, financial innovation is responsible only when its benefits remain defensible under loss, cyber disruption, concentration, consumer challenge and changing institutional conditions. These conclusions preserve the distinction between efficiency, knowledge and justice established at the outset of the chapter.

25.17 KEY TERMS, ASSESSMENT AND TEACHING RESOURCES

25.17.1 Cumulative glossary

Term	Operational meaning
Adverse selection	A selection problem arising when parties possess unequal information about risk-relevant characteristics.
Bank deposit	A bank liability to a customer under the applicable agreement; it is not an individually segregated holding of central-bank reserves.
Capital adequacy	The relationship of eligible loss-absorbing regulatory capital to defined exposures and applicable minimum requirements.
CBDC	A digital liability of a central bank, if authorized and issued, whose rights depend on the applicable legal and operational design.
Clearing	The processing, transmission and calculation of payment or securities obligations prior to settlement.
Collateral	Assets or rights securing an obligation, subject to legal priority, enforceability and realizable value.
Credit rationing	A circumstance in which some borrowers are denied credit despite accepting prevailing quoted terms.
Deposit protection	Legally specified protection for eligible deposits, subject to defined institutions, products and coverage limits.
Digital footprint	Information generated by online activity that may inform specified analyses, subject to data quality and legal constraints.
Effective borrowing cost	A discount rate inferred from actual dated net borrower proceeds and all relevant outflows.
Electronic money	Stored monetary value carrying claims and safeguarding rights defined by its issuance and regulatory arrangements.
Financial inclusion	An explicitly defined measure of the access to and use of financial products, distinct from their realized welfare effects.
Financial intermediation	The organization of savings, claims, information and risks between providers and users of capital.
Interoperability	The ability of different systems or providers to exchange and process payments under defined rules.
Liquidity transformation	The financing of relatively illiquid claims with comparatively liquid or short-dated liabilities.
Loss given default (LGD)	The proportion of a specified exposure remaining unrecovered upon a defined default.

Term	Operational meaning
Non-performing loan (NPL)	A loan meeting non-performance criteria specified by a supervisory or accounting framework.
Payment finality	The legally effective point at which settlement becomes ordinarily irrevocable under relevant rules.
Probability of default (PD)	Estimated chance of a defined credit default over an identified time horizon.
Prudential regulation	Rules and supervision addressing institutional solvency, liquidity and financial-system safety.
Risk-weighted assets (RWA)	An exposure aggregate calculated using prescribed regulatory risk weights or permitted methods.
Settlement	The discharge of financial obligations through the agreed asset and infrastructure.
Tokenization	A digital representation of a claim, right or asset under a particular legal and technical arrangement.
Underwriting	Assessment, pricing and acceptance of specified credit or insurance risks.

25.17.2 Conceptual and doctoral-level analytical questions

Question 1 (LO1–LO2). Explain why the claim that 'banks lend only pre-existing deposits' is misleading and why correcting it does not imply that bank lending is unlimited. Reconstruct the journal/balance-sheet changes when a newly created deposit moves to another bank, then compare delegated monitoring with liquidity-insurance explanations of banking. Identify assumptions that would fail in a non-deposit fintech model.

Question 2 (LO3–LO4). A manufacturer seeks RWF 80 million for equipment with a six-year useful life and RWF 20 million to bridge forty-five days of receivables. Evaluate a five-year term loan, overdraft, equity issue and invoice finance. State contractual information required before any numerical ranking and discuss why a single all-purpose instrument may increase risk.

Question 3 (LO5–LO8). Critically appraise a policymaker's statement that Rwanda's high reported financial-inclusion rate demonstrates universal access to affordable enterprise loans and financial resilience. Specify the FinScope definitions that must be separated, identify potential survey limitations, and construct an ethical, feasible empirical test of an actual welfare outcome.

Question 4 (LO4–LO7). Compare the failure channels of a commercial bank, a mobile wallet provider, an uninsured money-market fund, a tokenized deposit and an unbacked cryptoasset. In each case, identify issuer, enforceable claim, finality, supervisory perimeter, redemption and recovery rights. Explain how apparent similarity in the user interface could conceal significant differences in legal and financial exposure.

Question 5 (LO6–LO8). Design a research strategy to test whether interoperable digital payments causally reduce small-enterprise days-sales-outstanding in Rwanda. Specify the unit of analysis, exposure, estimand, baseline period, comparison construction, likely selection mechanisms, missing data, outcome measures, pre-analysis decisions, data protection and interpretation limits.

25.17.3 Applied calculations and case assignments

Exercise A: credit economics (LO3, LO5). For a six-month loan whose borrower receives RWF 1,000,000 but pays a RWF 30,000 origination fee at disbursement and RWF 1,130,000 at maturity, find the effective six-month borrowing rate using net proceeds, then compute its effective annual rate assuming two identical compounding periods. Explain why using the headline RWF 130,000 interest charge divided by the gross principal understates the effective cost. *Instructor check:* net proceeds = RWF 970,000; six-month rate = 1,130,000/970,000 − 1 = **16.49%**; effective annual rate ≈ **35.71%**. This is a constructed calculation, not a permitted interest-rate benchmark.

Exercise B: insurer and enterprise (LO4, LO8). Revisit Section 25.9.1 with a 7% event probability, RWF 5 million deductible and RWF 1.4 million premium. Specify which losses are covered, recompute expected insurance cost, and defend a decision for (a) a cash-constrained small firm and (b) a diversified large enterprise. A correct response should distinguish expected expenditure from the value of liquidity protection and should not assume identical risk preferences.

Exercise C: digital-lender stress (LO5, LO7–LO8). Rebuild Table 25.5, then change LGD from 65% to 80% and funding cost from 4.5% to 6% of originations over six months. Derive the new breakeven PD and explain why comparison with the original threshold must account for capital charges, vintage behavior and regulatory consumer-protection constraints. *Instructor check:* fixed modeled costs rise from RWF 24.75 million to RWF 28.50 million; interest remains 50(1−p), fee income 5 and credit losses 200p; contribution becomes **26.50 − 250p** million, giving break-even **10.60%**. All amounts are hypothetical.

Capstone assignment (LO1–LO8). Prepare a 3,500–5,000-word evidence-based financing and payments assessment for one actual Rwandan sector, using only legitimately obtainable secondary sources and no invented firm interviews. Compare a small enterprise, a household and a financial service provider. Critically examine applicable legal duties and primary statistics; construct a risk-adjusted funding alternative and a payment-failure scenario; assess inclusion, consumer protection and cyber resilience; explain international comparability; and develop a falsifiable monitoring plan. Every factual claim and numerical assumption must be traceable to a source or explicitly labeled illustrative. Separate the evidence summary from the author's normative judgments.

25.17.4 Assessment rubric and educator guidance

A defensible marking scheme for the capstone assigns **25%** to theoretical accuracy and engagement with competing explanations, **25%** to source validity, methodological transparency and inferential discipline, **20%** to quantitative correctness and stress testing, **15%** to Rwanda-specific institutional and international comparative reasoning, and **15%** to integration, ethical accountability and scholarly communication. At doctoral level, a polished description is not sufficient: students must defend assumptions, discriminate causal from descriptive evidence, identify where theories fail and supply credible alternatives. In classroom delivery, a staged simulation can assign roles to the borrower, bank risk officer, mobile-payment provider, insurer, regulator and consumer advocate, then require a joint decision memorandum. The instructor should verify changes to legislation and financial-market conditions before reusing country-specific examples.

25.17.5 Selected further reading

Diamond and Dybvig (1983) and Diamond (1984) provide complementary foundational explanations of liquidity transformation and delegated monitoring. Stiglitz and Weiss (1981) remains central for understanding credit rationing under imperfect information. Beck et al. (2005) offers empirical evidence on uneven firm-level financial constraints. Jack and Suri (2014) and Suri and Jack (2016) illuminate mechanisms and identification in African digital-finance research. Berg et al. (2020) supports a critical discussion of new data in underwriting, while Frost et al. (2020) develops the economic implications of technology platforms in finance. For contemporary Rwanda, read AFR (2024), NBR (2025, 2026), CMA (2026) and the IMF (2026) together rather than separately. Basel and CPSS-IOSCO materials provide international institutional frameworks whose national applicability must be verified.

25.18 REFERENCES

Access to Finance Rwanda. (n.d.). *Rwanda FinScope 2024: Gender and financial inclusion thematic report*. https://afr.rw/downloads/rwanda-finscope-2024-gender-financial-inclusion-thematic-report/

Access to Finance Rwanda. (2024). *Rwanda FinScope survey 2024*. https://afr.rw/downloads/rwanda-finscope-2024-report/

Allen, F., Demirgüç-Kunt, A., Klapper, L., & Martinez Peria, M. S. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation, 27*, 1–30. https://doi.org/10.1016/j.jfi.2015.12.003

Banerjee, A., Duflo, E., Glennerster, R., & Kinnan, C. (2015). The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics, 7*(1), 22–53. https://doi.org/10.1257/app.20130533

Bank for International Settlements. (n.d.). *CPMI cross-border payments programme: Enhancement of cross-border payments* [Programme description]. https://www.bis.org/committees/cpmi/cross-border-payments/overview

Basel Committee on Banking Supervision. (2026). *The Basel Framework: Risk-based capital requirements* (RBC20). Bank for International Settlements. https://www.bis.org/committees/bcbs/basel-framework/standard/rbc?allChapters=true

Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to growth: Does firm size matter? *The Journal of Finance, 60*(1), 137–177. https://doi.org/10.1111/j.1540-6261.2005.00727.x

Berger, A. N., & Udell, G. F. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance, 30*(11), 2945–2966. https://doi.org/10.1016/j.jbankfin.2006.05.008

Berg, T., Burg, V., Gombović, A., & Puri, M. (2020). On the rise of FinTechs: Credit scoring using digital footprints. *The Review of Financial Studies, 33*(7), 2845–2897. https://doi.org/10.1093/rfs/hhz099

Brunnermeier, M. K., & Pedersen, L. H. (2009). Market liquidity and funding liquidity. *The Review of Financial Studies, 22*(6), 2201–2238. https://doi.org/10.1093/rfs/hhn098

Capital Market Authority. (2026, March 2). *Rwanda's capital market records broad-based growth in FY2024/25*. https://www.cma.rw/news-publications/press-center/rwandas-capital-market-records-broad-based-growth-in-fy2024/25

Committee on Payment and Settlement Systems, & International Organization of Securities Commissions. (2012). *Principles for financial market infrastructures*. Bank for International Settlements. https://www.bis.org/publications/principles-financial-market-infrastructures

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies, 51*(3), 393–414. https://doi.org/10.2307/2297430

Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy, 91*(3), 401–419. https://doi.org/10.1086/261155

Financial Stability Board. (2025). *Global monitoring report on non-bank financial intermediation 2025*. https://www.fsb.org/2025/12/global-monitoring-report-on-nonbank-financial-intermediation-2025/

Frost, J., Gambacorta, L., Huang, Y., Shin, H. S., & Zbinden, P. (2020). BigTech and the changing structure of financial intermediation. *Economic Policy, 34*(100), 761–799. https://doi.org/10.1093/epolic/eiaa003

Fuster, A., Plosser, M., Schnabl, P., & Vickery, J. (2019). The role of technology in mortgage lending. *The Review of Financial Studies, 32*(5), 1854–1899. https://doi.org/10.1093/rfs/hhz018

International Monetary Fund. (2026). *Rwanda: Request for a 38-month arrangement under the Extended Credit Facility; press release; staff report; and statement by the Executive Director for Rwanda* (IMF Country Report No. 26/139). https://www.elibrary.imf.org/view/journals/002/2026/139/002.2026.issue-139-en.xml

Jack, W., & Suri, T. (2014). Risk sharing and transactions costs: Evidence from Kenya's mobile money revolution. *American Economic Review, 104*(1), 183–223. https://doi.org/10.1257/aer.104.1.183

Karlan, D., Osei, R., Osei-Akoto, I., & Udry, C. (2014). Agricultural decisions after relaxing credit and risk constraints. *The Quarterly Journal of Economics, 129*(2), 597–652. https://doi.org/10.1093/qje/qju002

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics, 108*(3), 717–737. https://doi.org/10.2307/2118406

Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance, 32*(2), 371–387. https://doi.org/10.1111/j.1540-6261.1977.tb03277.x

McLeay, M., Radia, A., & Thomas, R. (2014). Money creation in the modern economy. *Bank of England Quarterly Bulletin, 54*(1), 14–27. https://www.bankofengland.co.uk/quarterly-bulletin/2014/q1/money-creation-in-the-modern-economy

Meager, R. (2019). Understanding the average impact of microcredit expansions: A Bayesian hierarchical analysis of seven randomized experiments. *American Economic Journal: Applied Economics, 11*(1), 57–91. https://doi.org/10.1257/app.20170299

Ministry of Finance and Economic Planning. (2024, June 20). *96% of Rwandans are financially included: FinScope survey 2024*. https://www.minecofin.gov.rw/news-detail/96-of-rwandans-are-financially-included-finscope-survey-2024

National Bank of Rwanda. (2025). *Annual report 2024–2025*. https://www.bnr.rw/documents/Annual_Report_2024_25_English_Full_Version_RwYAWN0.pdf

National Bank of Rwanda. (2026). *Rwanda CBDC proof of concept report*. https://www.bnr.rw/documents/Rwanda_CBDC_PoC_Report.pdf

National Institute of Statistics of Rwanda. (2026). *Integrated business enterprise survey (2024)*. https://statistics.gov.rw/statistical-publications/business-establishment-finance-trade/business-establishment-finance-trade/integrated-business-enterprise-survey-2024

Rajan, R. G., & Zingales, L. (1998). Financial dependence and growth. *American Economic Review, 88*(3), 559–586. https://www.jstor.org/stable/116849

Republic of Rwanda. (2021). *Law No. 017/2021 of 03/03/2021 relating to financial service consumer protection*. *Official Gazette*, Special Issue of 05/03/2021. https://www.bnr.rw/documents/Law_relating_to_Financial_Service_Consumer_Protection__2021.pdf

Republic of Rwanda. (2024a). *Law No. 039/2024 of 22/03/2024 establishing the Deposit Guarantee Fund*. *Official Gazette*, Special Issue of 09/04/2024. https://www.bnr.rw/documents/DGF_LAW_2024__002_.pdf

Republic of Rwanda. (2024b). *Law No. 044/2024 of 30/05/2024 governing banks*. *Official Gazette*, No. 24 Bis of 10/06/2024. https://www.bnr.rw/documents/Banking_Law_2024_yMYGT82.pdf

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *American Economic Review, 71*(3), 393–410. https://ideas.repec.org/a/aea/aecrev/v71y1981i3p393-410.html

Suri, T., & Jack, W. (2016). The long-run poverty and gender impacts of mobile money. *Science, 354*(6317), 1288–1292. https://doi.org/10.1126/science.aah5309

World Bank. (2025). *The Global Findex Database 2025: Connectivity and financial inclusion in the digital economy*. https://www.worldbank.org/en/publication/globalfindex/report

APPENDIX A. TECHNICAL REPRODUCTION AND SOURCE-PROVENANCE PROTOCOL

The illustrations use Rwandan francs (RWF) at nominal values without inflation adjustment. Each percentage is converted to a decimal before multiplication; each time unit is disclosed. Section 25.2 compares bank assets with liabilities plus equity after each operation. Section 25.3's installment follows A = Pr/[1 − (1+r)^(−n)] with P = 12,000,000, r = 0.015 per month and n = 12. Section 25.9's expected loss is probability multiplied by loss severity; it is not a confidence bound. In Section 25.15, expected interest counts only nondefaulting loans; expected loss applies to principal using PD and LGD; fees and expenses follow their disclosed assumptions. The case excludes fixed overhead, taxes, capital costs, collection timing, loss-distribution tails, changes in client behaviour and regulatory provisioning. Reproduction requires no private dataset or fieldwork.

Source provenance follows a four-part rule. First, identify the primary organization responsible for the dataset or rule. Second, record the reference/observation period separately from the release date. Third, preserve the author's exact definition of the population or instrument before comparing sources. Fourth, mark constructed assumptions and analytically derived values so that they are never mistaken for observed outcomes. The cited Rwandan statutory texts, regulator communications, survey findings and identified scholarly publication metadata have been cross-checked against accessible institutional or publisher records through the stated evidence date; interpretation should be refreshed before any real-world regulated transaction or legal opinion. No survey, interview, experiment, peer review, formal publication acceptance or DOI registration is claimed by this chapter.