

Systems Thinking & Problem Solving:

(Understanding Our Most Important Messes)

Change, What's Required for Learning Organizations,
System Dynamics for Going from Issues to Action,
People Express Management Flight Simulator

MGM-315 06/16/04

Bob Powell, Ph.D., MBA

Continuous Improvement Associates

Tel: 599-0977, E-mail: scuba@usa.net

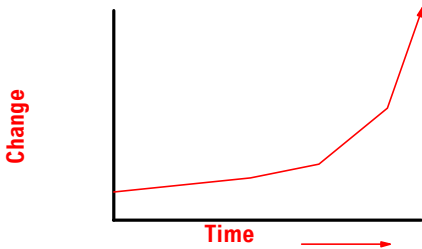
Web: <http://www.exponentialimprovement.com>

Change

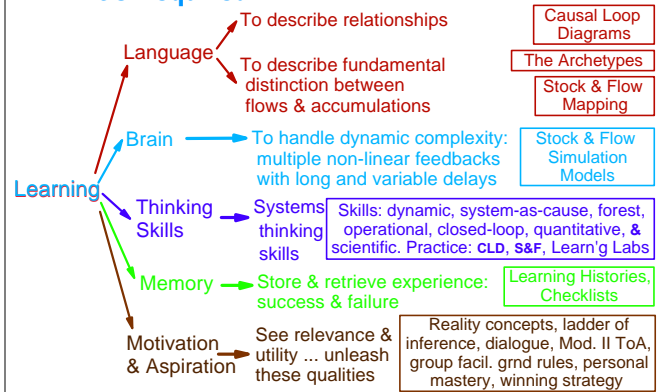
Change

"Change isn't what it used to be."

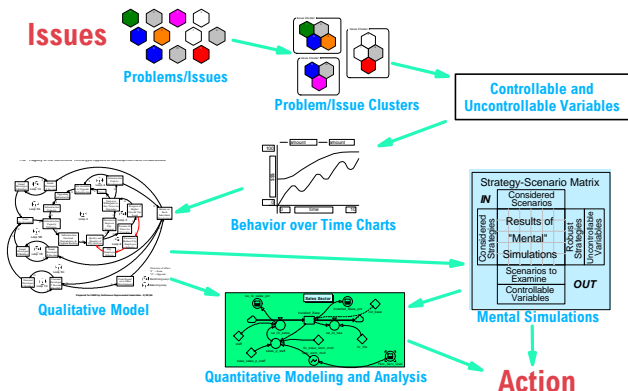
Charles Handy, *The Age of Unreason*



Thinking & Learning in Organizations What's Required?



Learn to Move From Issues to Action



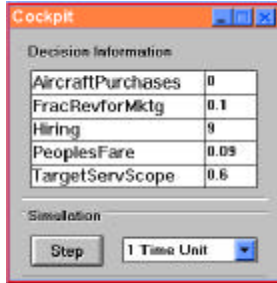
People Express Management Flight Simulator



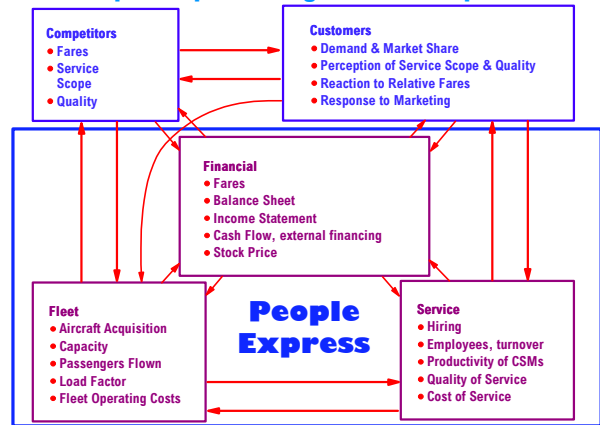
Reference: "People Express Management Flight Simulator" instructions by John D. Sterman, Sloan School of Management, MIT, Cambridge, MA 02142

People Express Simulations

- Each simulation lasts up to 10 years.
- Each quarter year you have the opportunity to make five decisions.



People Express High Level Map



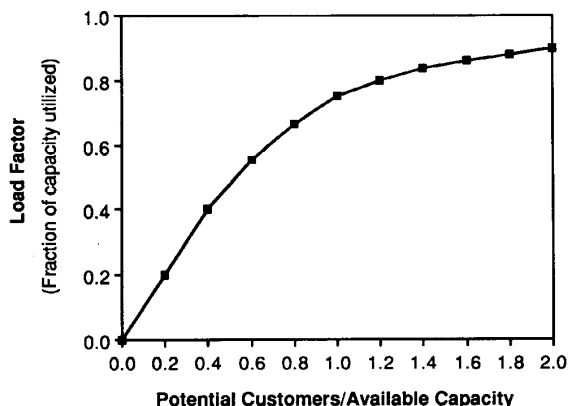
Fleet Capacity

- **Passenger Capacity:**
 - Average 210 million seat miles per aircraft per year.
 - Improve flight hrs/day from industry average = 7 to 10 hrs/plane
 - reduce maintenance down-time
 - eliminate first & business class to increase avail. seats/aircraft.
- **Aircraft Acquisition:**
 - Plan to add high quality, economically efficient aircraft.
 - Average cost is \$10 million / aircraft,
 - includes aircraft itself and total supporting capital investment
 - to place each aircraft into service (gates, terminal space, spare parts, support equipment).
- **Operating costs for each aircraft = \$5.5 million / year**
 - includes fuel, aircraft maintenance, and facilities not including depreciation or interest to service debt.

Fleet Capacity (cont.)

- **Capacity / Customers**
 - available capacity = # available seat miles in any period
 - potential customers = # prospective passengers wishing to fly PE
 - passengers carried = # revenue passenger miles actually flown during each time period
- **Load Factor = passengers carried / available capacity**
 - Industry average load factor is about 58%.
 - Potential customers will exceed total passengers carried.
 - Initial breakeven load factor at anticipated fare levels is about 60% (generates profits w/o relying on overbooking more than the industry as a whole).

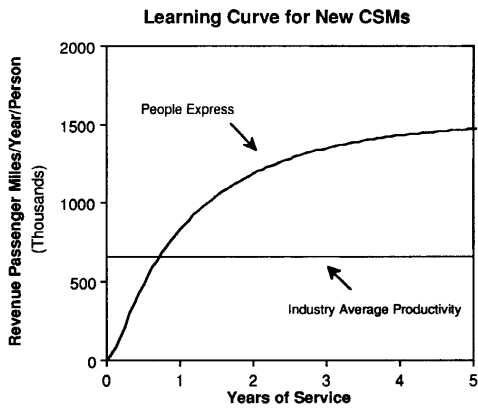
Load Factor Graphical Function



Human Resources Management

- **No Frills Service**
 - service scope will be .60 of the full service industry standard
- **Ownership**
 - every employee is an owner and participates in profit sharing
 - turnover will be reduced by the ownership system
- **Cross-utilization and job rotation for higher productivity**
- **Self-Management**
 - few layers of management & fewer employees / aircraft average
 - CSMs will review their own performance and set their own goals
- **CSM recruitment, hiring, and training**
- **The PE learning curve**
 - hire people who fit the vision and direction of People Express

PE Learning Curve



Cost Structure

- **Total operating costs:**
 - fleet operations, service, marketing, and interest.
- **Fleet costs:**
 - fuel, maintenance, airport fees, etc.
 - \$5.5 million per aircraft per year.
- **Service costs (human resources):**
 - wages, benefits and taxes, related facilities (computers, telephones, etc.) = \$42,000 per employee / year.
- **Marketing expenditures:** a fraction of revenues.
- **Interest:**
 - Paid on debt = 10 %/yr. Earned on savings = 5%/yr.
- **Depreciation:**
 - a non-cash charge, aircraft depreciated at 6.25 %/yr.

Capitalization and Finance

■ Balance Sheet:

- | | |
|-------------------------|--------------------|
| ● Assets | Liabilities |
| Value of fleet | Debt |
| Other capital equipment | Equity |

■ Cash Flow:

- + Revenues
- Cost of fleet operations
- Cost of service (employees)
- Marketing expenditure
- Interest
- Net Cash Flow before financing

Capitalization and Finance (cont)

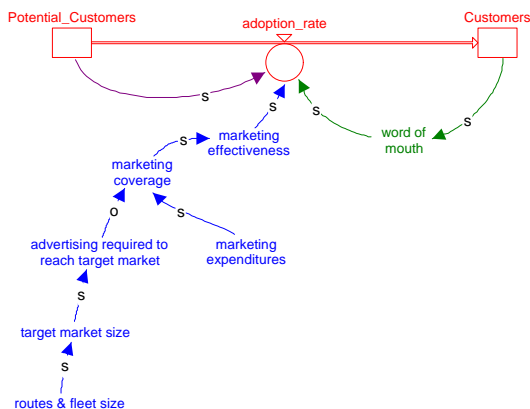
■ External Financing

- Debt = 75%
- Stock Shares = 25%
- No dividends ... retain earnings to finance growth

■ Share Price

- (market value of shareholder's equity)/(# outstanding shares)
- Valuation depends on
 - assets & debt,
 - present value of the profit stream
 - premium for growth based on expected future profits
- During startup markets will expect and discount initial losses

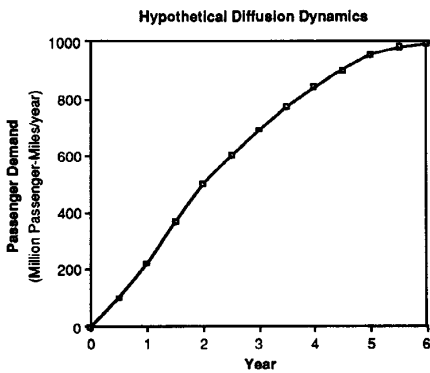
Causal Structure of Market Growth



Marketing Effectiveness

- Given expected load, ~10% of revenues should provide a sufficient long-run marketing budget.
- Fraction may be increased during startup to provide a marketing 'kickoff' before word of mouth becomes effective
- Fraction can be varied to meet competitive challenges or financial pressures.

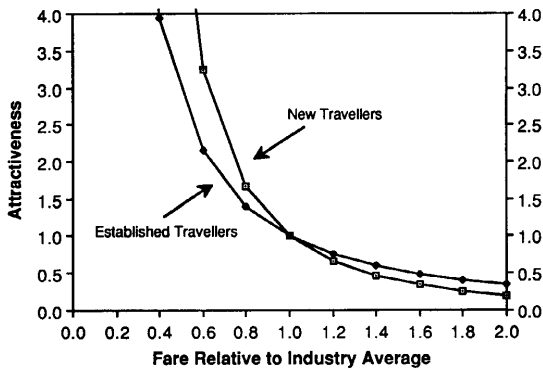
Market Diffusion Dynamics



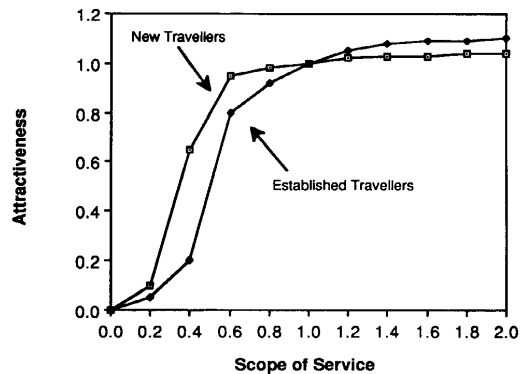
Market Segments & Attractiveness

- Segments
 - New Travelers
 - Established Travelers
- Market attractiveness
 - Routes and schedule: competitive on routes flown
 - Relative fare: PE profitable at \$.09/seat mile vs. industry average of \$.16/seat mile
 - Scope of service" 60% of industry average
 - ▶ reduces attractiveness 20% among Established Travelers
 - ▶ but only 5% among New Travelers
- Service Quality - Different for each market segment

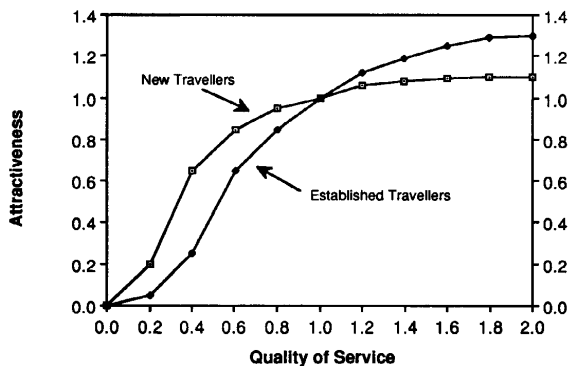
Attractiveness from Relative Fare



Attractiveness from Scope of Services



Attractiveness from Quality of Service



Competition

- Deregulation has substantially increased the competitiveness of the airline industry.
- People Express will be going head to head with major carriers who currently dominate the markets
- PE's competition will not sit idly by while PE succeeds.
- PE's cost advantage will create a window of opportunity of up to several years during which PE can grow and establish itself before competitors catch up.

Competitive Factors

- **Current Industry Fare Structure:**
 - Industry average fare is currently \$.16/seat-mile.
 - PE costs are low; PE profitable at \$.09/seat mile (w/LF = ~60%).
 - A large advantage that the competition will not be able to match by cutting their profit margins alone.
 - To match PE, the competition will have to lower their breakeven points. To do so will be painful, difficult, and time consuming.
- **Long Run Industry Fare Structure**
 - Over time competitors will probably be able to lower their costs (e.g., wage concessions and efficiency improvements).
 - Competitors will imitate some of our human resource policies.
 - However, it will probably take at least two years to close the gap.
 - If PE succeeds, we can expect other new airlines to be formed.

Dynamics of Competitive Response

- As long as People Express is only a small player in the market, we do not expect the competition to respond.
- While PE is small, the costs to the competition of lowering prices will be prohibitive: to punish PE by cutting their prices will reduce revenues across their much larger customer base.
- However, as PE market share increases, we expect the competition to intensify cost-cutting efforts.
- The larger PE's market share, the faster we expect competitors to respond (at the fastest ~2 years).

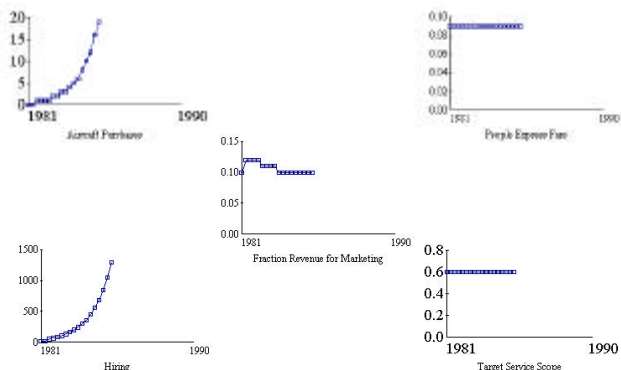
Hap Pareti's Strategy

- "We thought we'd start by leasing three little DC-9's and flying them for a few years until we made enough money to buy a plane of our own." HBR Case Study
- Pareti's strategy means
 - no additions to the fleet or staff,
 - low prices and
 - moderately aggressive marketing.
- Run Simulation of Pareti strategy

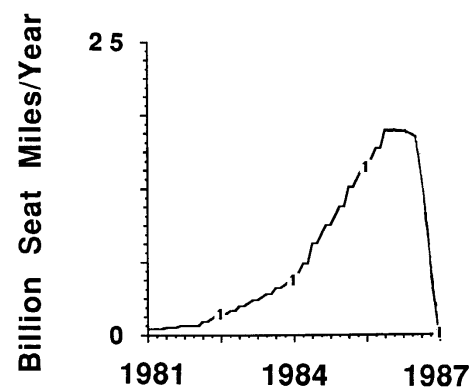
Don Burr's Strategy

- Prices low at \$.09/seat-mile from the beginning.
- Target scope of service at 0.60.
- Expand the fleet aggressively (about 100%/year), hiring people at a comparable rate.
- Market aggressively, particularly in the beginning (12% of revenues at the beginning, falling to 10% as load factor rises).
- Note results of Burr's strategy.

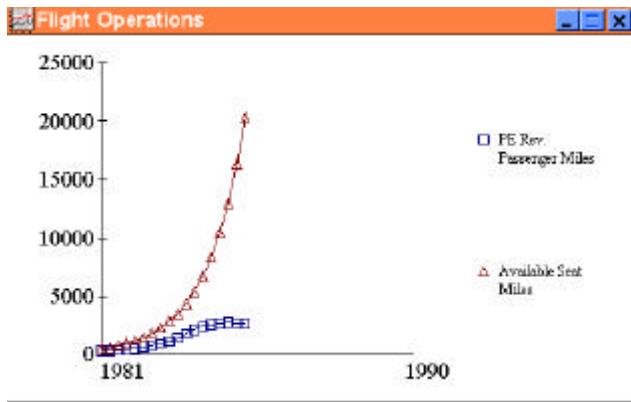
Decisions for Don Burr's Strategy



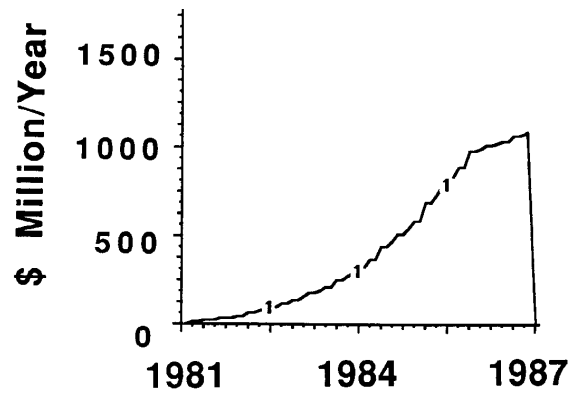
People Express Historic Capacity



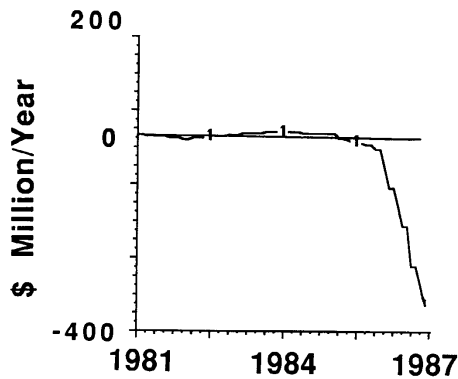
Don Burr Simulation Capacity



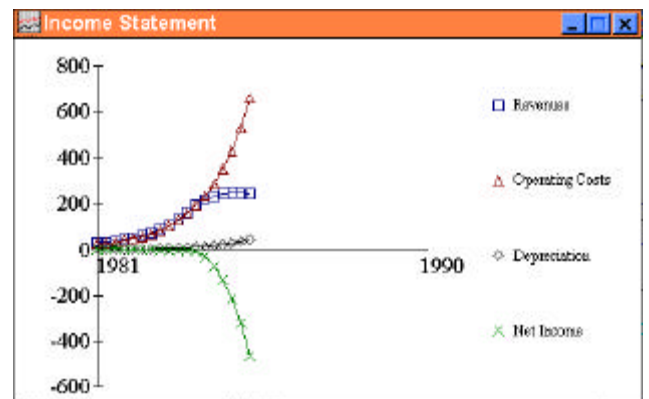
People Express Historic Revenue



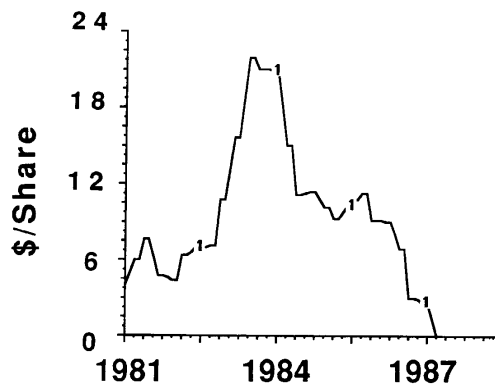
People Express Historic Profits



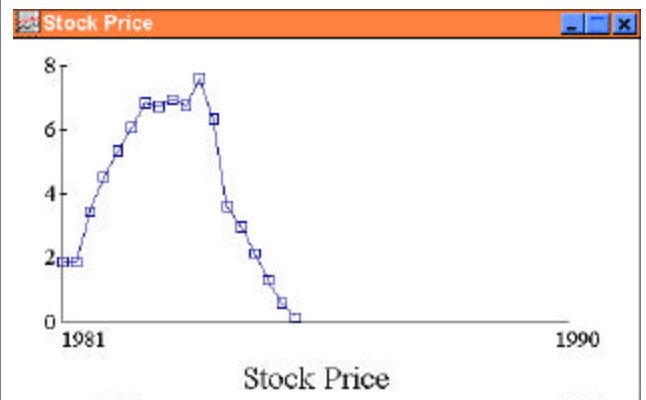
Don Burr Simulation Revenues



People Express Historic Stock Price



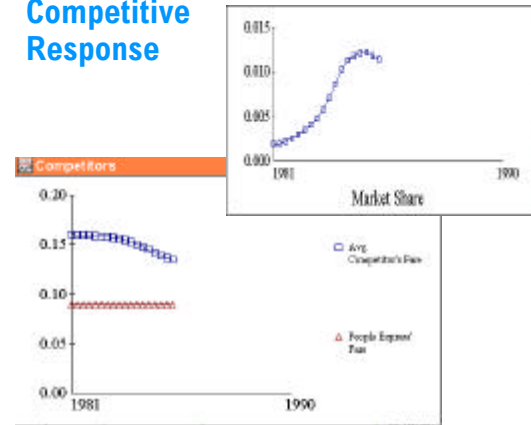
Don Burr Simulation



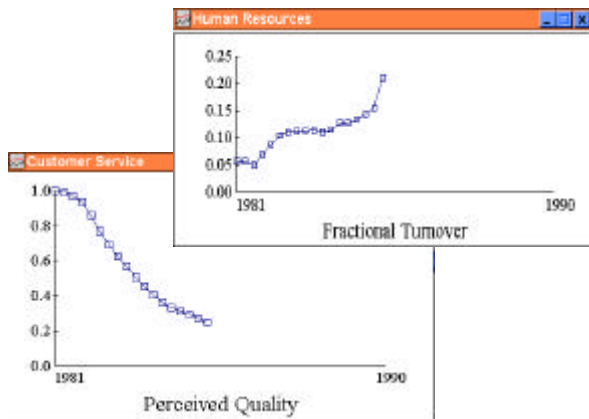
Don Burr Strategy Summary Report

1985 Q 1			
Capacity Growth Rate (%/year)	82	Employees	3,724
Demand Growth Rate (%/year)	-6	Emp./Plane	38
Aircraft	97	Hiring	.297
Aircraft Acquisition	19	Turnover	701
Load Factor	0.13	Marketing (\$ Millions/year)	24
Break-even Load Factor	0.38	Market Share	0.11
Fare (\$/seat-mile)	\$0.098	Reported Service Quality	0.25
Competitor Fare	\$0.135	Revenues (\$ Million/year)	\$242
		Net Income	-\$462

Don Burr Strategy Market Share & Competitive Response



Don Burr Strategy



Run Simulation Experiment(s)