

Exercises: Lesson 8.4 – The Future of Finance — Synthesis and Scenarios
Module 8: The Future Problem

Prof. Dr. Joerg Osterrieder

Exercise 1: Hype Cycle Technology Classification

Place each of the following technologies at the correct stage of the Gartner hype cycle. Justify each placement with one sentence.

Technologies to classify:

- i Mobile payments (Apple Pay, Google Pay)
- ii Generative AI in financial advisory
- iii Blockchain-based supply chain finance
- iv Central Bank Digital Currencies (CBDCs)
- v Quantum-resistant cryptography for banking

Hype cycle stages:

- A Innovation Trigger
- B Peak of Inflated Expectations
- C Trough of Disillusionment
- D Slope of Enlightenment
- E Plateau of Productivity

Tasks:

- a Map each technology to a stage and justify.
- b Identify which technology is likely to move stages fastest and why.
- c Name one technology from the course (any module) that you believe will *never* reach the Plateau of Productivity. Explain.

Exercise 2: Scenario Planning — Quantitative Comparison

A mid-sized European bank generates €800 million in annual revenue. Estimate its financial position under two scenarios by 2032:

Metric	Scenario B: Regulated Renaissance	Scenario C: Slow Burn
Revenue growth rate	2% per year	1% per year
Cost-to-income ratio	52% (RegTech savings)	62% (legacy costs)
Compliance cost as % of revenue	8%	5%
Technology investment as % of revenue	12%	6%
Regulatory fine probability (annual)	2%	8%
Average regulatory fine	€15 million	€25 million

Tasks:

- Calculate the bank's projected revenue in 2032 (7 years of growth) under each scenario.
- Calculate projected annual operating costs (cost-to-income \times revenue) in 2032.
- Calculate the expected annual regulatory fine cost (probability \times fine amount) under each scenario.
- Which scenario produces higher operating profit in 2032? Show your calculation.
- Discuss: is higher technology investment always better? What could go wrong?

Exercise 3: Design a Cross-Module Financial Product

Design a hypothetical financial product that combines technologies from **at least four** different course modules. Use the template below.

Template:

- **Product name:** (your choice)
- **Target customer:** (who uses it?)
- **Module 1 (Cost):** How does it reduce cost?
- **Module 2 (Access):** How does it expand access?
- **Module 3 (Trust):** How does it establish trust?
- **Module 5 (Automation):** What role does AI/ML play?
- **Module 6 (Infrastructure):** What technical infrastructure supports it?
- **Module 7 (Compliance):** How does it handle regulation?

Tasks:

- a Fill in the template for your product (select at least 4 modules).
- b Identify the single biggest risk to your product's success.
- c Estimate a simple unit economics model: cost per user, revenue per user, breakeven number of users.

Exercise 4: Embedded Finance Revenue Projection

An e-commerce platform with 5 million monthly active users plans to embed three financial products:

Product	Adoption Rate	Revenue/User/Month	Cost/User/Month
BNPL (buy-now-pay-later)	8%	\$2.50	\$1.80
Instant checkout insurance	3%	\$0.85	\$0.30
Cash-back savings account	12%	\$0.40	\$0.15

Tasks:

- Calculate the monthly users, revenue, cost, and profit for each embedded product.
- Calculate the total annual embedded finance profit for the platform.
- If BNPL default rate is 4% of loan volume and average loan is \$120, calculate the monthly expected loss. Is the product still profitable?
- The platform considers adding embedded investment (fractional shares). If 2% of users adopt at \$0.60 revenue and \$0.45 cost per user per month, what is the incremental annual profit?
- Discuss which course module's concepts are most relevant to managing the BNPL default risk.

Exercise 5: Autonomous Finance — Level Assessment

Classify each of the following financial services by its autonomy level (0–5) and identify which course module explains the relevant technology:

Service	Autonomy Level	Primary Module
A teller approving a wire transfer	?	?
Robo-advisor with quarterly human review	?	?
Aave lending protocol auto-liquidation	?	?
AI chatbot answering account balance queries	?	?
ML fraud detection that blocks transactions	?	?
Algorithmic trading with human kill-switch	?	?
Hypothetical: AI CEO running a digital bank	?	?

Tasks:

- Fill in the autonomy levels and primary modules.
- For each Level 3+ service, identify the accountability gap: who is responsible when it fails?
- A regulator proposes banning any financial service above Level 3. Argue *for* and *against* this proposal.

Exercise 6: Digital Finance Career Skills Self-Assessment

Rate your current proficiency (1 = beginner, 5 = expert) in each skill area, then identify gaps for your target career path.

Skill Area	Your Rating	FinTech PM	ML Engineer	Risk Analyst
Python programming	?	3	5	4
Financial regulation	?	3	2	5
Machine learning	?	2	5	4
Blockchain/smart contracts	?	2	3	2
Data analysis/statistics	?	3	4	5
Product management	?	5	2	2
Risk measurement (VaR, ES)	?	1	3	5
API design/integration	?	4	4	2

Tasks:

- Fill in your self-assessment ratings.
- Choose a target career path and calculate your “skill gap” (sum of required – your rating, where positive).
- Create a 12-month learning plan: for your three largest gaps, identify one specific course, book, or project to close each gap.
- Which skill area do you think AI will *not* be able to automate within 10 years? Why?

Exercise 7: Applying Carlota Perez to FinTech History

Perez identifies three phases: **Installation** (speculation), **Turning Point** (crash/regulation), and **Deployment** (real infrastructure).

Tasks:

- a. Map the following events to Perez's phases:
 - 2017 ICO boom (\$5.6 billion raised)
 - 2022 crypto crash (Terra/Luna, FTX collapse)
 - 2024 EU MiCA regulation enacted
 - 2024–2025 real-time payment networks reach 80+ countries
 - 2023–2024 GenAI investment surge (\$50B+ in FinTech AI)
- b. For the *deployment period*, identify three specific technologies from the course that are entering this phase and explain why.
- c. Perez argues that deployment periods create the most lasting economic value. Using one example from Module 1 (Cost) or Module 6 (Infrastructure), calculate a rough estimate of value created.
- d. Is it possible that FinTech skips the deployment period and goes directly into a new installation cycle (e.g., AI hype following crypto hype)? Discuss.

Exercise 8: Integrative Case — Building the Bank of 2032

Scenario: You are advising a team that has just received a banking license to build a fully digital bank from scratch. The bank will launch in 2027 and target 1 million retail customers by 2032. You have €200 million in initial capital.

Tasks — use concepts from all eight modules:

- a **Cost (M1):** Design the cost structure. What is your target cost-to-income ratio? How will you achieve it without physical branches?
- b **Access (M2):** How will you serve the underbanked? What alternative data sources will you use for credit scoring?
- c **Trust (M3):** Will you use blockchain for any operations? If yes, which ones and why?
- d **Risk (M4):** How will you measure and manage credit, market, and operational risk?
- e **Automation (M5):** What will AI handle autonomously vs. with human oversight?
- f **Infrastructure (M6):** Cloud-native or hybrid? Which APIs will you build vs. buy?
- g **Compliance (M7):** How will you embed RegTech from day one?
- h **Future (M8):** Which emerging pattern (embedded finance, autonomous finance, programmable money, AI-native) defines your strategy?