PROJECT MANAGEMENT:

CASE STUDIES

Sharmila Chavaly
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Case Study 1: The "Big Dig"

The Project: To bury Boston's elevated I-93 highway underground and build a new harbor tunnel (1990s-2000s).

The Vision: Reduce congestion, reconnect city to waterfront.
Initial Plan (1991): Cost: $2.8 Billion | DOC: 1998

The Reality:

- Final Cost: Over $15 Billion
- Finished: 2007 (Nearly 10 years late)
- 2006: A ceiling panel collapsed in a tunnel, killing a motorist. Investigation revealed substandard materials and flawed construction.
- Public trust evaporated. The project became a national symbol of mismanagement.

Your Challenge: You are on a crisis review team. What were the primary systemic failures in governance and control? What specific mechanisms should have been in place from day one?

Key Questions

1. Who was truly in charge? Was accountability clear?
2. Was the $2.8 billion estimate a failure of analysis or a political tactic?
3. How were risks like "unknown underground utilities" managed?
4. Did the pressure to get back on schedule compromise safety and quality?

<u>GROUP TASK</u>:
The TOP 3 recommended actions for a project of this scale.

Focus: Governance, cost control, and quality assurance

What Actually Happened: Lessons Learnt

- Fragmented Governance: Multiple agencies (MTA, Bechtel/Parsons Brinckerhoff) led to blame-shifting.

- Response to Crisis: Forensic investigation, criminal charges, and a frantic repair program after the collapse.

KEY PROJECT MANAGEMENT LESSONS

1. Megaprojects Need a Single Commander: One empowered executive with control over all parties is non-negotiable.
2. Use Reference Class Forecasting: Base estimates on outcomes of similar past projects, not theoretical models.
3. Transparency as a Tool: Real-time public dashboards on cost/schedule build accountability.
4. Independent QA: Quality assurance must be funded and managed separately from construction teams.

Case Study 2: Boeing 787 Dreamliner

The Project: Revolutionize air travel with a composite-bodied, fuel-efficient jet (2000s).

The Innovative Strategy: "Global Partner" Model.

- Old Way: Boeing designs & builds, suppliers make parts.
- 787 Way: Boeing is the "systems integrator." Partners in Japan, Italy, etc., would design, finance, and build entire sections (wings, fuselage). Boeing would just "snap together" in 3 days.

The Reality:

- Integration Nightmare: Sections arrived with thousands of mismatched fasteners and incomplete wiring.
- Loss of Control: Boeing's engineers couldn't fix problems at partner factories.
- Result: 3.5-year delay, billions in overruns, first planes needed massive rework.

Your Challenge: Was the core idea flawed, or just the execution? What specific PM controls were missing in this partnership model?

Key Questions

1. Did Boeing transfer risk or share it? What's the difference?
2. What was underestimated about "systems integration"?
3. Did partners have the right tools and information to collaborate?
4. Were partner incentives aligned with the final plane's success or just their section's?

GROUP TASK

Design the "ideal contract clause" for a global partner.

How does it ensure alignment and manage integration risk?

What Actually Happened: Lessons Learnt

THE ACTUAL OUTCOME

A Costly Retreat:

- Boeing bought out key partners
- Stationed thousands of its own engineers at partner sites
- Created "traveling work teams" to fix issues on the final line.

KEY PROJECT MANAGEMENT LESSONS

1. Never Outsource Your Core Competency: "Systems integration" must remain an internal, core skill.
2. Partnerships Need a Shared Brain: A single digital model (digital twin) and aligned processes are mandatory.
3. Prototype First: Use a "lead partner" or prototype phase before full-scale global rollout for radically new models.
4. Align Incentives to Final Outcome: Penalties/rewards based on the performance of the final product, not just the subcomponent.

Case Study 3: UK NHS National IT Programme

The Project (2002): Create a single, integrated digital health record for England's entire National Health Service (NHS), the world’s largest civil IT project

The Grand Plan: "Big Bang" Top-Down.

- A few large contractors deliver a one-size-fits-all system to all hospitals/clinics.
- Budget: £6.2 billion

The Reality:

- User Rebellion: Doctors/nurses not consulted. System clashed with local workflows.
- Impossible Complexity: A single record for 50+ million people involved data privacy, old system compatibility, etc.
- "Waterfall" Lock-In: Massive fixed-price contracts couldn't adapt.
- Result (2011): After 9 years and £10+ billion spent, program was scrapped. Little usable software delivered.

Your Challenge: This is a classic "failure of requirements." How would you have re-scoped and re-planned this from the start?

Key Questions

1. Who is "the user"? Can you treat all doctors and hospitals the same?
2. Can you fix scope, cost, and schedule for a project of this novelty?
3. Was the goal to transform healthcare or to make a political announcement?
4. Could a different methodology have saved it?

<u>GROUP TASK</u>

Sketch a 1-page project charter for a re-launch. What is the primary goal, core methodology, and first milestone?

What Actually Happened: Lessons Learnt

- Terminated. The government admitted the centralized approach was unworkable

- New Strategy: "Local choice, national standards." Hospitals could buy their own systems if they met core interoperability rules.

KEY PROJECT MANAGEMENT LESSONS

1. For Societal IT, think "Ecosystem": Set standards, enable innovation—don't mandate a single solution.
2. Users are Co-Creators: Use agile development with pilot sites from day one.
3. Decompose the Megaproject: Break into smaller "tranches" with independent value (e-prescriptions first, then labs, etc.).
4. Beware the Political Announcement: The PM's duty is to inject realism when grand visions meet practical constraints

Case Study 4: Sydney Opera House Construction

The Project (1959): Build an iconic masterpiece from architect Jørn Utzon's radical, competition-winning design

The Vision: Breathtaking, sculptural "shells."

- Initial Plan: Cost: A$7 million | Time: 4 years.
- Critical Unknown: No engineering plan existed to build the shells.

The Reality:

- Unbuildable Design: Years spent experimenting on shell construction.
- Chaos: Costs exploded. Utzon clashed bitterly with the new government over cost and design compromises.
- The Breaking Point (1966): After 10 years, still not done, Utzon resigned and left the country.
- Result (1973): Finished by others. Final cost: A$102 million. A global icon born from a management tragedy.

Your Challenge: It "succeeded" as a building but "failed" by every PM metric. At what point should it have been re-baselined or halted? What is the PM's duty with a visionary but unproven design?

Key Questions

1. Should a design be chosen without a feasibility review?
2. How do you schedule and budget for an "unknown unknown"?
3. Should building one full-scale shell have been the first official project phase?
4. Could a stronger Project Executive have mediated between the visionary and the cost controller?

GROUP TASK

Define the "stage-gate" criteria for moving from Design to Construction. What three questions must be conclusively answered before breaking ground?

What Actually Happened: Lessons Learnt

THE ACTUAL OUTCOME

- After Utzon left, Australian architects simplified the interiors.

- The shells were completed using pre-cast concrete ribs, a solution derived from Utzon's later work. It opened to global acclaim.

KEY PROJECT MANAGEMENT LESSONS

- Feasibility Before Funding: A visionary design must pass a "buildability" gate before full commitment.
- Stage-Gate for Innovation: Radically new projects need a dedicated, funded R&D and prototyping phase (with its own separate timeline/budget).
- The "Project Executive" Role: A single leader with authority over both vision and budget, acting as buffer/integrator between artist and client.
- Redefine Success Consciously: Success was ultimately redefined as "deliver an icon," accepting the overruns. This must be an explicit, agreed decision.

Case studies from Asia

- Crucial regional context
- Diverse governance models, and
- Parallels to unique challenges like rapid urbanization

The Hyderabad Metro Rail Project

- Build a 72-km metro rail system in Hyderabad, India (2012-2019)

- Ambitious Design-Build-Finance-Operate-Transfer (DBFOT) PPP model

- The private consortium (L&T) raises most of the funds, builds, and operates it for 35 years.

- The Innovative Vision: To create a "lifeline for the city" that was not just a transit system but an integrated urban development corridor

The Reality Unfolds

- Land Acquisition & Utilities Relocation: The single biggest hurdle. Negotiating with thousands of property owners and relocating dense, undocumented utilities (water, sewer, electrical) caused massive delays

- The "Social" Risk: Intense protests from shop owners and residents along the route, who feared loss of livelihood and property

- Cost Escalation: Initial estimates proved too low. The private player had to invest significantly more equity

- Scope Challenge: Balancing the need for speed with the desire to architecturally integrate stations into the city's heritage and commercial hubs

Core Challenge

This PPP was hailed as a rare success in India:

- What specific actions by the government and the private consortium made this work despite the huge "social risk"?

- What is the true responsibility of a Project Manager in a PPP when it comes to non-technical stakeholders?

Beyond the Contract

- A PPP contract defines liabilities, but success requires collaboration beyond it. How was this fostered?
- The "Hyderabad Model": The government created a special purpose vehicle (SPV) with real decision-making power to act as a single window for clearances. Was this the key?
- Stakeholder Management as a Core Activity: How were protesters and shop owners engaged? Was it just compensation, or something more?
- Risk Sharing vs. Transfer: Were "social risks" transferred to the private player, or were they shared?

How It Was Actually Done / Key Lessons:

- The "How": The state government took an unusually proactive role in land acquisition and utility shifting. The contractor, L&T, employed innovative engineering (e.g., pre-cast segments, elevated viaducts) and invested in extensive public outreach, including 3D visualizations to show the final outcome. The project was delivered, is operational, and is considered a benchmark for Indian metros.

KEY PROJECT MANAGEMENT LESSONS

- For PPPs, the Government Must Be an Active Partner, Not Just a Policeman: The state must de-risk the project's non-commercial elements (land, utilities).

- Social License to Operate is a Deliverable: Project plans must include a dedicated stakeholder engagement and communication strategy with a budget and team.

- Flexibility within Framework: The contract must allow for technical innovation and scope adaptation to solve unforeseen ground realities.

- Success is Systemic: A successful mega-project requires a supportive ecosystem—political will, a capable private partner, and public communication—not just a good blueprint.

Case Study: Beijing Daxing International Airport (China) Project

- Construct one of the world's largest single-terminal airports (700,000 sq.m. terminal, 4 runways) on a tight schedule (2014-2019).

- The National Imperative: To relieve congestion at Beijing Capital Airport and serve as a new aviation hub for the region. It was a project of national prestige with a non-negotiable deadline.

The Reality Unfolds:

- Astronomical Scale & Speed: Mobilizing over 40,000 workers on site, working 24/7. Prefabrication was used at a massive scale.
- Centralized Command: Unprecedented authority given to the project leadership, bypassing typical bureaucratic layers. Decisions were made and implemented in real-time.
- The Human Cost: Reports of intense pressure, grueling schedules for workers, and concerns about long-term maintenance quality due to the breakneck pace.
- Technology Showcase: Incorporated advanced tech from the start: facial recognition for a "walk-through" passenger journey, RFID bag tracking, and intelligent building management.

Core Challenge

Daxing was delivered on an impossible schedule and is an engineering marvel. But at what cost?

- As a Project Manager, how do you balance the "iron triangle" when the Schedule constraint is absolute and politically non-negotiable?
- What are the ethical and long-term trade-offs of the "delivery at all costs" model?

Case Study C: Jakarta MRT (Indonesia) - Phase 1

The Project:

- Build South-North Phase 1 (16 km, 13 stations) of Jakarta's first MRT (2013-2019).
- JV between Indonesian state-owned firms and a Japanese consortium (JICA funding, Japanese engineering).

The Daunting Context: Jakarta is a sinking, flood-prone megacity with some of the world's worst traffic. The ground is soft, waterlogged, and densely packed with unknown utilities.

The Reality

- A "soup" of Challenges: Construction involved navigating permanent traffic, frequent floods, extremely soft soil, and relocating utilities that often had no accurate maps.
- The Technology Transfer: Japanese engineers brought stringent safety and quality standards (e.g., pressurized Tunnel Boring Machines to control groundwater) which were new to the local construction culture.
- Cultural & Procedural Friction: Differences in work pace, decision-making style, and risk tolerance between the Indonesian and Japanese teams.
- The Public's Patience: A skeptical public, weary of decades of traffic chaos, needed to see progress.

Core Challenge

This was as much a socio-technical integration project as a construction one.

What specific management approaches were needed to bridge the cultural gap between the international experts and the local team/ context?

How do you maintain schedule when the ground itself is your biggest unknown?

Q&A