



lean
software development

Agile Contracts

What is Trust?

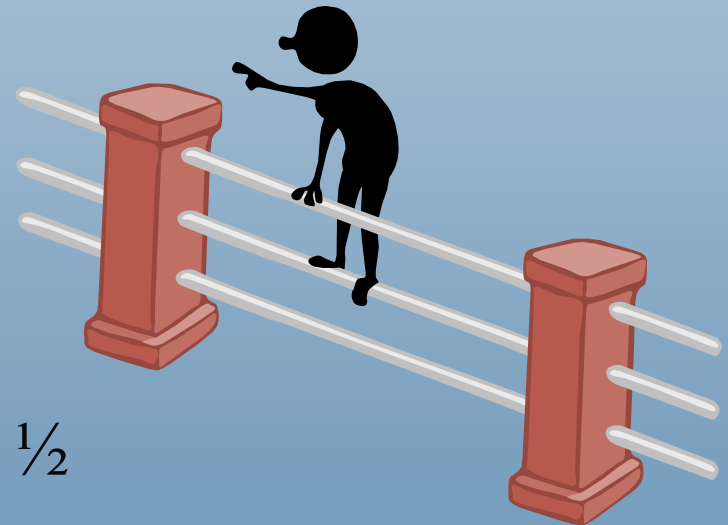


The Cost of Crossing Boundaries

- “In every single case, the Keiretsu (K-ret-soo), that is, the integration into one management system of enterprises that are linked economically, has given a cost advantage of at least 25% and more often 30%.”*

* *Management Challenge for the 21st Century*, Peter Drucker

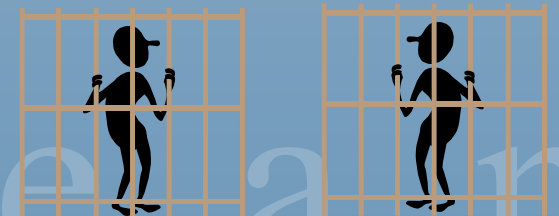
- Toyota
 - Obtains $\frac{3}{4}$ of US components from suppliers, GM obtains $< \frac{1}{2}$
 - Spends $\frac{1}{2}$ as much money & time on procurement





Prisoner's Dilemma

- Two prisoners held in separate cells and not allowed to communicate. The police can prove they both have committed crime A, but want to convict at least one of them of the more serious crime B.
- Each prisoner is offered this deal:
 - Confess to crime B and testify against the other. If he does not confess and testify against you, you go free, while he receives 3 years in prison.
 - If, however, he also confesses to crime B and agrees to testify against you, you each will receive 2 years.
 - If you both remain silent, you both will be convicted of crime A and serve 1 year.
- There are two choices – cooperate (remain silent), or defect (confess).
 - Cooperation either means you serve one or three years.
 - Defection means you may serve 0 or 2 years.
- What would you do?





Opportunism

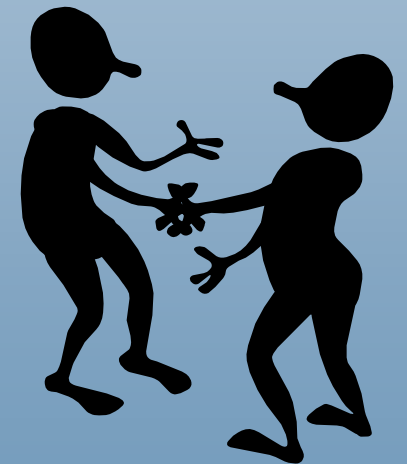
Taking advantage of opportunities without regard for the consequences to others.

Seeking immediate advantage with little regard for ultimate consequences.



The Purpose of Contracts

- Conventional Wisdom
 - Companies inevitably look out for their own interests
 - Contracts are needed to limit opportunistic behavior
- The Lean Approach
 - Assume other party will act in good faith
 - Let the relationship limit opportunism
 - Sometimes is called a relational contract
 - Use the contract to set up incentives
 - Align the best interests of each party with the best interests of the joint venture





What is Trust?

- Confidence in the fairness, stability, and predictability of the company's routines and processes.

It's not that I don't trust the person sitting across from me at General Motors. In fact, I may feel more comfortable with him than his counterpart at Toyota. I may trust him completely.

What I don't trust is that he will be sitting there a year from now. And even if he's there, he may have to play by a new set of rules.



Supplier executive quoted in *Collaborative Advantage*, by Jeffery Dyer, 2000

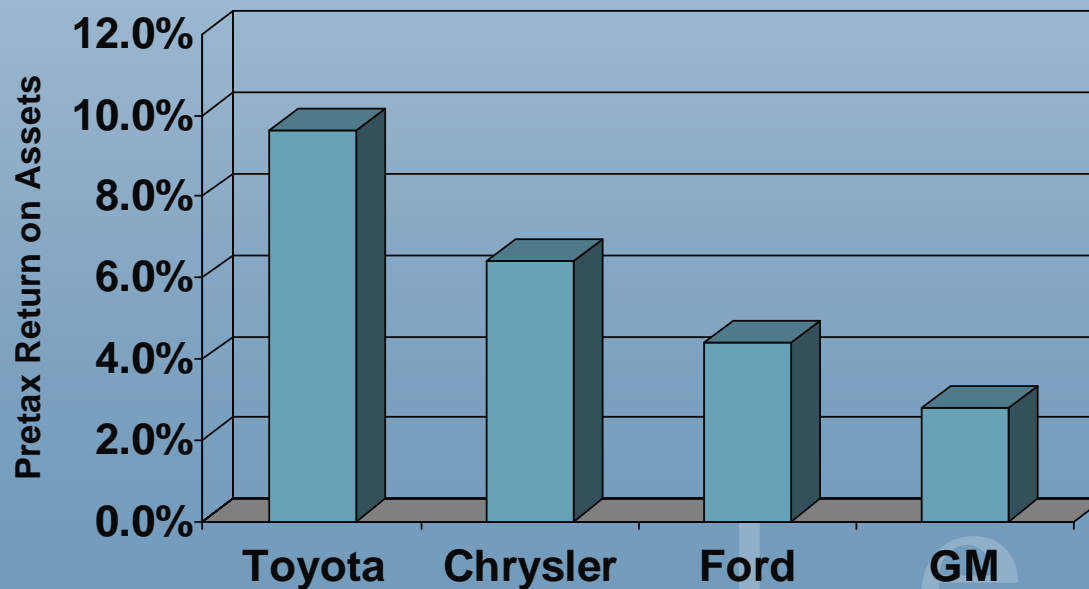


The Economic Value of Trust

TOYOTA

- Obtains $\frac{3}{4}$ of US components from suppliers while GM obtains $< \frac{1}{2}$ from suppliers
- Spends $\frac{1}{2}$ as much money & time on procurement as GM

Automaker Profitability (Average from 1982-1998)





The Economic Value of Trust



- Rapid growth was incompatible with the prevailing model of vertical integration
- Wanted to focus on customers, not components
- Uses Virtual Integration, not Vertical Integration

“Virtual integration means you stitch together a business with partners that are treated as if they’re inside the company.”

Michael Dell, Harvard Business Review Interview, March, 1998



The Economic Value of Trust



- The one airline that focuses on partnership relationships with suppliers, rather than fixed price contracts.
- The least cost way of doing business.
- Who's making the profit?



Who Bears the Risk?

- Risk should be born by the party best able to manage it.
 - Uncertainty in the domain
 - Customer
 - Uncertainty in the technology
 - Supplier



Case Study: T5 Agreement

■ Heathrow Terminal 5

- 2002 – 2008
- £4.2 billion

■ BAA

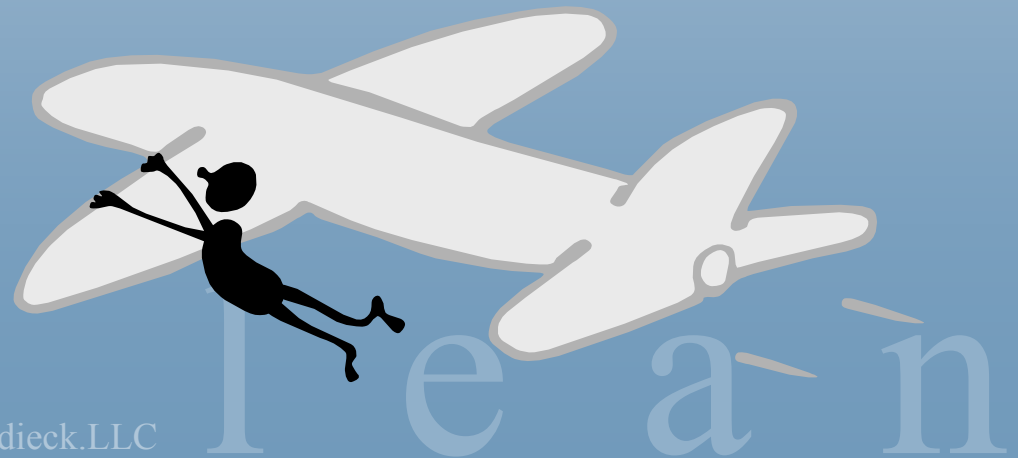
- Delay would threaten existence
- Studied other terminal projects
- Assumed responsibility for risk

■ T5 Agreement

- Legally binding
- Contractors agree to:
 - work in teams
 - mitigate risks
 - work to achieve the best possible results

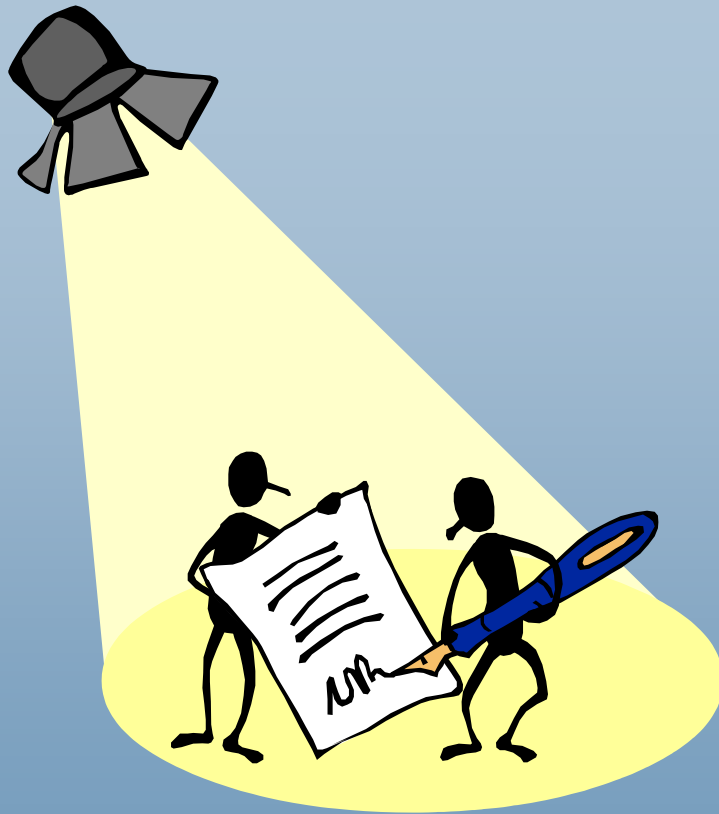
■ In Practice

- 147 Sub-Projects
 - Integrated Team
 - Target Cost
 - Pool of incentive/risk money
 - 2/3's split among contractors
- On Time
- On Budget
- Very Safe





Contract Models

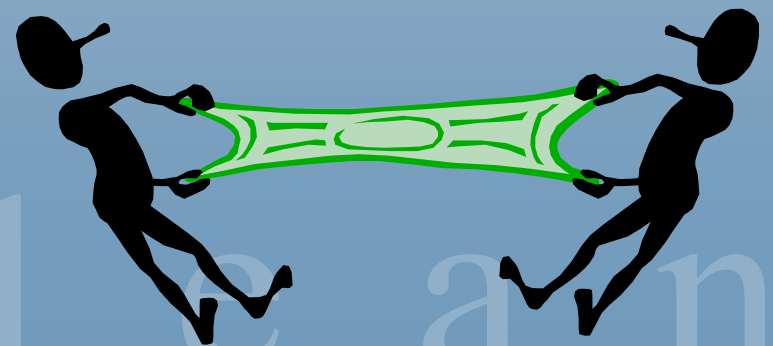


Fixed Price
Time-and-Materials
Target Cost
Profit Sharing
Progressive



Fixed Price Contracts

- Supplier is at greatest risk
 - Customer has little incentive to accept the work as complete
- Generally does not give the lowest cost
 - Competent suppliers will include cost of risk in bid
 - Creates the game of low bid with expensive change orders
- Generally does not give the lowest risk
 - Selection favors the most optimistic [desperate] supplier
 - Least likely to understand project's complexity
 - Most likely to need financial rescue
 - Most likely to abandon the contract
- Customers are least likely to get what they really want

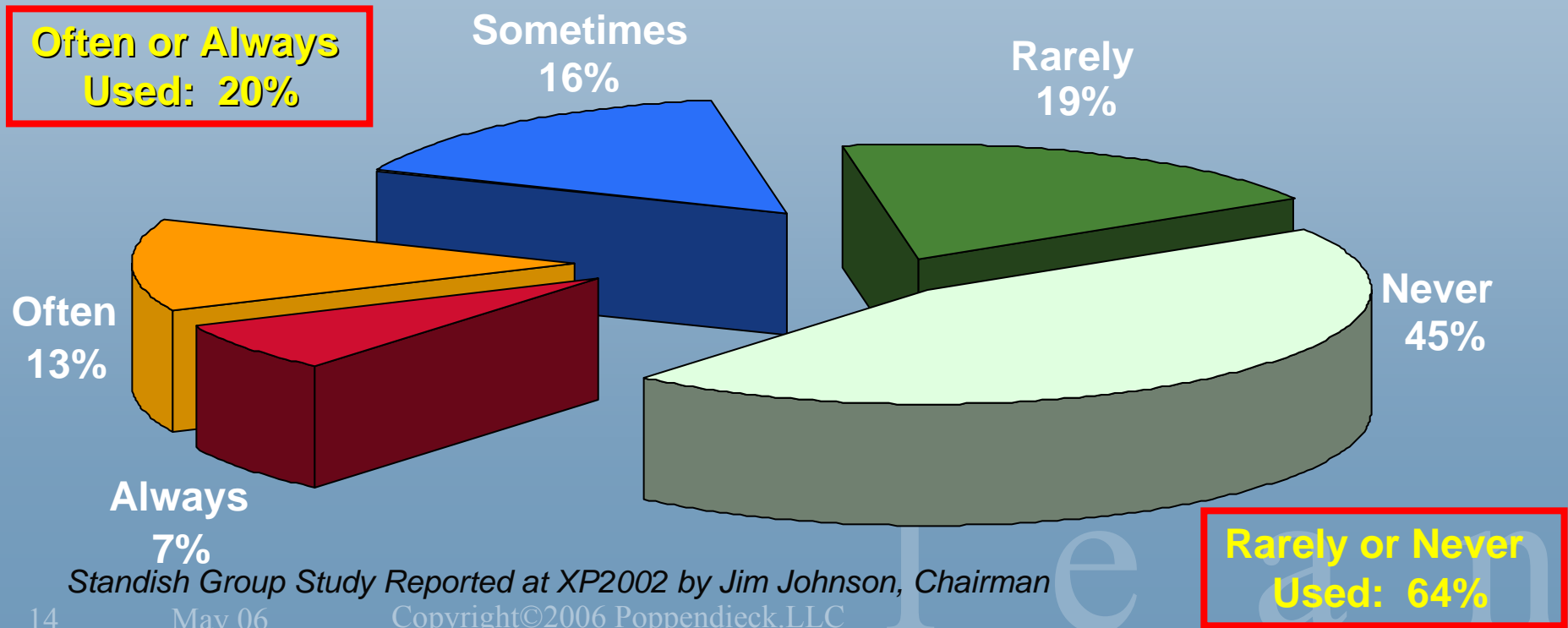




Fixed Price Contracts Lead to:

- Early Scope Definition (to protect the vendor)
- Excess Scope (to protect the customer)

Features and Functions Used in a Typical System



Standish Group Study Reported at XP2002 by Jim Johnson, Chairman

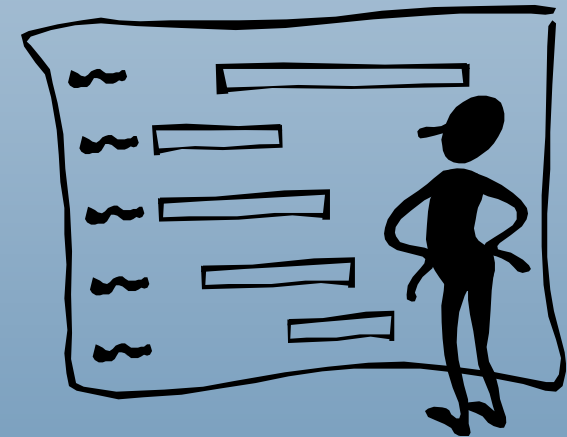


Rarely or Never Used: 64%



Time-and-Materials Contracts

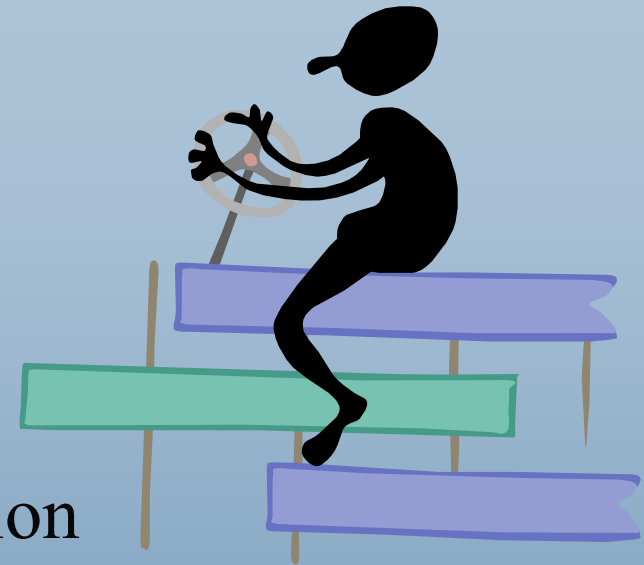
- Customer is at greatest risk
 - Supplier has little incentive to complete the work
 - Therefore need to control supplier opportunism
- DOD T&M contracts
 - Birthplace of the Waterfall Lifecycle
- Traditional T&M control systems
 - Are Expensive
 - Do Not Add Value
 - Get in the way of Good Practices
 - Do not support on-going user feedback
 - Are not tolerant of change or uncertainty





Transaction Costs

- Selection
- Negotiation and Renegotiation
- **Monitoring and Enforcement**
- Billing and Payment
- Inventory and Transportation
- Cost of Diminished Communication
- Cost of Loss of Skill Base
- **Cost of Poor Results**



Note: Transaction Costs Do Not Add Value.



The Polaris Project

- One of the most successful weapon development projects.
 - Developed a submarine, solid fuel missile, and underwater launch capability in ~3 years (1956-1959)
 - Continued rapidly deploying new technology for 8 years.
- Success was incorrectly attributed to ‘PERT’
 - Pert was a ‘Management Innovation’
 - Publicized by Program Director – Rear Admiral William F. Raborn,
 - Designed to track the extremely aggressive schedule
 - Requirements and scope were constantly changing
 - Cost was not important and not managed by PERT
 - A façade to keep Congress happy
 - Not actually used to manage the project
 - Dismissed as worthless by contractors
 - Bypassed as unreliable by technical officers

Harvey M. Sapolsky, *The Polaris System Development*, Harvard University Press, 1972)



Why Polaris was Successful

- **Quality of Leadership**
 - Technical Director – Admiral Levering Smith
 - Maintained control over performance requirements
 - Made or directed all key technical decisions
- **Focus on Deployment**
 - Primary goal was an operational system as early as possible
 - Resulted in timeboxed iterations of technical advancement
- **Decentralized, Competitive Organization**
 - Technical people had control of their own decisions
 - A range of options was developed for all decisions
- **Emphasis on Reliability**
 - Stringent quality control with ‘excessive’ testing
 - Redundant systems were designed in
- **Esprit de corps**
 - Personally fostered by Admiral Raborn
 - Teamwork and commitment were encouraged and rewarded

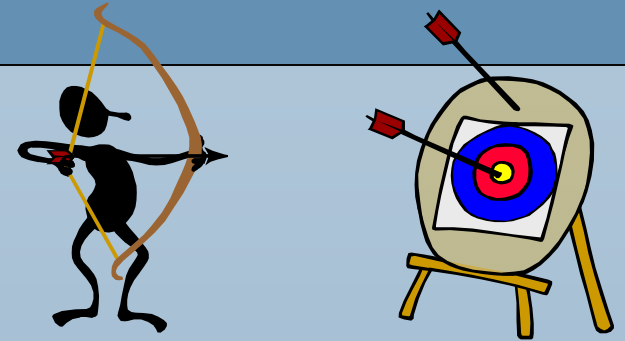


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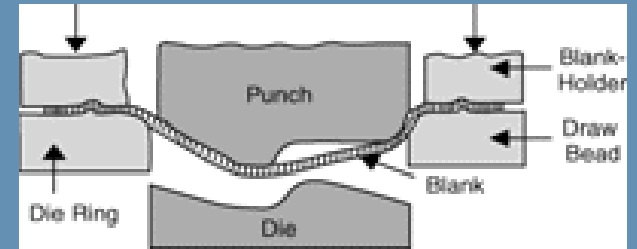
Target Cost Contracts

- Target cost
 - Target cost **includes all changes**
 - Target is the **joint responsibility** of both parties
 - Target cost is **clearly communicated** to workers
 - Negotiations occur if target cost is exceeded
 - Neither party benefits
 - *Workers at all levels have clear incentives to work collaboratively, compromise, and meet the target*
- Examples: Toyota Suppliers, T5 Agreement



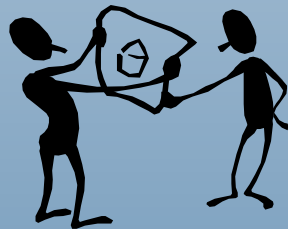


Stamping Dies



Japan

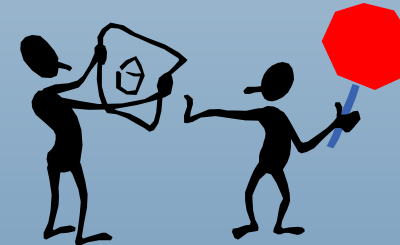
- Mistakes very expensive
- Never-ending changes
- Focus: Reduce Time
- Early Design – Early Cut
- Designer makes changes



- Target cost (includes changes)
- 10-20% cost for changes
- Half the time, Half the cost

US

- Mistakes very expensive
- Never-ending changes
- Focus: Reduce Waste
- Wait to Design – Wait to Cut
- Slow change approval system

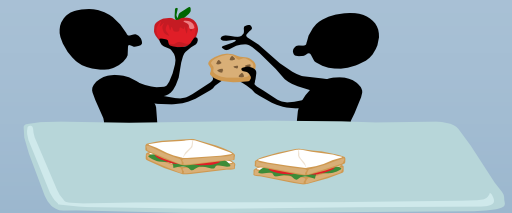


- Fixed cost (changes are profit!)
- 30-50% cost for changes
- Twice the time, twice the cost



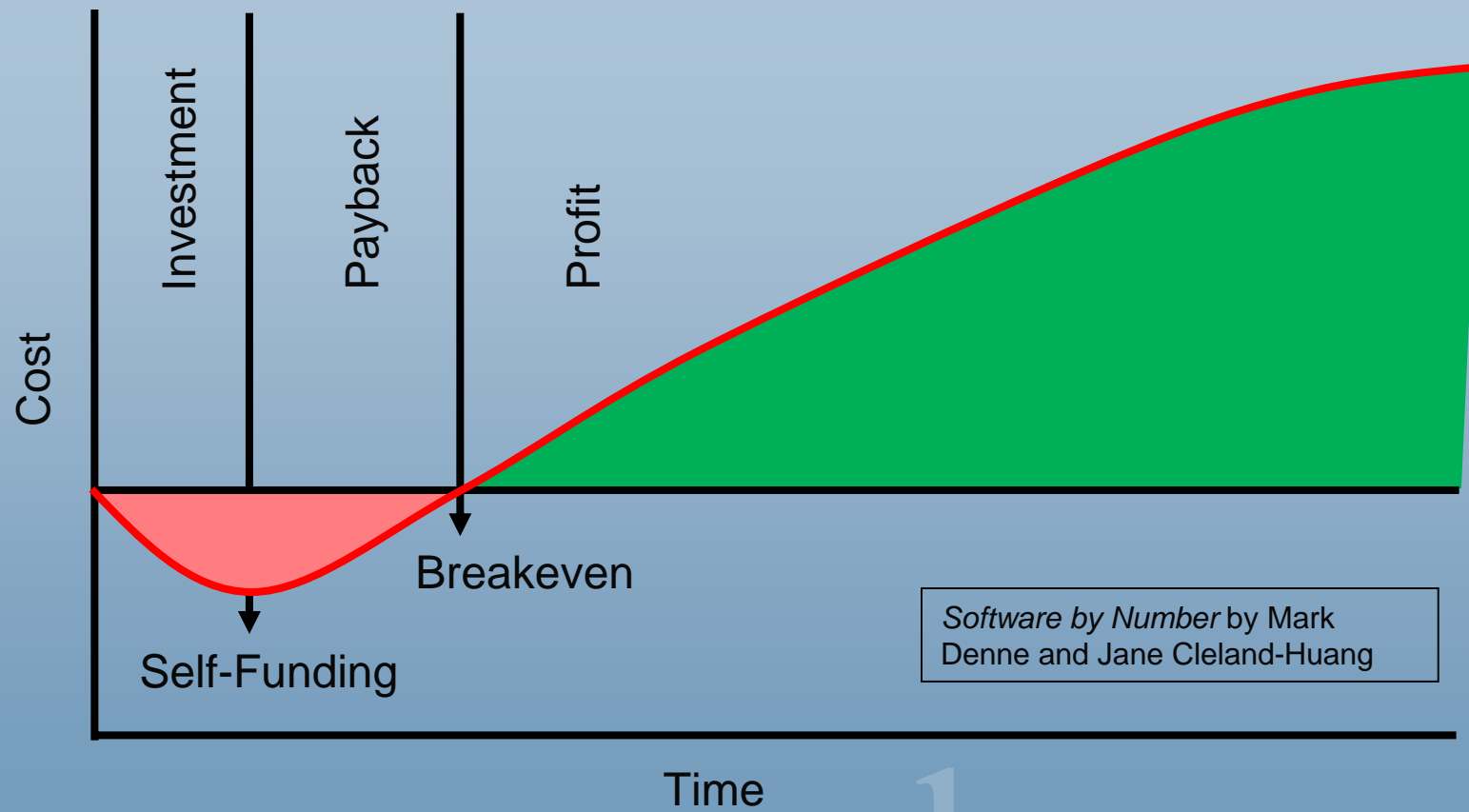
Profit Sharing

- Vendor & customer share profits from Joint Venture
 - Customer may fund vendor's development at cost
 - Vendor may develop system on speculation
- Advantages
 - Both sides prosper (or not) together
 - Workers motivated to work for the good of the Joint Venture
- Disadvantages
 - Intellectual Property ownership may be a challenge
 - Customer may not market the product aggressively
 - Quality of product may not meet expectations

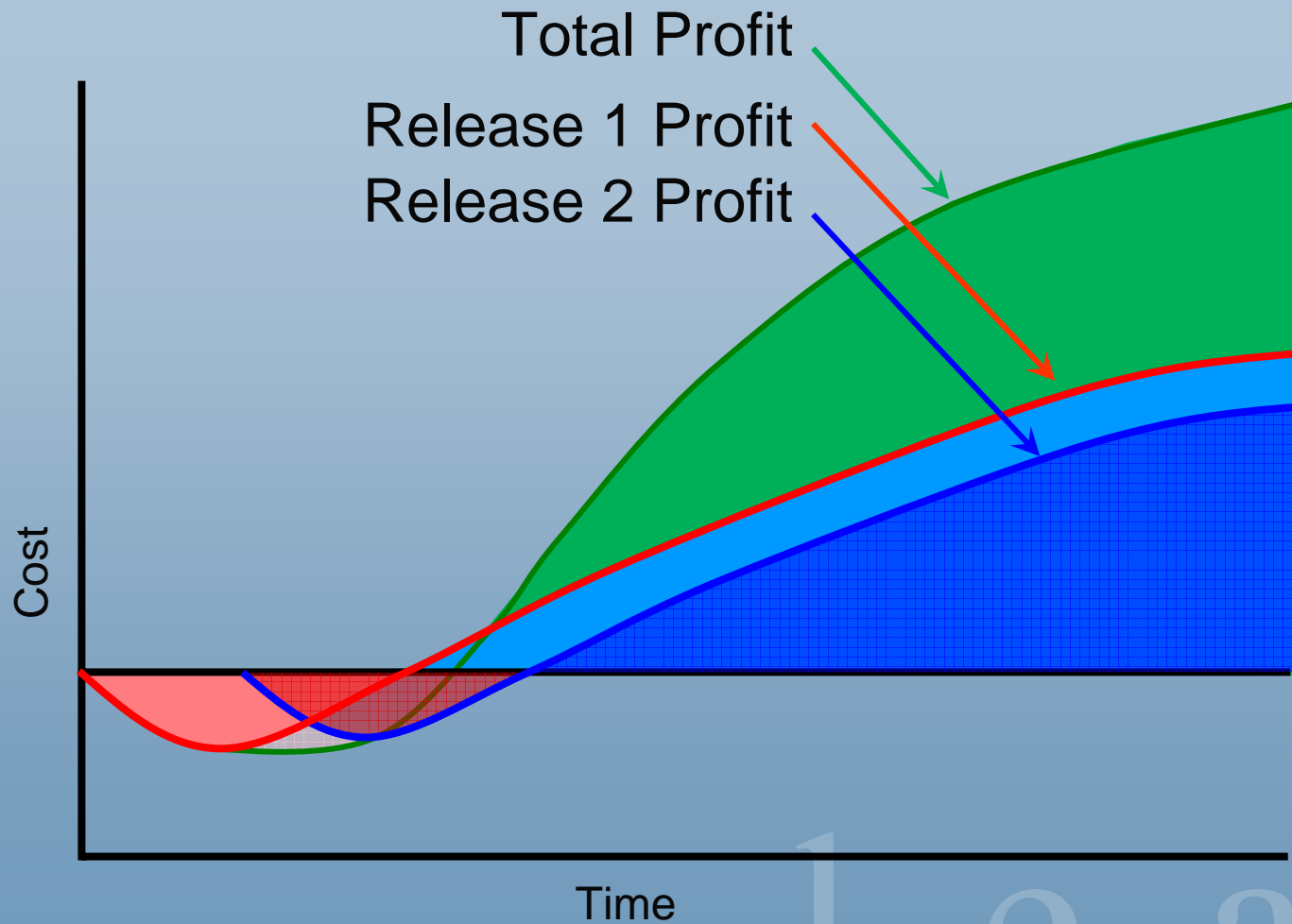




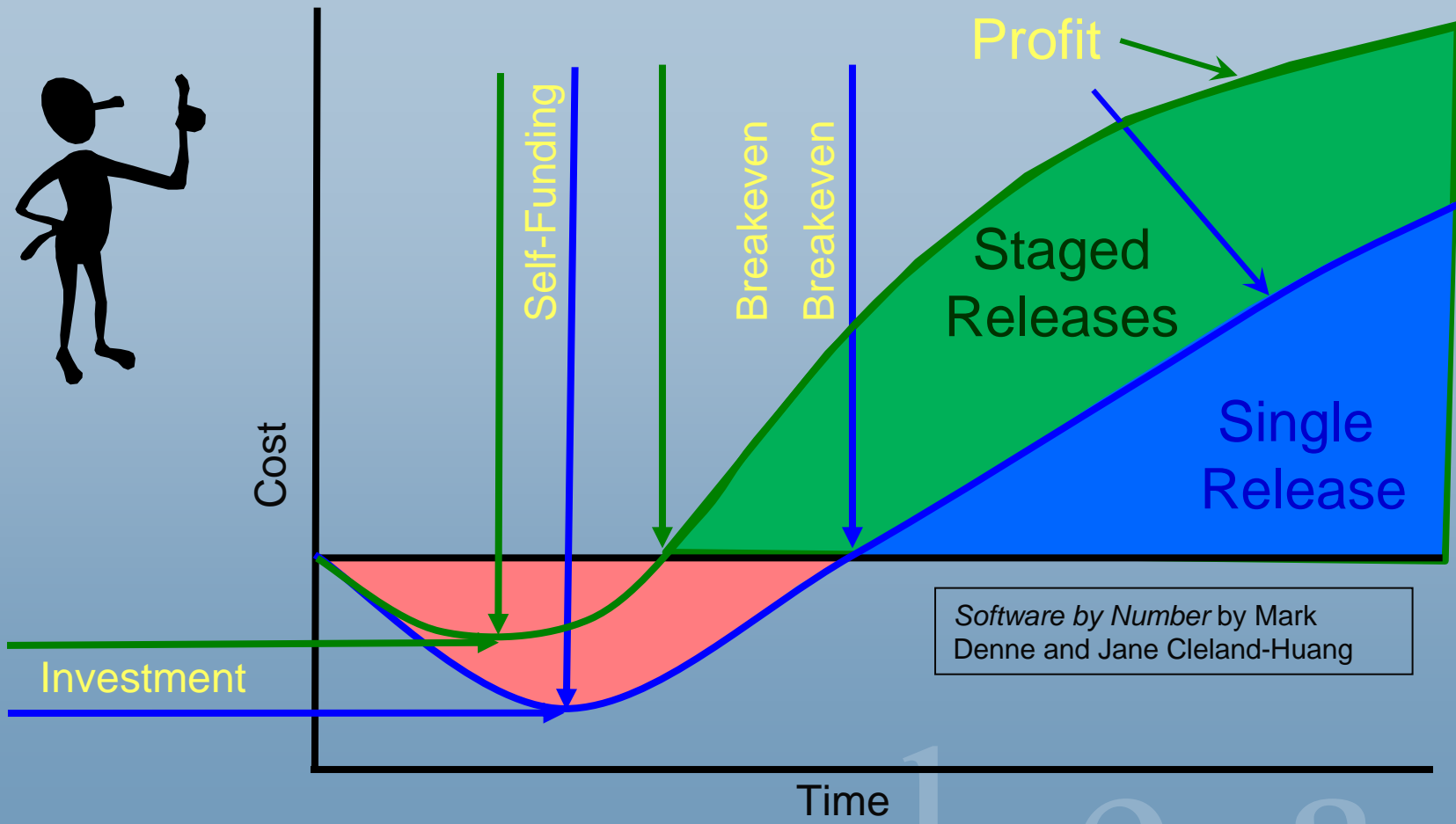
A Financial Model



Staged Releases



Increased Profit





Progressive Contracts

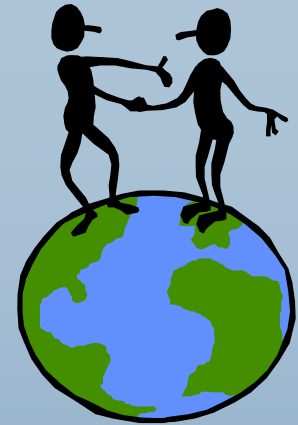
- Structure
 - Start With An Umbrella or Framework Contract
 - Release Work In Stages
 - Keep Stages Small
 - Each Stage is an Iteration
 - Often Early Stages are Fixed Price
 - Scope Beyond the Existing Stage is Negotiable
- Contract Form
 - Describes the relationship, not the deliverables
 - Sets up a framework for future agreements
 - Provides for mediation if no agreement is reached





PS 2000 (Norway)

- Developed by Norwegian Computer Society
- Used in large public IT projects in Norway
- Highlights
 - Flexible iterative model for development suited for an environment of uncertainties and risks
 - Used when it is particularly difficult to draw up a detailed specification prior to tendering
 - Provides mechanisms for establishing a common understanding between customer and the developer
 - Leaves it to the developer to find the best way to meet the objectives and needs of the customer



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PS 2000 Experience Report

■ Advantages

- Allows for Agile Development
- Promotes Trust
- Has Mechanisms for Change
- Target Cost
 - Has target, upper limit and lower limit
 - If under cost, share savings
 - If over cost, share overrun
 - Reduces the incentive to do the wrong thing

■ Disadvantages

- Each iteration is a separate contract
 - Tends to be fixed-price like
 - Time and Materials
- Works well only if the iterations are small



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