

Content Reference: When Digital Finance Fails

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Digital Finance – BSc Course – Standalone Lecture

Learning Objectives

After engaging with this reference sheet and the companion lecture, you will be able to:

- **Classify** digital-finance failures into technical, governance, fraud, and macroeconomic categories [Understand]
- **Apply** the 5-step failure framework (trigger, mechanism, module link, impact, response) to new cases [Apply]
- **Analyse** why six specific post-2020 failures happened and how each was resolved [Analyze]
- **Evaluate** the regulatory response for adequacy, proportionality and unintended consequences [Evaluate]

1. Key Definitions

- **Systemic event** — a failure large enough to materially disrupt financial intermediation or payments.
- **Herstatt risk** — settlement risk in FX that arises when one leg of a trade settles before the other.
- **Bank run** — a self-fulfilling stampede to withdraw deposits faster than a bank can liquidate assets.
- **Rehypothecation chain** — the same collateral pledged multiple times through prime brokers.
- **Death spiral** — a stablecoin’s algorithmic design that melts reserves when de-pegging accelerates, as in UST.
- **Kernel-mode code** — software running with operating-system privileges; a single bug can take down the machine (see CrowdStrike).
- **Single-point failure (SPoF)** — a component whose failure cascades to the rest of the system.
- **Co-mingling** — mixing customer funds with firm funds; a recurring pattern in crypto-exchange failures (FTX).

2. The Six Post-2020 Failures at a Glance

Event	Year	Root cause	Impact
Wirecard collapse	2020	Accounting fraud, auditor failure	€1.9B missing
Archegos Capital	2021	TRS rehypothecation chain	\$10B+ bank losses
Terra/Luna (UST)	2022	Algorithmic stablecoin death spiral	\$60B wiped
FTX implosion	2022	Co-mingling + governance absence	\$8B customer gap
Credit Suisse AT1 wipe	2023	Deposit run + regulator fiat	\$17B AT1 zeroed
CrowdStrike outage	2024	Kernel-driver software defect	8.5M hosts offline

3. Core Concept: The 5-Step Failure Framework

A template for reading any digital-finance failure

1. **Trigger.** What was the proximate event? (missed audit, price shock, malicious transaction, bad deploy)
2. **Root mechanism.** What structural weakness amplified the trigger? (leverage, oracle manipulation, identity failure, co-mingling)
3. **Module link.** Which taught concept does this illustrate? (e.g. algorithmic stablecoins = M3L4; rehypothecation = M4L3)
4. **Impact.** Who paid, how much, and over what horizon?
5. **Response.** What rules, market-conduct changes or technology standards emerged?

The framework forces analysts to distinguish lucky recoveries (trigger passed without breaking something) from durable fixes (rules changed, incentives repriced).

4. Key Figures & Data

- **Wirecard** (June 2020): €1.9B of reported cash never existed; EY failed to confirm the balance for three consecutive audits. CEO Markus Braun sentenced to 6 years in 2024.
- **Archegos** (March 2021): Credit Suisse lost \$5.5B, Nomura \$2.9B, Morgan Stanley \$900M, UBS \$774M – total ~\$10B of direct P&L from a single family-office TRS book.
- **Terra/Luna** (May 2022): LUNA went from \$80 to \$0.00003 in one week; UST lost its \$1 peg and wiped ~\$60B of market capitalisation.
- **FTX** (November 2022): 1M+ creditors; \$8.7B shortfall in customer funds; founder Sam Bankman-Fried sentenced to 25 years in March 2024.
- **Credit Suisse AT1 wipeout** (19 March 2023): \$17B of Additional Tier 1 notes written down to zero while equity received 0.76 CHF/share from UBS – the AT1-equity seniority inversion triggered lawsuits in multiple jurisdictions.
- **CrowdStrike Falcon** (19 July 2024): a single bad update to Windows kernel-mode driver crashed ~8.5M hosts globally; Delta Air Lines alone reported a \$500M impact.

5. Worked Example

Applying the 5-step framework: Terra/Luna

Trigger. Coordinated \$2B USDC swap out of the Anchor lending protocol (May 7–8, 2022) created a small UST sell-pressure imbalance.

Root mechanism. UST's peg was maintained by a mint-and-burn arbitrage with LUNA. As UST traded below \$1, arbitrageurs minted LUNA by burning UST – but the resulting LUNA flood depressed LUNA's price and accelerated the loss of reserve value backing the peg.

Module link. M3L4 (stablecoins); M4L4 (liquidity crises). The case is the canonical illustration that *algorithmic* backing is reflexive: when you most need the peg to hold, the reserve-token price is collapsing precisely because the peg is failing.

Impact. ~\$60B of market-cap destroyed in 7 days. Retail users were hit hardest (Anchor advertised 20% APY, attracting non-specialist savers). Celsius, Voyager and Three Arrows Capital insolvencies cascaded from the same event cluster.

Response. MiCA (EU, 2023) explicitly bans algorithmic stablecoins from offering payment services. The GENIUS Act (US, 2025) requires 1:1 reserve-backing for any stablecoin marketed as a payment instrument. Algorithmic stablecoin TVL collapsed and has not recovered.

6. Self-Check Questions

1. Apply the 5-step framework to the March 2023 USDC de-peg (\$3.3B stuck at Silicon Valley Bank).

2. The CrowdStrike outage was a software bug, not fraud. Why is it included in a digital-finance failure library?
3. Rank Wirecard, Archegos, and FTX by the speed at which their collapse was discoverable from public information. Justify.

[Answers hidden in student version.]

7. Further Reading

- McCrum, D. (2022). *Money Men: A Hot Startup, a Billion Dollar Fraud, a Fight for the Truth*. Penguin. (Wirecard)
- Lewis, M. (2023). *Going Infinite: The Rise and Fall of a New Tycoon*. Norton. (FTX)
- Financial Stability Board (2023). “The Financial Stability Risks of Decentralised Finance.”
- FINMA (2023). “Report on the Credit Suisse Crisis.”
- Cyber Insurance Association (2024). “CrowdStrike Incident: Operational-Risk Lessons.”
- UST Forensic Report: rekt.news/anchor-rekt.