

15.871 Introduction to System Dynamics

Integrating systems thinking and strategy

People Express Flight Simulation

October 11, 2013



Agenda for Today

- *Announcements*
 - *Assignment #5--Deadline extended to Friday 5pm*
- *People Express Logistics*
 - Download simulation
 - Mac Users: Uses teammates' laptop or use VMWare (windows virtual machine)
- *The People Express 2000 Microworld- Walkthrough*
- *What to hand in?*
 - List of deliverables
- *Run Don Burr Strategy, see if you can observe the dynamics that lead to PE demise*
- *Run your Own Strategy*



Overview

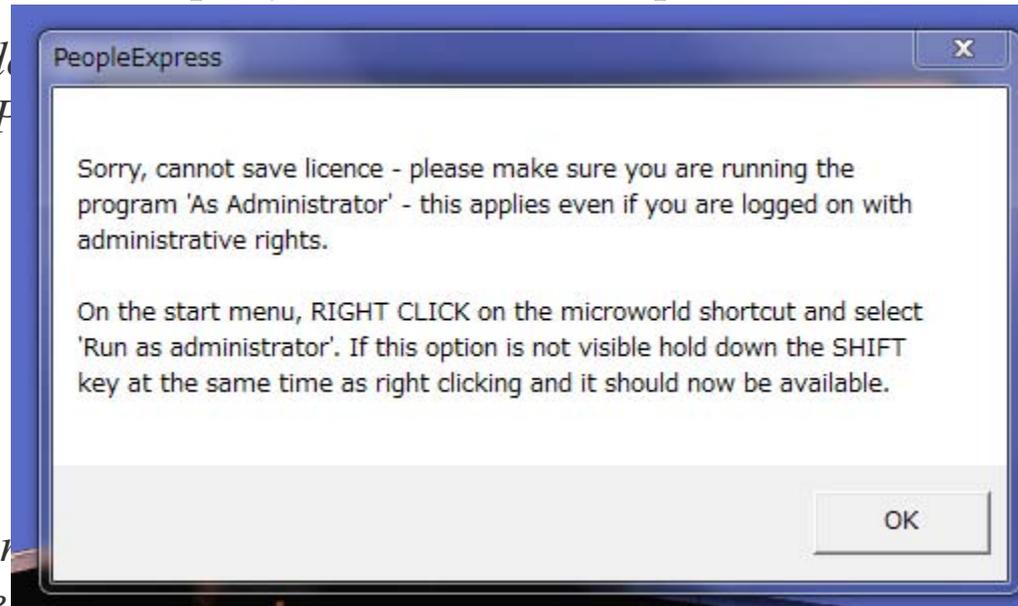
- *In this assignment, you will:*
 - First ‘fly’ the company yourself through a “*management flight simulator*”—a SD model embedded in an interface in which you will make strategic and operational decisions “quarter by quarter” (every 3 months)
 - You will then draw on your experience running your own PE to develop a conceptual model of the feedback structures responsible for the dynamics.
 - Finally, you will use your conceptual model and experience in the management flight simulator to recommend policies for the sustainable success of PE.



To start the Simulation

- *The Simulation is developed for a Windows Computer.*

- *To use this code, you need to run the program as ADMINISTRATOR open it from Start | Programs | PeopleExpress*



- *Click on GO on the PeopleExpress window, enter the name and code as shown here.*
- *The code is now applied and the software does not need to be run as admin again*

Remember: What to Hand in?

- *Prepare a short report. Brevity is a virtue! (~10-12 pages should be enough) ☺*
- *Hint: Main Elements to include in your report:*
 - 1) Identify Key Variables: Variable List with units*
 - 2) Reference modes*
 - 3) Develop a “ONE PAGE” causal loop diagram including key variables****
 - 4) Explanation of PE strategy**
 - Telling the PE Story in "A Few Paragraphs" :
 - 5) Explanation of Your Strategy**:
 - Policy Recommendations: Imagine You are CEO of PE; What policies/strategies would you propose to ensure the sustainable success of your firm?
 - 6) Strategy record sheet: Your decisions made per quarter, up to 10 years
 - Recommended: Include a picture of tables->user decisions, so that we can easily see the decisions you made. Last page of assignment is the graphical presentation of this table.

**** Important: Refer to your CLD to tell the story of PE and your strategy**

*** More details will follow after the PE flight simulator walk through**



Remember: Developing reference modes

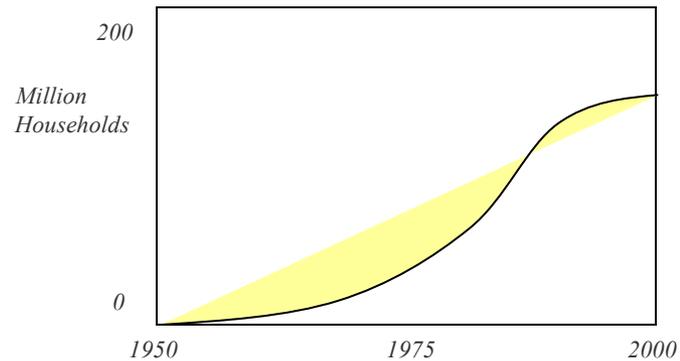
- *Identify the **time horizon** explicitly*
 - Be homogeneous in all the charts so that it is easy to compare charts and analyze relationships
- *Use different charts for different variables with **different units***
 - It simplifies the analysis of the reference modes
 - Use the same chart only when you want to illustrate explicit relationships (Revenues vs. costs => profit; Input-Output => Excess production or Change in inventory)
- *You need to be **consistent** across the graphs*
 - Example: if Input > Output at some point, Inventory has to grow
- *Find a **rationale** for every feature in the reference mode you describe*
 - E.g. “Cable Revenues go down because Subscription Fee goes down”
 - The rationale will help you find and test the causal loop structure underlying the system



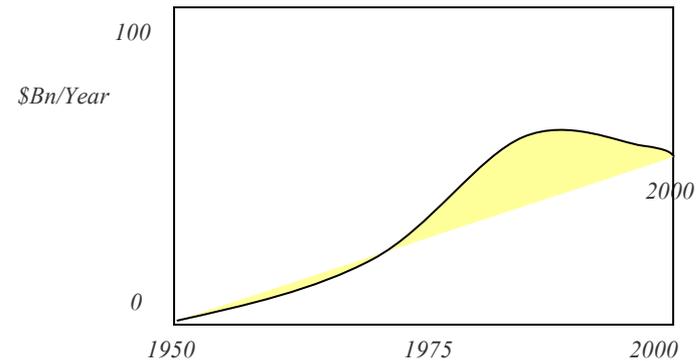
Example Reference modes

(variables are different than the People Express assignment)

Customer Base



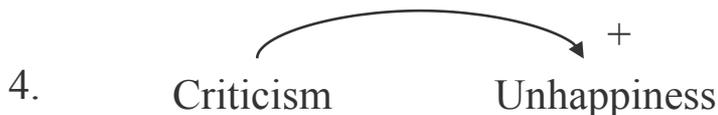
Cable Provider Revenues



Remember: Defining causal loops

- Name all the variables in a convenient, meaningful way, which is *measurable*

Wrong



Vs.

Right



Vs.



Vs.

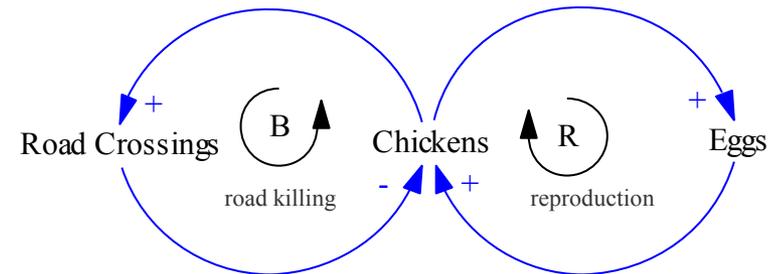


Vs.



Remember: Defining causal loops

- *Make the loops easy to see*
 - Curved arrows help visualize the loops
 - Try not to have many crossed lines
 - Don't **box** the variables ! (at least, at this stage of the course. Boxes mean stock variables)



- *Assign polarity to all the links!!!*

Remember: Defining causal loops

- *Use the right way (not the fast way) to find the nature of the loops*
 - It helps you debug the model (e.g. typos in the polarity of links)
 - It strengthens your understanding of the model
 - It helps you draw reference modes
- *Name your loops*
 1. Indicating if it is reinforcing (R) or balancing (B)
 2. Numbering them (R1, R2, B1, B2..)
 3. Labeling them with a meaningful sentence (Word of mouth, Inventory depletion, etc ...)



Overview of Flight Simulator

- *Simulator consists of 3 parts:*
 - *The micro-world: Represents structure of PE*
 - *The information system: Reporting current state and the past*
 - *The simulator controls: Strategic and operational decisions*
 - **Simulator Controls:** Each game lasts up to 10 years. Each quarter year you will have the opportunity to make five decisions. These are:
 1. **Aircraft Acquisition** – how many aircraft will you add to your fleet?
 2. **Hiring** – how many people will you hire?
 3. **Marketing** – what fraction of revenues will you allocate for marketing?
 4. **Fares** – what average fare will you charge?
 5. **Target Scope of Service** – what services will you offer?



Cleared for Take-Off

- Before you enter your first decisions, let's take a look at some of the reports available through the Information system.
- Under the **Report menu** you will find **7 status reports**. Click on the **Summary Report**. This report summarizes the crucial information you will need to run your airline.
- Take a look at some other reports if you wish.
- The **current date** is reported at the top of the **Summary window**.
- You are taking over at the beginning of “Year 1”. Thus the summary report gives you the results for the last quarter of “Year 0”.
- When you take over, People Express has **3 aircrafts**, and **165 employees**, or **55 employees per plane**. Reported **service quality** is high.



Game 1: Play Don Burr's strategy

- Good starting point is to mimic Don Burr:
 - Keep prices low from the beginning (\$0.09/ seat mile)
 - Set the target scope low at 0.60
 - Then expand fleet aggressively (about 100%/year)
 - Hire people at a comparable rate
 - You would also market aggressively, particularly in the beginning (say, 12% of revenues in the beginning, falling to 10% as load factor rises)

- After playing Burr, play again with same price and service scope, but choose different growth rate, or a different marketing strategy, or a different target for employees per aircraft
- As you start understanding dynamics of the firm, consequences of actions, and delays, you can design your strategy for success
- There is no right answer, careful experimentation is key



Helpful Hints

1. You may **sell airplanes** as well as **buy them**. To sell airplanes, simply enter a negative number for the purchase rate. The software will not allow you to sell more than you have..
2. You may **fire employees** as well as **hire them**. Simply enter a negative number for hiring. You may not fire more employees than you have.
3. Think of strategies, run them. See why they work/ fail. Which loops made it work, which loops did you miss..don't spend too much time on one run, just play again, as many times as possible
4. Remember there can be **delays**, so behavior can be complex



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