

FSE 394: Innovation In Corporate Technology

Corporate Context: Improving Supply/Production Efficiencies



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A young woman with dark hair tied back, wearing a bright yellow long-sleeved top, stands against a solid yellow background. She is gesturing with her hands: her left hand is pointing towards the text on the right, and her right hand is held open palm-up, as if presenting or holding something.

What is a Supply Chain?

noun: **supply chain**; plural noun: **supply chains**

1. the sequence of processes involved in the production and distribution of a commodity.

“External” Elements of the Supply Chain

Raw Materials
and Producers



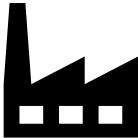
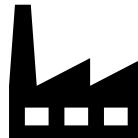
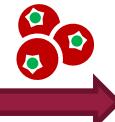
Manufacturing/
Processing



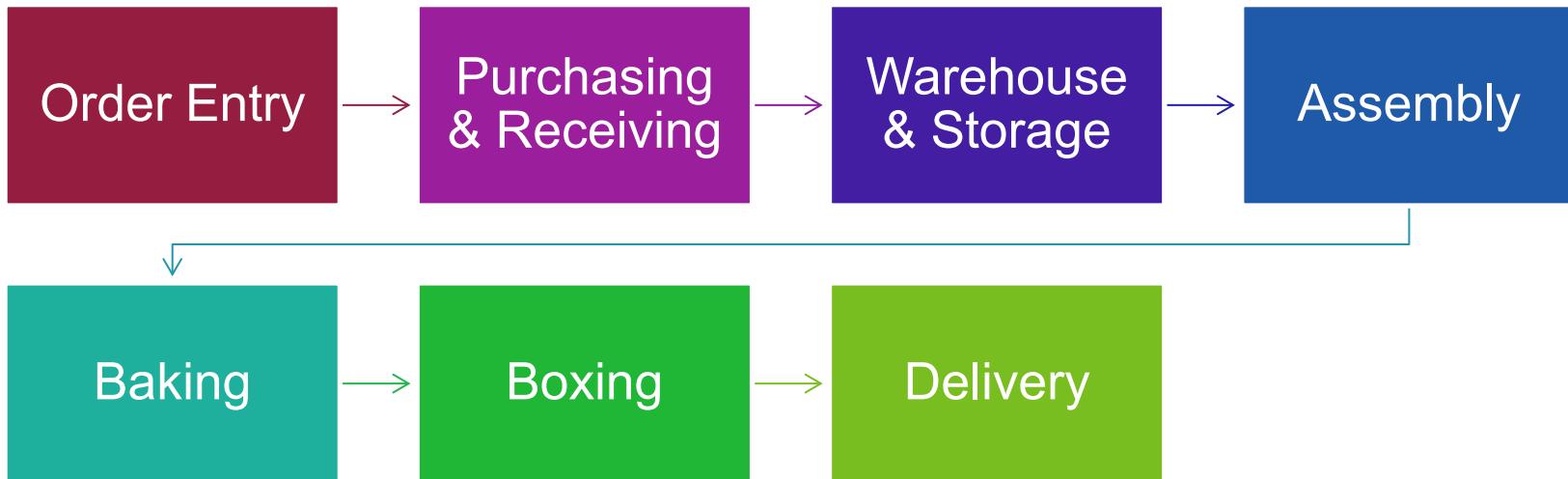
Shipping/
Distribution



Production



“Internal” Elements of Supply Chain



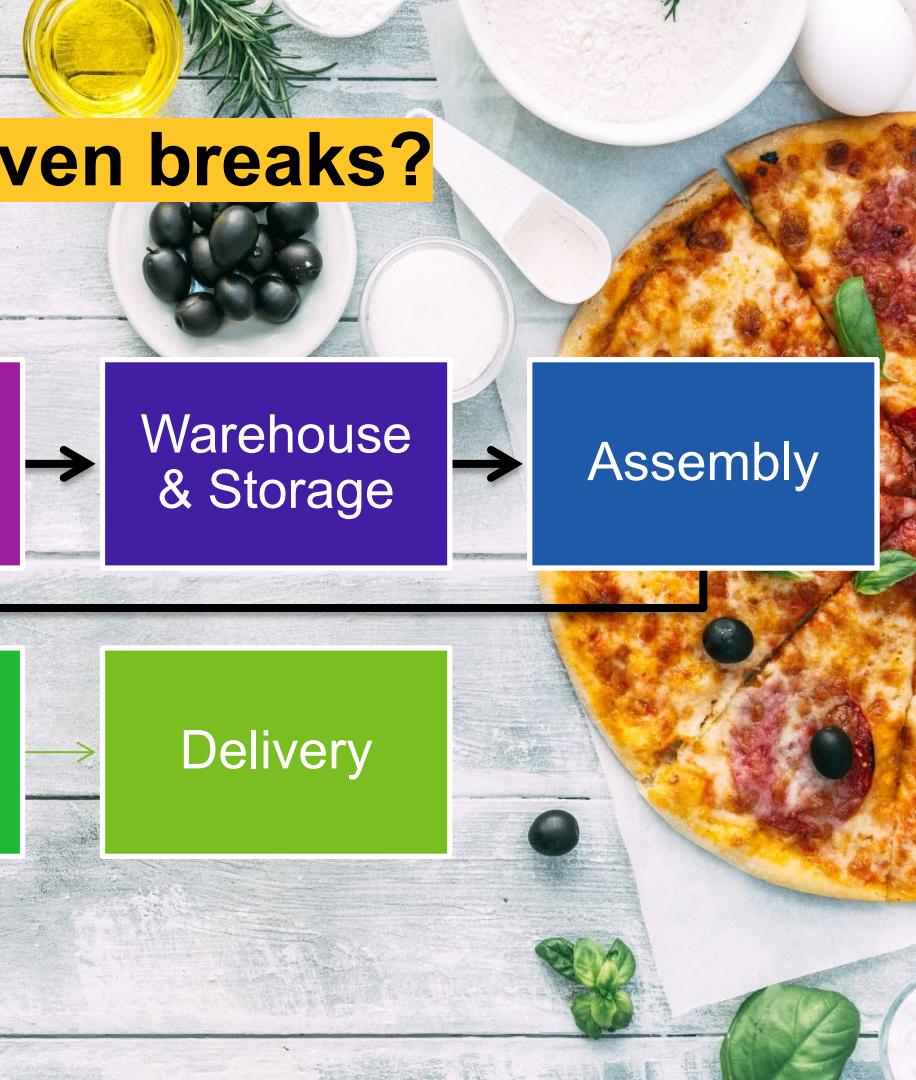


**Observation: It costs
money to run a supply
chain**



**A Chain is Only
as Strong as its
Weakest Link...**

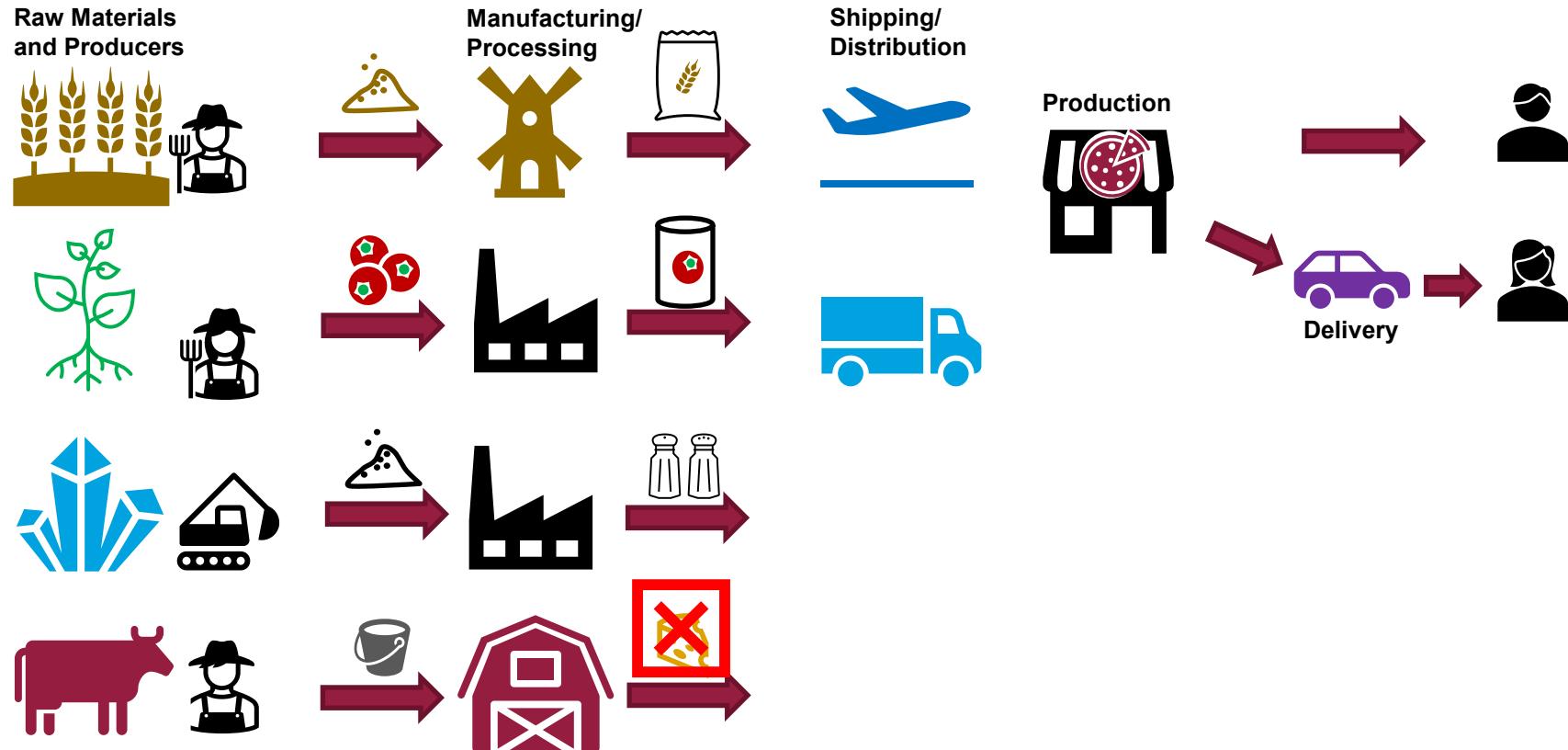
What happens if my oven breaks?



What happens if I can only assemble half the pizzas needed during peak hours?

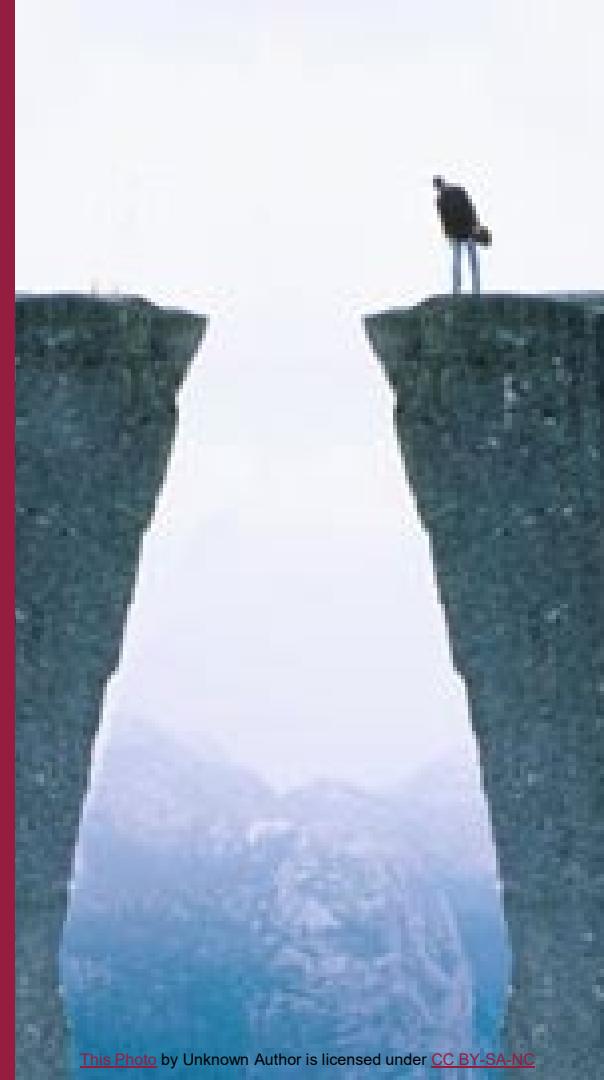


What happens if there is a global cheese shortage?



Some Supply Chain Disruptions

- Natural Disasters
- Transportation Failure
- Geopolitical Instability
- Price Hikes
- Cyber Attacks



Measuring the Impact of Supply Chain Disruptions

Lost Revenue = Length of Disruption X Revenue

Lost Profit = Length of Disruption X Profit Lost

Expected Profit Lost Per Year = \sum LostProfit(i) * NumberPerYear(i)



Production Efficiency:

Profit

Operational Expenses

Example: Global Cheese Shortage

- Cheese prices could double due to global cheese shortage
- Likelihood of a cheese shortage is 1:1,000,000
- Using higher-priced cheese will reduce our profits by \$5,000 per month
- The cheese shortage is expected to last 8 months

Profit Lost = \$5000/month x 8 months = \$40,000

Expected Profit Lost Per Year = \$40,000 * 1/1000000 = \$0.04

Example: Not Enough Pizza Assemblers

- During peak hours, I can only meet $\frac{1}{2}$ the demand of pizzas due to lack of pizza assemblers
- This happens 6 days a week
- Profit lost each day estimated at \$500

Profit Lost = \$1000/occurrence

Expected Profit Lost Per Year = $\$500 * 52*6 = \$156,000$



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Innovating for Supply Chain Operations



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**Innovation is about
solving problems that
matter**

Supply Chain/Operational Efficiency Goals



Reduce Disruptions



Improve Efficiency



Common Strategies

Efficiency

- Reduce duplication of effort
- Improve quality
- Targeted reliability improvements
- Reduce waste
- Reduce time to produce product

Reliability

- Have spare capacity
- Have spare materials
- Have alternate sources



Artificial Intelligence/Deep analytics



Asset Tracking



Internet of Things



Innovation Example:



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Innovation Example



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Innovating with “The Leapfrog”



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The Problem



*That idea is perfect!
Let's go with it!*



The Goal

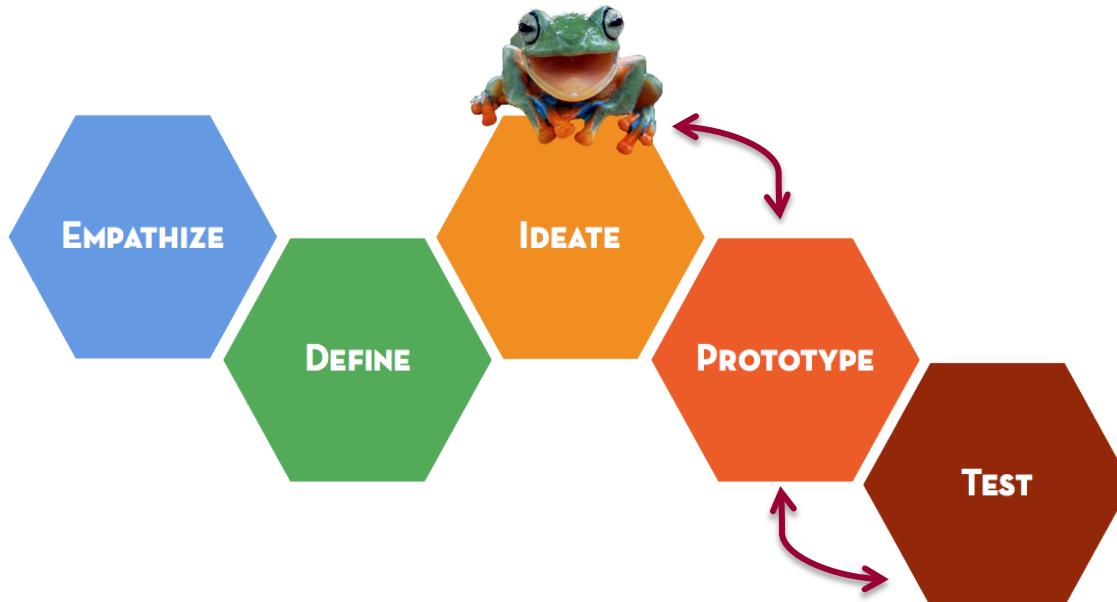
- Force team to re-evaluate preconceived concept
- Get fresh perspective on the problem
- Arrive at a better approach

The Solution: “The Leapfrog”



Imagine that a competitor has just deployed your best solution. You must quickly determine an alternative.

Human/User-Centered Design Flow



Example



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Numerical Methods: Modeling Product Costs



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Price:

The amount of money users will pay to purchase the item:

\$287



Cost of Goods Sold (COGS):

The amount of money company will spend to manufacture the product

\$255

Profit Margin: Difference Between Price and Cost

$$\text{Profit Margin} = 100\% \frac{\text{Price} - \text{Cost}}{\text{Price}}$$

Gross Profit Margin when cost is COGS only

Net Profit Margin when cost includes everything (operating costs, taxes, etc.)

Typical Net Profit Margins By Industry

Air Transport
2.21%

Apparel
2.98%

Auto & Truck
3.77%

Auto Parts
2.27%

Business Services
7.09%

Computer Services
4.15%

Computers /
Peripherals
16.78%

Electronics
5.62%

Household Products
10.38%

Machinery
17.59%

Retail
4.60%

Grocery and Food
1.97%

Shipbuilding &
Marine
10.52%

Software
(System &
Application)
22.94%

Transportation
4.09%

Two Approaches to Determining Cost and Price

Determine Price that Potential
Customers are Willing to Pay



Remove Net Profit Margin



Cost

Price



Add Net Profit Margin



Determine Costs of Components,
Manufacturing, Distribution,
and Ongoing Support

Some Components of a Cell Phone

Chassis (Metal Fabrication)

Screen

Circuit boards (Electronic
Fabrication)

- Main board
- Camera
- Screen interface
- Cellular Interface
- ...

Firmware (Software License?)

Battery



Cost for App

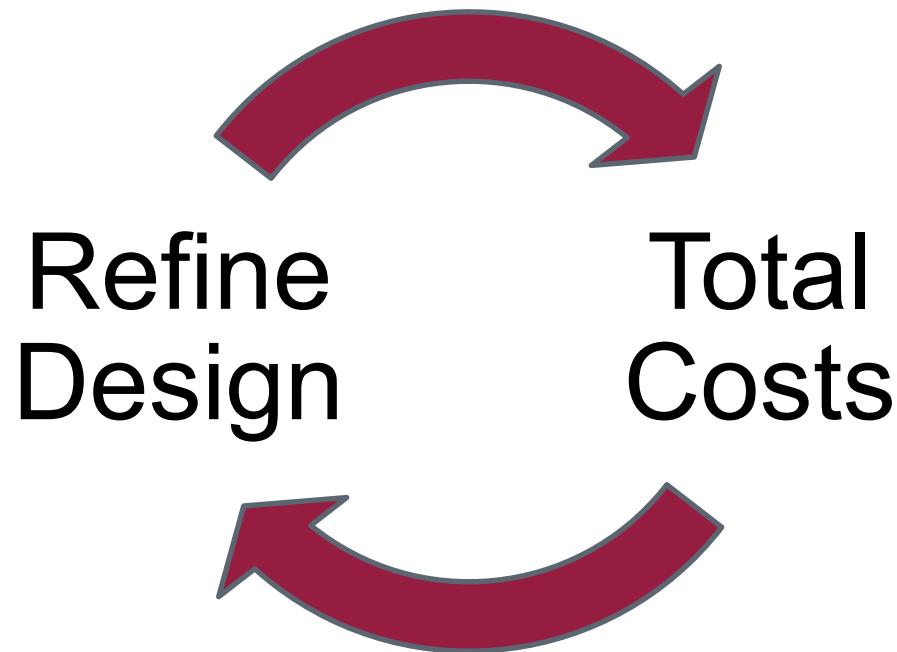
- App Store / Play Store ‘Tax’ – Typically 30%
- Developer License

Ongoing Expenses



- Support / Maintenance
- Taxes
- Marketing
- Distribution

This is an Iterative Process





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