

# A Systems Engineering Approach to Developing Business Models - Healthcare

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# Large Company X Can Do Anything !! Is There Room For Start-UPs

- Large companies
  - Build infrastructure, gain momentum
  - Confined to successful paradigms
- Start-ups
  - Free to choose or develop what's needed, i.e., new ***business model***
  - Willing to accept risk
    - Roll dice for the “BIG WIN”
    - Pay is less than starting job at Post Office
    - Pay amount and frequency is problematic (lottery for cash)
    - 80+ hour work weeks
    - Divorce rates are high

# Beer and Systems Engineering

# Beer

- Burt has an idea



# Beer



# Aunt Elizabeth Has Money!



Money comes at a price.

# Beer



Item 1



Item 2



tem 2



dem 6



Tu tu



xxwytatek



wixagh

#%!



gmmmm



tlem 3

# Discussion with Engineer Results in Production Model



## **Burt asked for:**

“A helicopter that holds beer, makes you happy, and can be sold through TV infomercials”.

And,...

The engineer gave Burt what he asked for!



# It's Not Working and IT'S NOT GONNA TO WORK

- First there is that annoying issue of defining and stating the problem. But it makes a difference!
- Customers, who needs them?
- Then you have to do those dumb requirements
- Architecture? For BEER?? No Way!
- Validate – what, why???
- Verification, smerification...!
- Risk....have another brewsky
- Integration....Test....When da yu do dat?



# Contributions to Company Success

- Business Environment
  - Competition
  - Government
  - Market
  - Suppliers
- Company
  - Marketing
  - Production
  - Technology
- Venture
  - Strategy
  - Investment
  - Support
- Product
  - Scalability
  - Performance
  - Defensibility

- Company Marketing
- Product Scalability
- Company Production
- Venture Strategy
- Venture Investment
- Business Environment Competition
- Business Environment Government
- Business Environment Market
- Product Performance
- Company Technology
- Business Environment Suppliers
- Venture Support
- Product Defensibility

These makeup  
Business Model

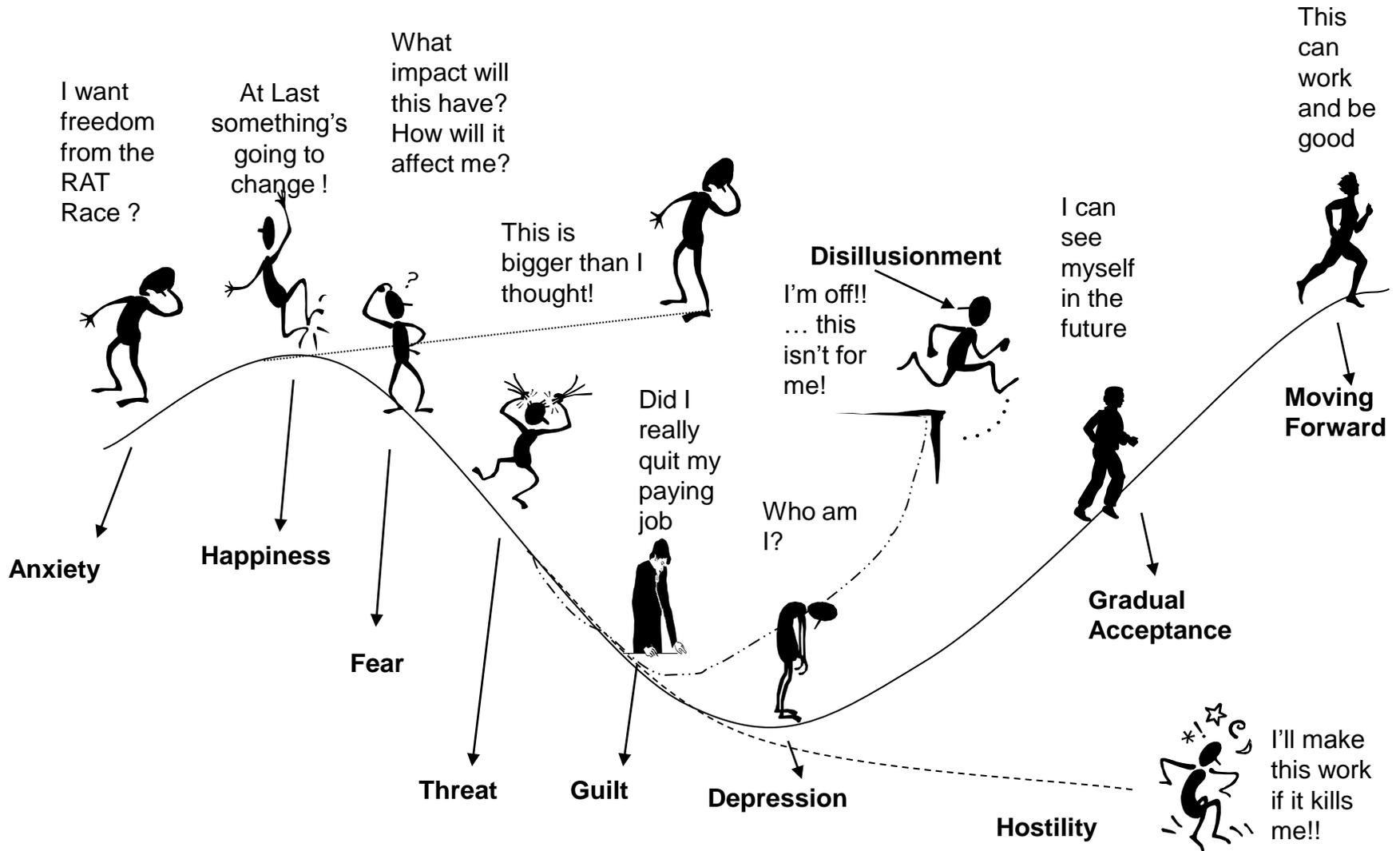
# Four Benefits Come From Systems Engineering a Business Model

- Less time to develop business model than By Guess & By Golly Method
- Fundable by sophisticated venture investors
- Scalable to large market segments
- Early profitability

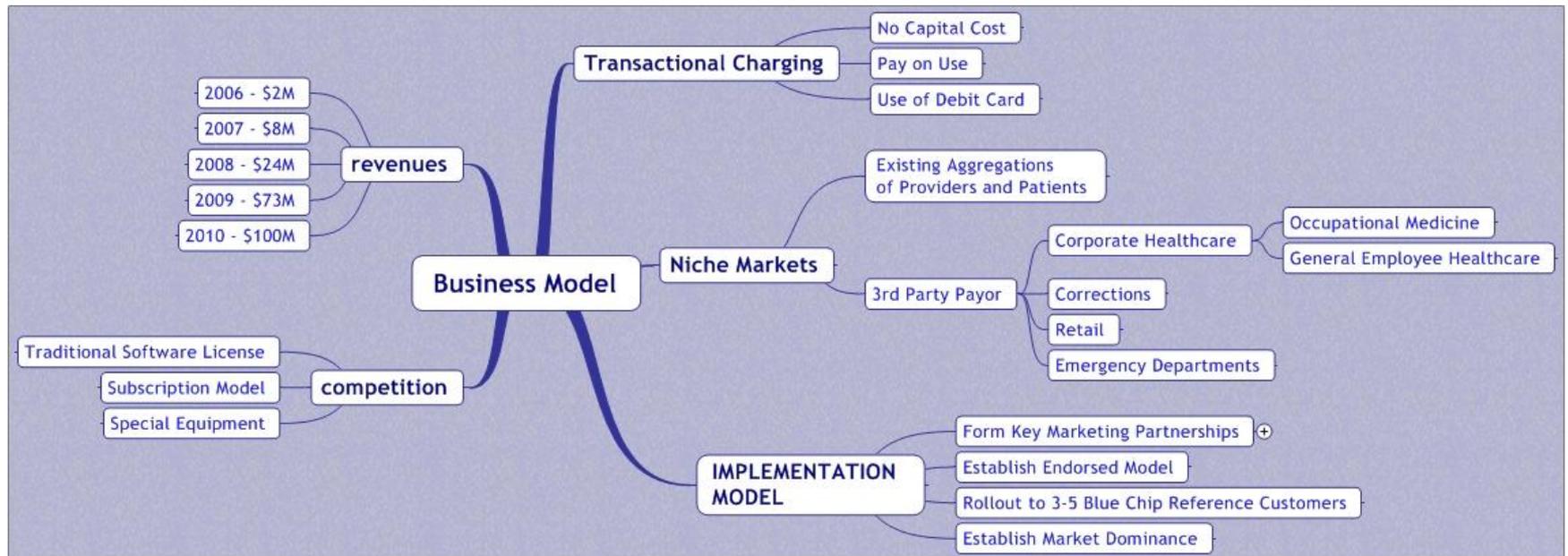
# A Business Model is Framework Plus Use Cases

- the architecture for the product/services and the information flows
- includes a description of the various business actors and their roles, and a description of potential benefits for the actors
- describes the revenue processes

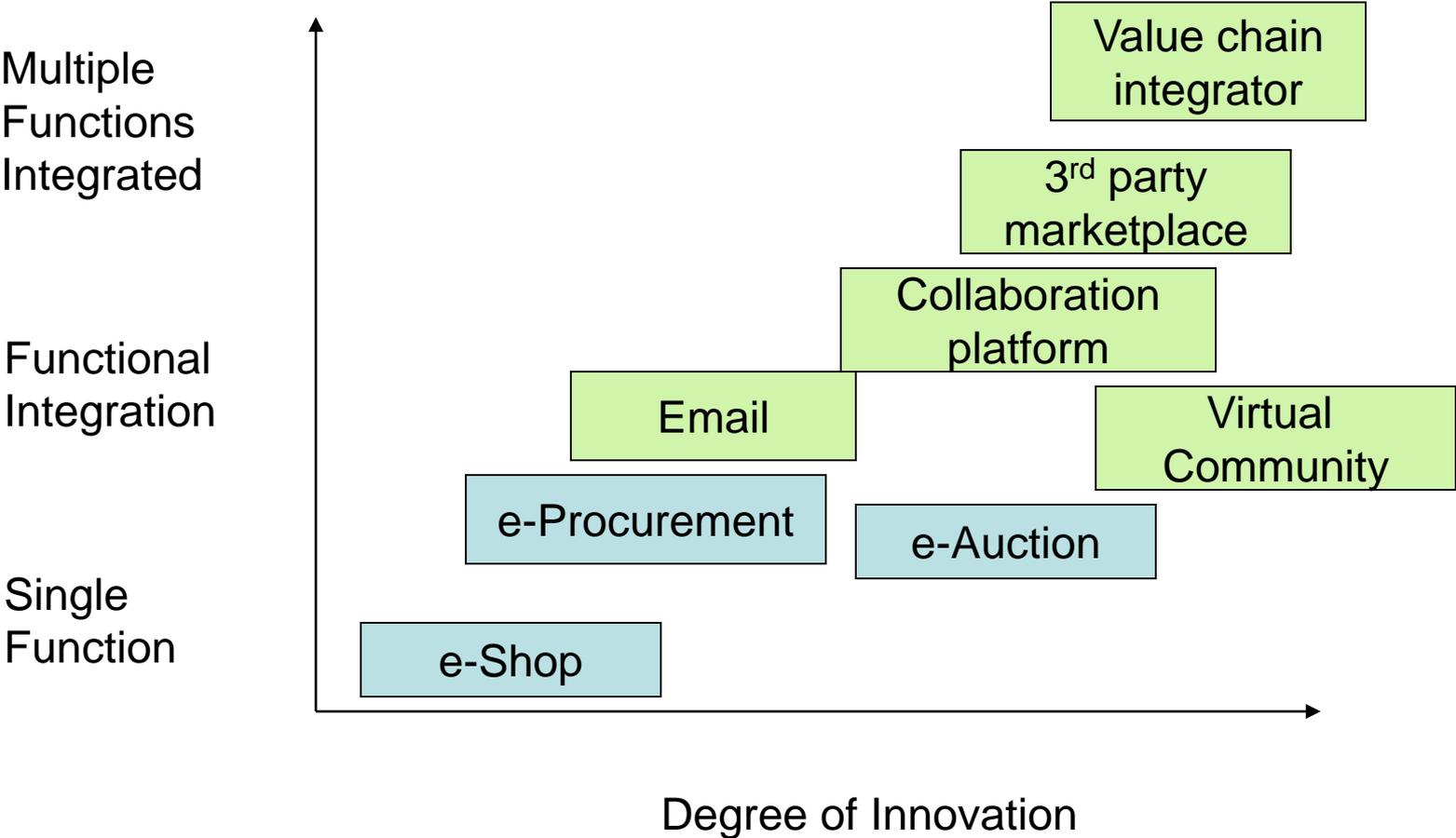
# The Art of Becoming an Entrepreneur



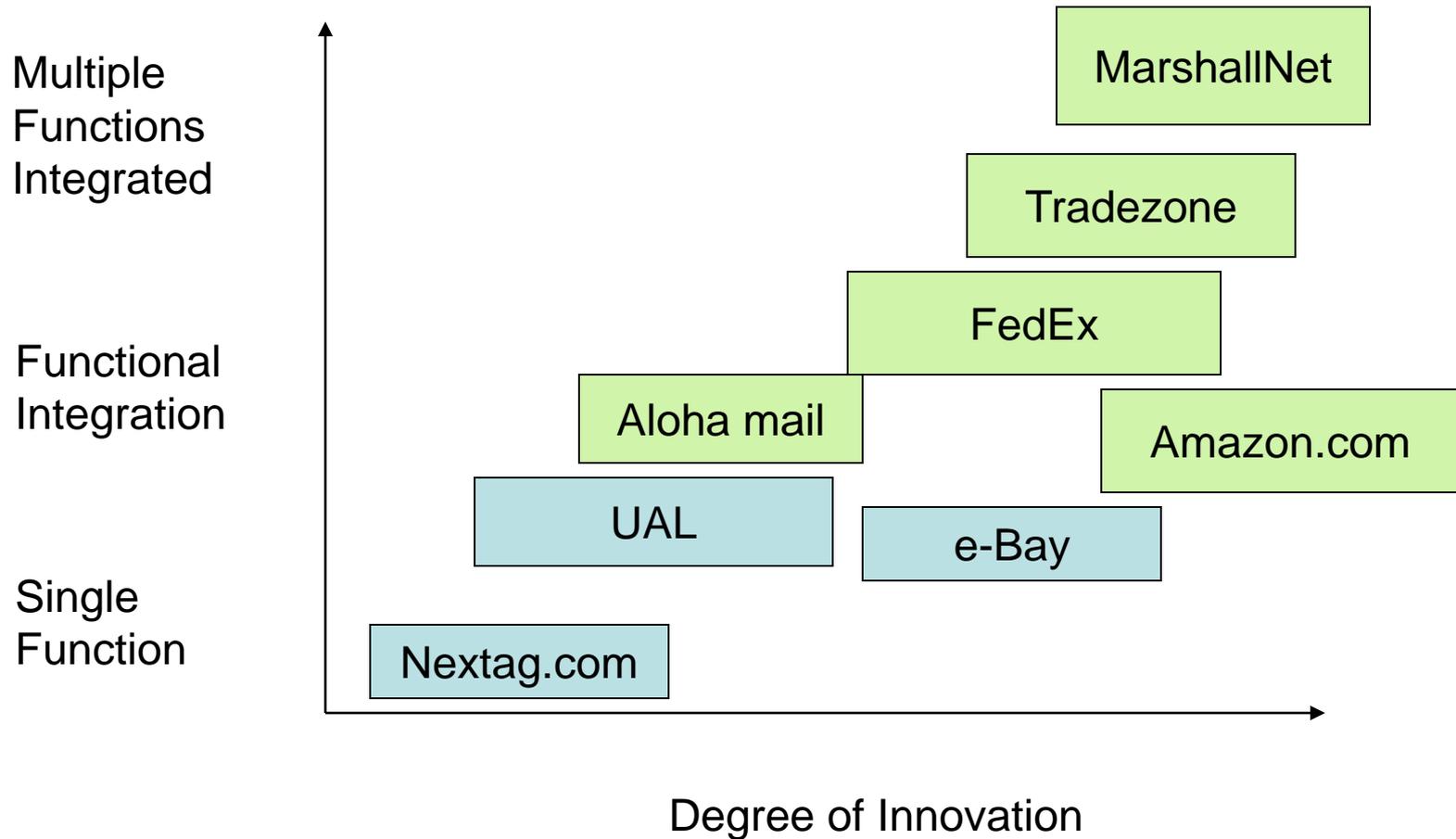
# Business Model Tracks \$ and Sense (markets, competition, implementation)



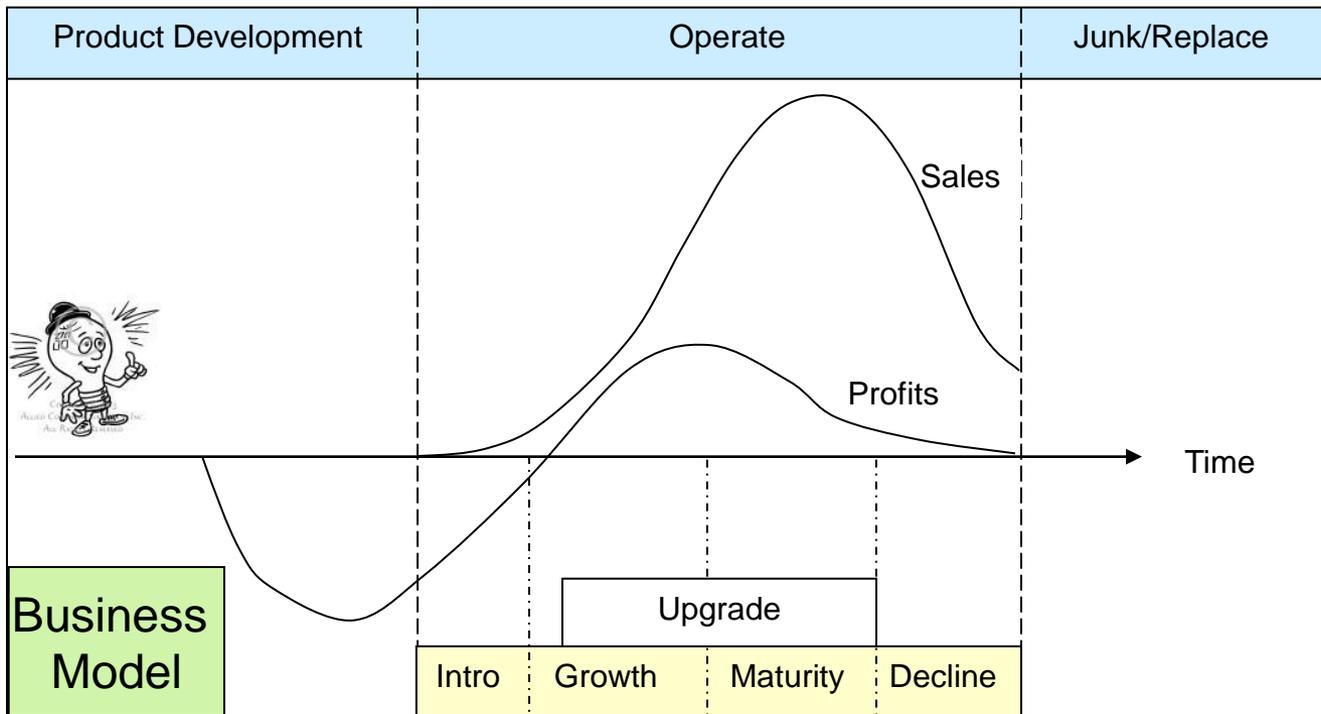
# Classification of Business Models



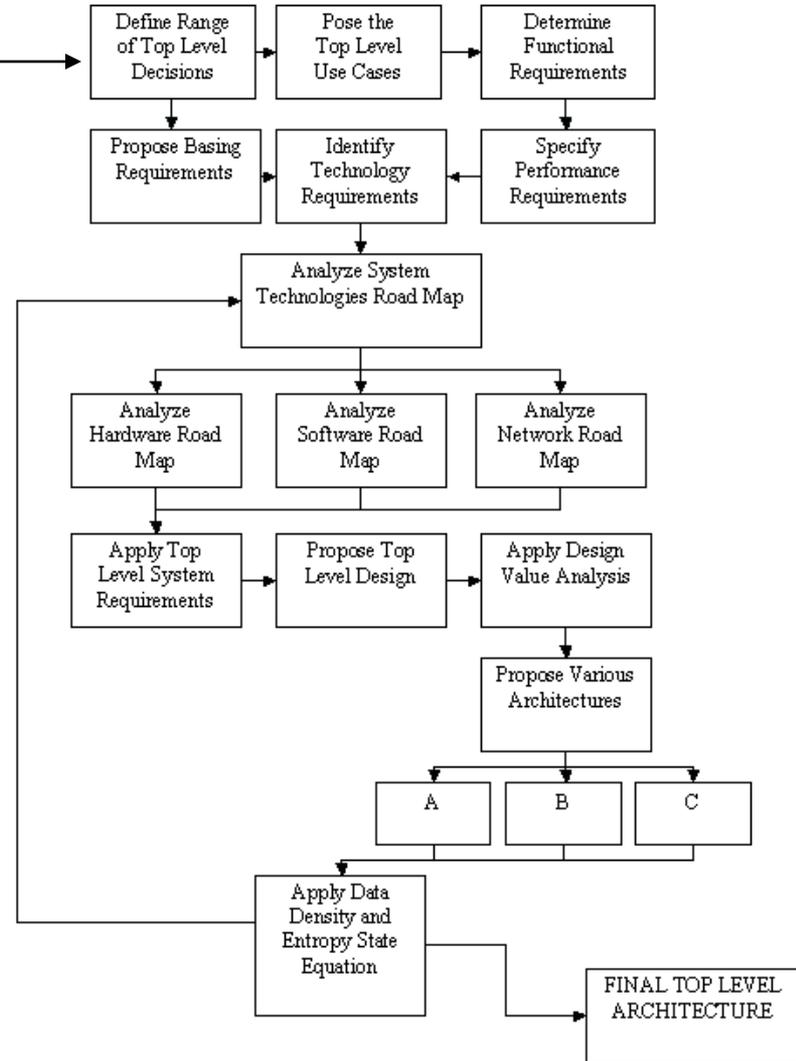
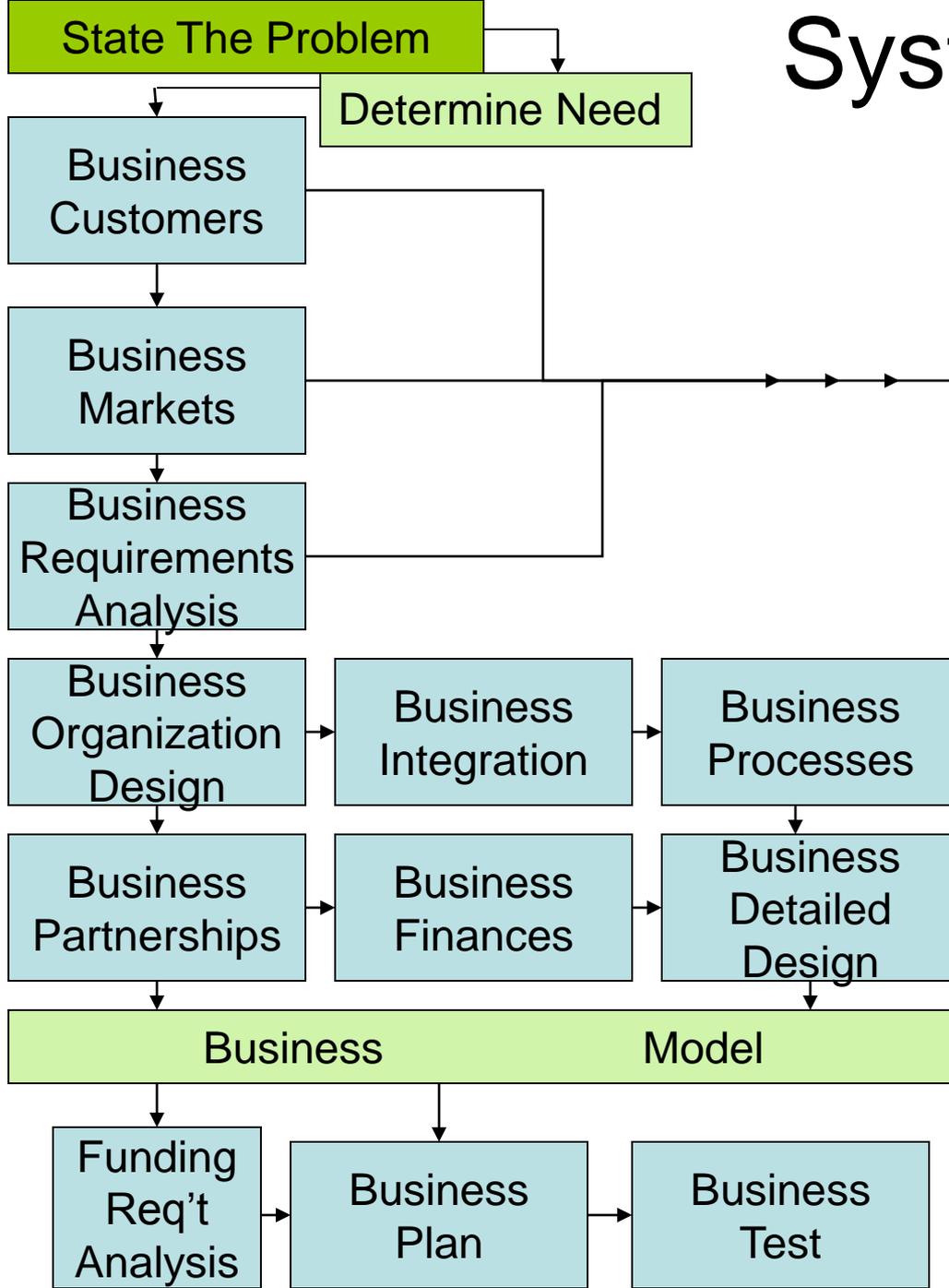
# Examples of Business Models



# Product Life Cycle



# Systems Engineering Process



# Problem Defined

Whenever there is a **Difference** between what can be done and what you want to do, **AND** you do not know how to achieve the desire, there is a **Problem**.

# HOW TO Start ?

I have a

**VISION**

of something that I

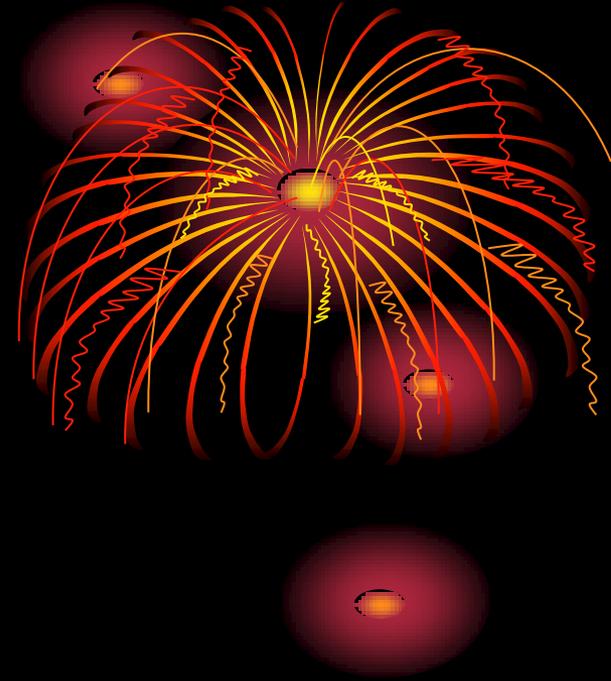
**WANT** or **NEED**

satisfied by

**IT**

which is different than I

**HAVE**



# HOW TO State the Problem

- What does IT solve?
- Who has the problem that needs to be solved by IT?
- Why is there a need for IT?
- What does IT do?
- Who uses IT?
- When will IT be purchased?
- Who will purchase IT?
- Who will use IT?
- How is IT used?
- Where is IT used?
- When is IT used?
- Why would the user not use IT?
- Why would the buyer not purchase IT?
- What is the minimum IT that would be purchased?
- What is the minimum IT that would be used?
- What are the competitive ITs?
- What had been done about the problem before?
- When did the problem arise?
- How long does IT have to be a viable solution to the problem?
- What would the world be like if the problem did not exist?

1. Become the "customer/consumer advocate / surrogate".
2. Do not assume the original statement of problem is necessarily best, or even right.
3. Determine customer priorities (schedule, performance, cost, risk, preferences, and assumptions).
4. Have to face sessions with the different customer / consumer groups.

**and then**

- Does a problem really exist?
- Do I have all the facts?
- Have all the supporting facts been checked for correctness?
- Can this problem be fractionalized into smaller components?
- Is there a logical explanation for the cause of the problem?

# No Problem, No Business

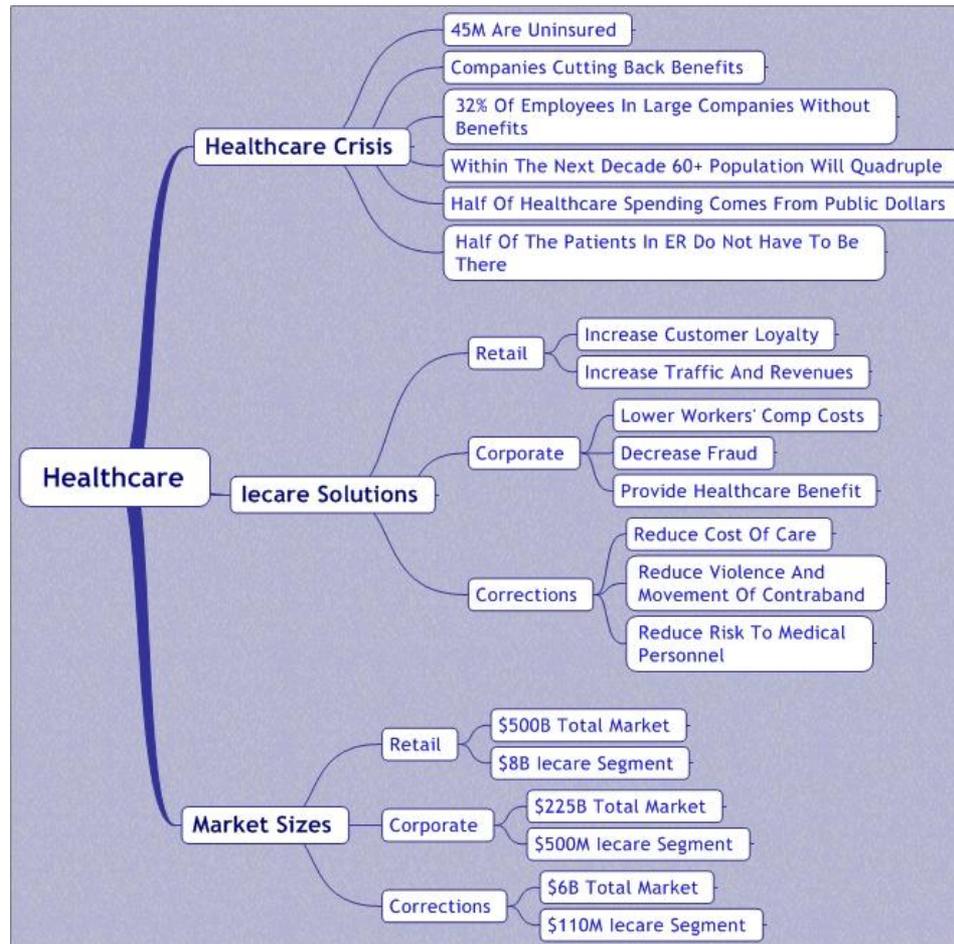
- If you do not have a real or contrived problem defined, YOU DO NOT HAVE A BUSINESS.
- Why...Because NOBODY CARES.
- No Business Model alive will save you.

# Systems Engineering and Healthcare e-Business

# Health Services are Inaccessible to Most Patients - Inconvenient

- Constraints of time and place limit access
- Insufficient access for poor and working poor
- Most are unable to access basic medical services outside the business day or in a convenient manner
- Long wait times in emergency rooms – people next to you are very sick
- Healthcare is expensive (tell me about it)

# Top Level Business Model Outlines The Problem



# e-Business May Be Key to Healthcare

- Overall better health outcomes
- Lower costs for higher quality care
- More effective communication - doctor/patient
- Time and place of treatment can be negotiated
- Faster access to doctors
- More effective follow-up care
- Patients manage their own healthcare

# What is an e-Business?

The use of software applications and digital communications to support the exchange of value between participants (goods and services for payment).

## e-Business is a NEW Delivery Channel

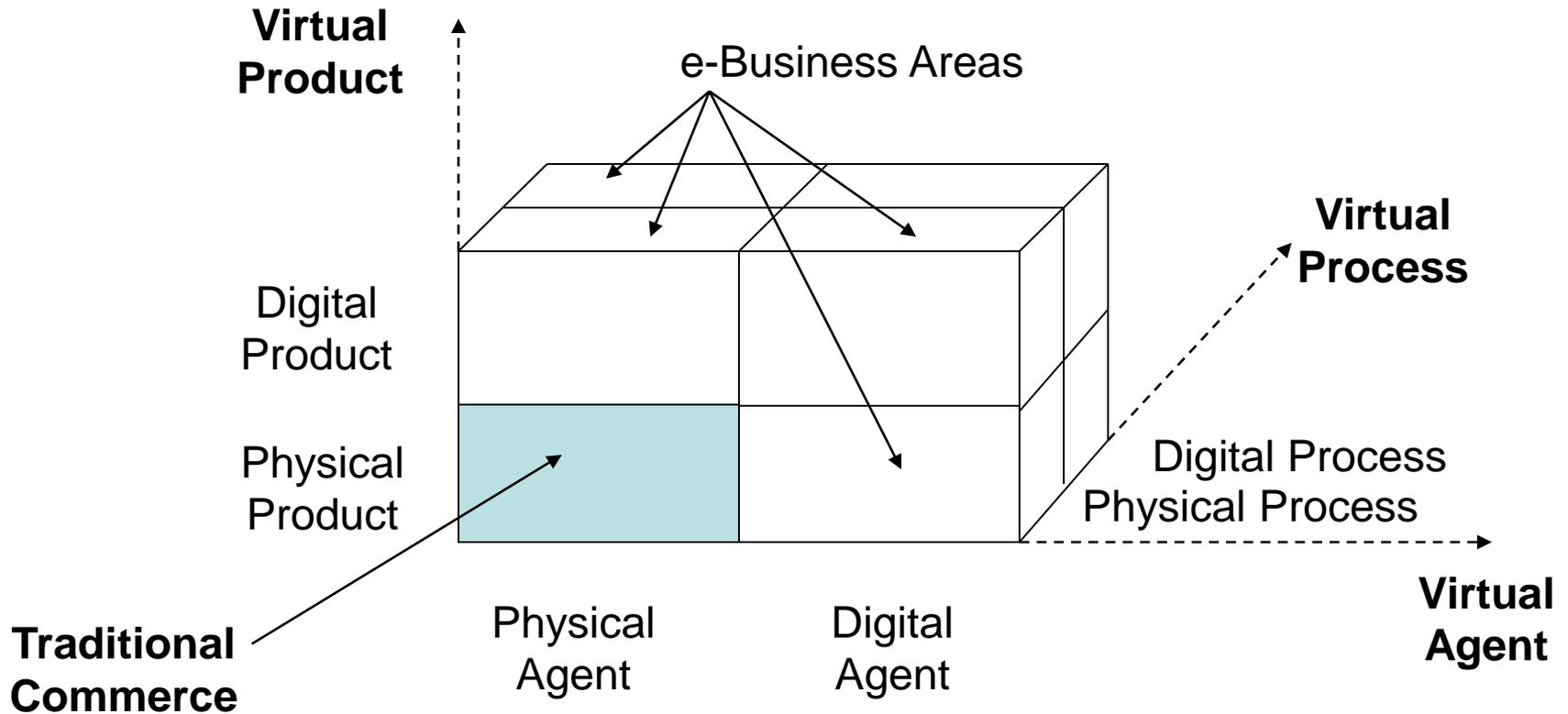
The core composition of an e-Business is:

- Value Proposition (customer's problem and value given the solution)
- Logistics
- Relationships
- Service Distribution Channels
- Transformed Capital and Cost Structures
- Branding

# Advantages Plenty for e-Businesses

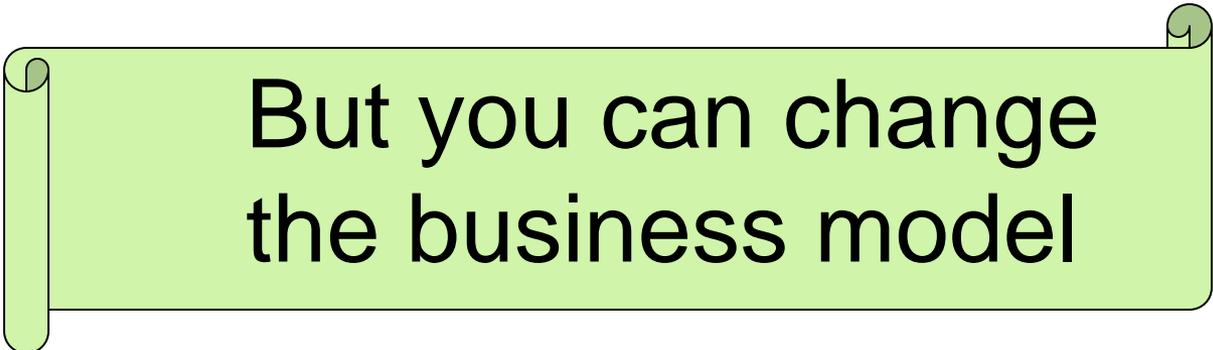
- Wider potential market
- Lower sunk costs
- Better economies of scale
- Network externalities
- Transaction automation
- Rapid response to market
- Capturing data on users
- 7 days, 24 hour operations
- No limitation on information

# e-Business Builds Service, It is not Commerce



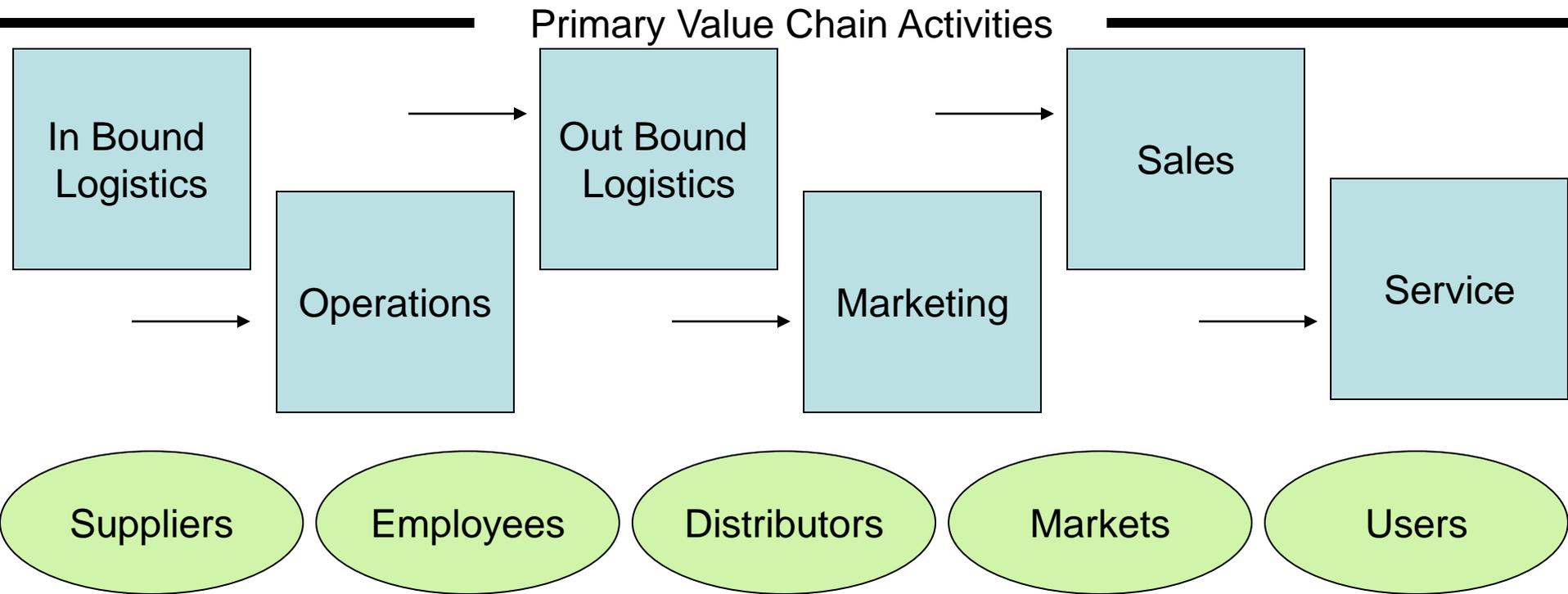
# e-Businesses Must Follow Basic Business Theories and Practices

- Transaction Cost Economics
- Value Chain Concept
- Modularization of Corporations
- Start-ups Versus Traditional Firms



But you can change  
the business model

# Converting Value into *Profit* is Bottom Line in Commercial World



# The Five Dimensions of e-Business Exemplify Advantages

- Phased in adoption
  - Readiness
  - Intensity
  - Impact
- Technology
  - Infrastructure
  - Transmission
  - Applications
- Market (Actors)
  - Administration
  - Business
  - Customers
- Products
  - Tangibles / Intangibles
  - Material / Immaterial
  - Specificity: location, physical, personal time
- Processes
  - Information
  - Appointments
  - Web Consultations
  - Payment
  - Order fulfillment
  - After-consultation interactions and sales
  - Personal management of records



# Some Could Benefit From Immediate Access to Doctor

1

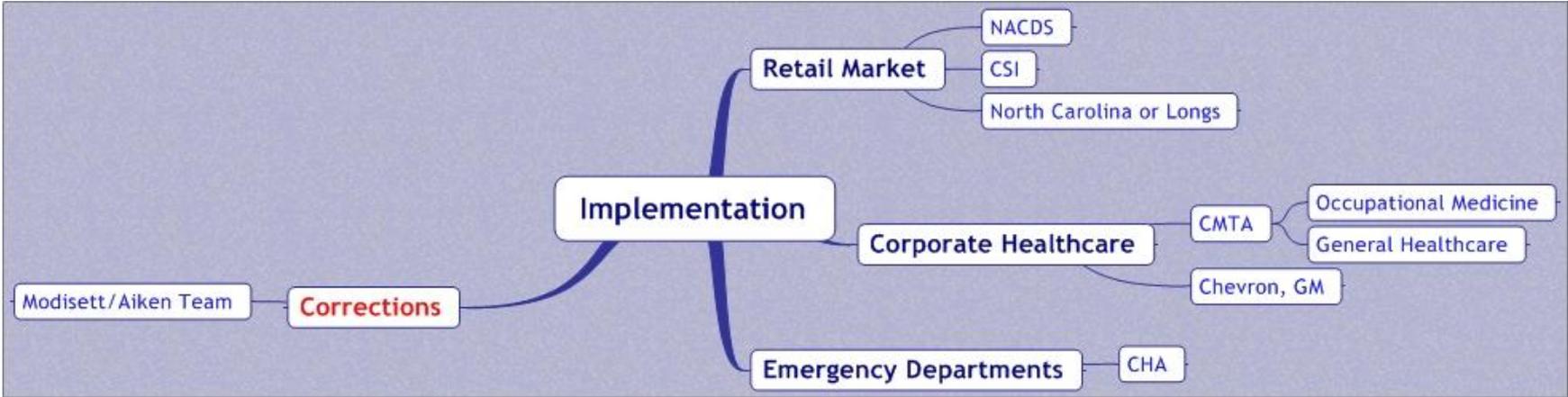
## *Immediate Treatment on the Web*



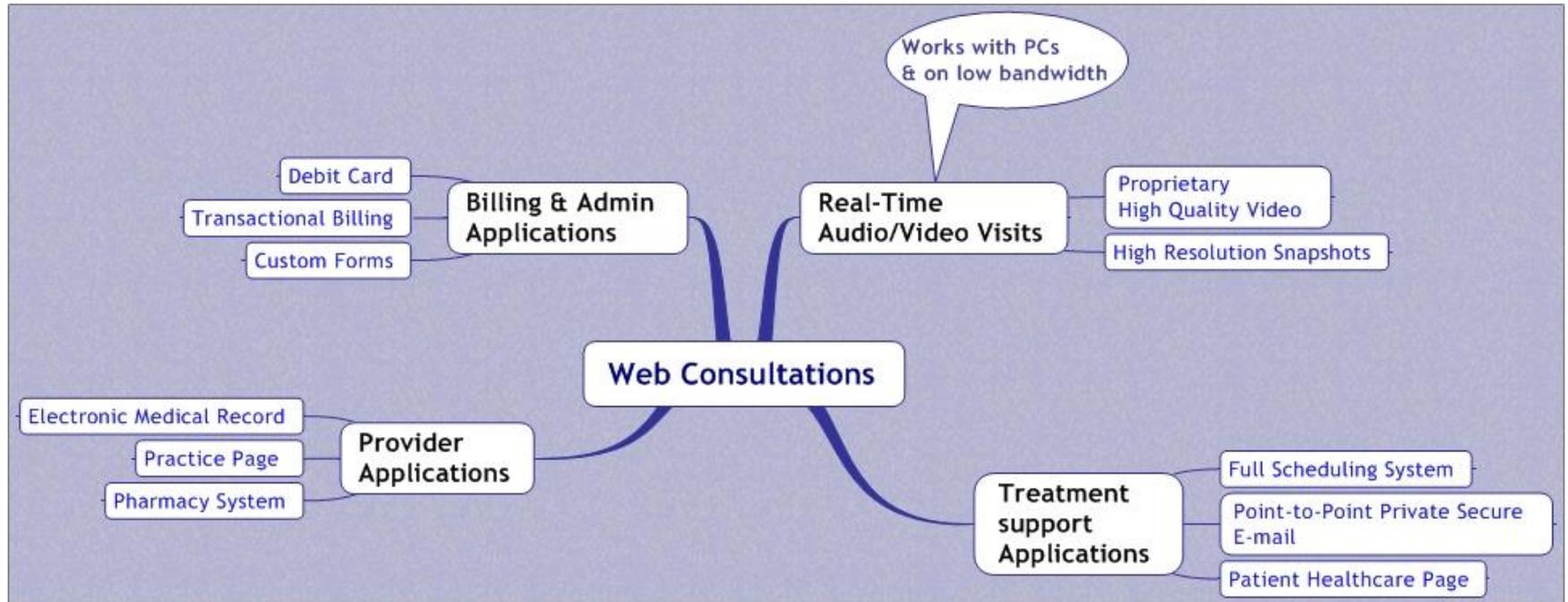
CSI kiosk for retail market



# VC Care About Implementation of Business Model

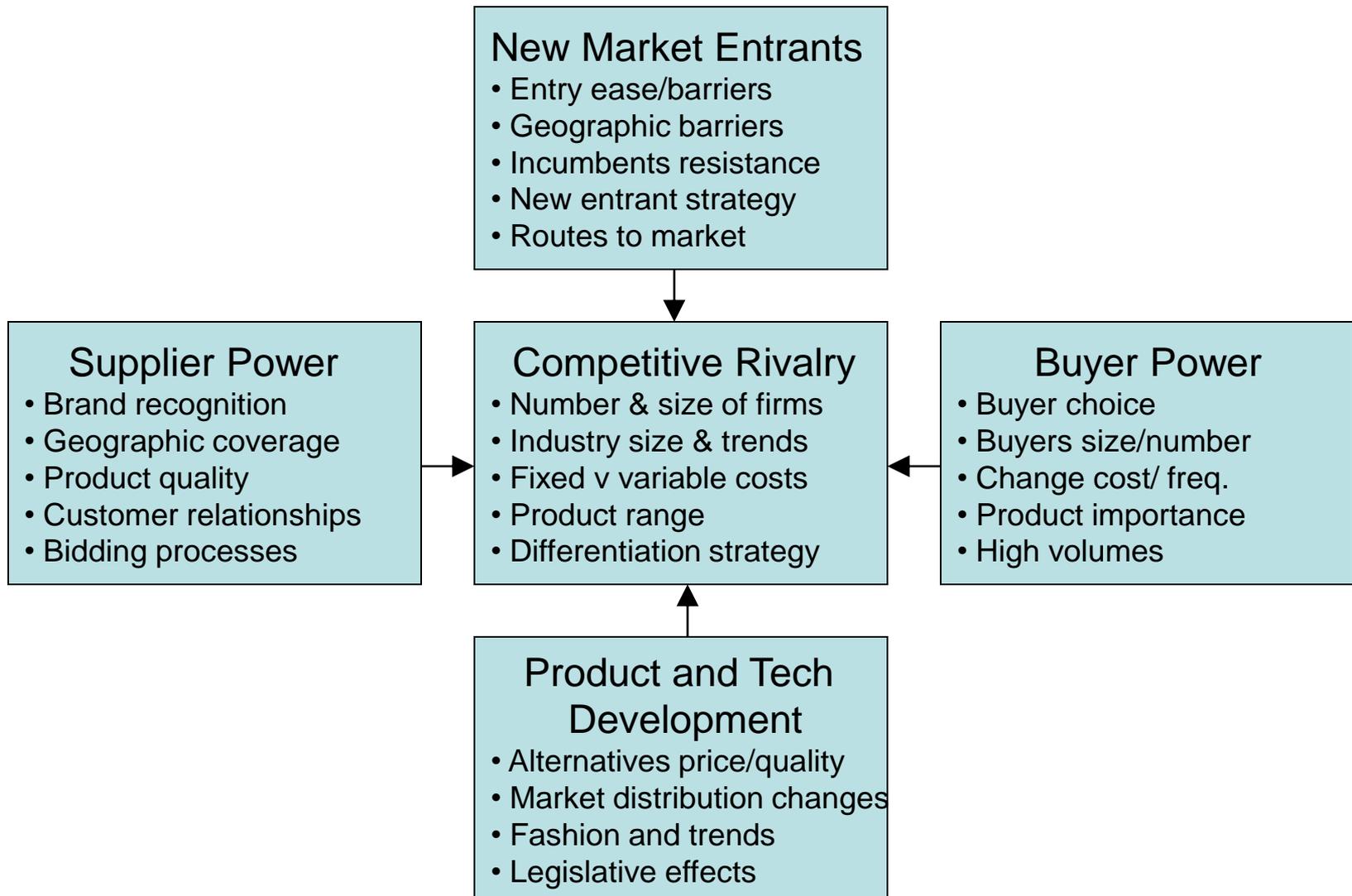


# Position Product Against Competition To Achieve Max. Market Share

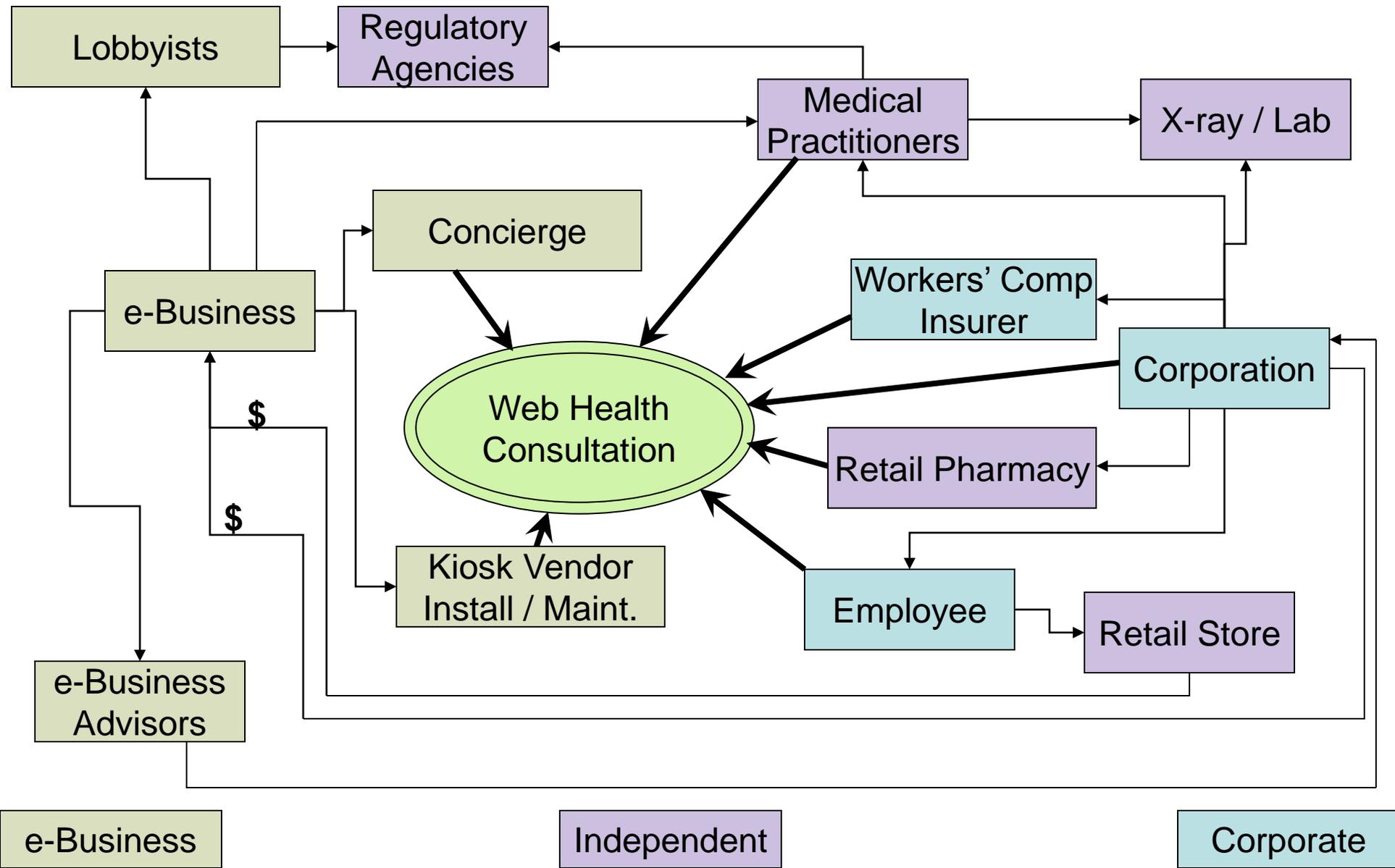


This Drives Requirements

# Product Must Have Strong Competitive Positioning

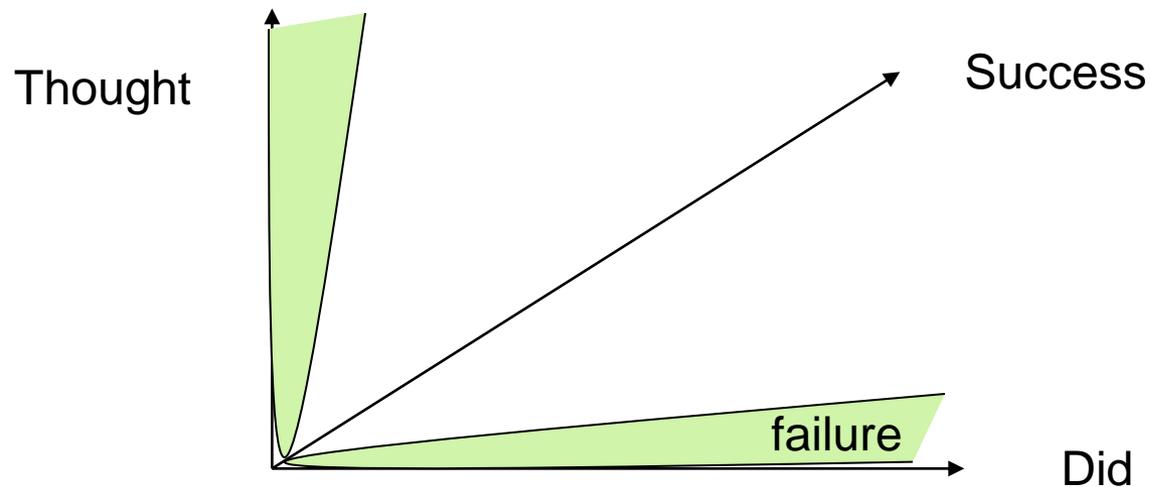


# Business Model for e-Healthcare



# Venture Capitalists Fund Business Models, NOT Good Ideas

- Those who thought and never did
- Those who did and never thought
- Those who thought and did



# Boiled Down to Bare Bones, You and VC are in Causal Relationship



But Don't Cause The VC a Problem

# Langford's Silly Rules

- The customers are not always right, but they are never wrong.
- A program manager without enemies is a PM without character and ethics.
- Measure people not by where they have worked, but rather what they have learned from the journey.
- You are only as good as the product you deliver.
- Work hard, work smart, but work work work.
- Winning is not everything, it is the ONLY thing.
- There's plenty of time to rest when you're dead.
- Business Models are like Gold.

# Tips to Sell Ideas to VC

- Focus Business Model on the concept of Value
  - Use value
    - Properties and qualities of business which accomplish a use
  - Esteem value
    - Properties, features, or attractiveness which cause VC to want to invest
  - Cost value
    - Sum of labor, material, and other costs required to reach a profit in a short period of time
  - Exchange value
    - Properties or qualities which enable VC to sell their stock

# Success is...

<b>Entrepreneur</b>	<b>Developers</b>	<b>Customers</b>	<b>Individual</b>	<b>Age</b>
Not missing a requirement	Not missing a requirement	Not missing a requirement	Not peeing in your pants	Age 4
Forming an effective team	Working effectively on a team	Forming an effective team	Having friends	Age 12
Forming an effective process that results in a successful conclusion	Working within the processes to meet schedule	Maximizing the tools and resources provided	Having a drivers license	Age 16
Successful tests	Successful tests	Successful tests	Having sex	Age 20
Getting first round VC money	Working on other contracts to stay employed	Promotion with increasing responsibility	Having money	Age 35
Liquidity event: buyout, additional funding, acquisition	Participating in a broader range of contracts for complex systems	Providing leadership to help and encourage others	Keeping money	Age 50
VC fund your other ideas and make you CEO	Winning respect from co-workers	Presidential Appointment / Senior Statesperson	Having sex	Age 60
Personally fund others / Mentor	Leave the world a little better	Honorably meeting objective with ethics and value	Not peeing in your pants	Age 80

# Parameters for a VC Fundable e-Business Model for Healthcare

- Automation of traditional office visits
- Reliability and ease of mode of payment
- Customer friendly situations
- Professional services available
- Global reach
- Regional diversification and tailoring
- Retail conveniences
- Integration of internal business operations
- Controlled releases of product offerings
- Promises kept

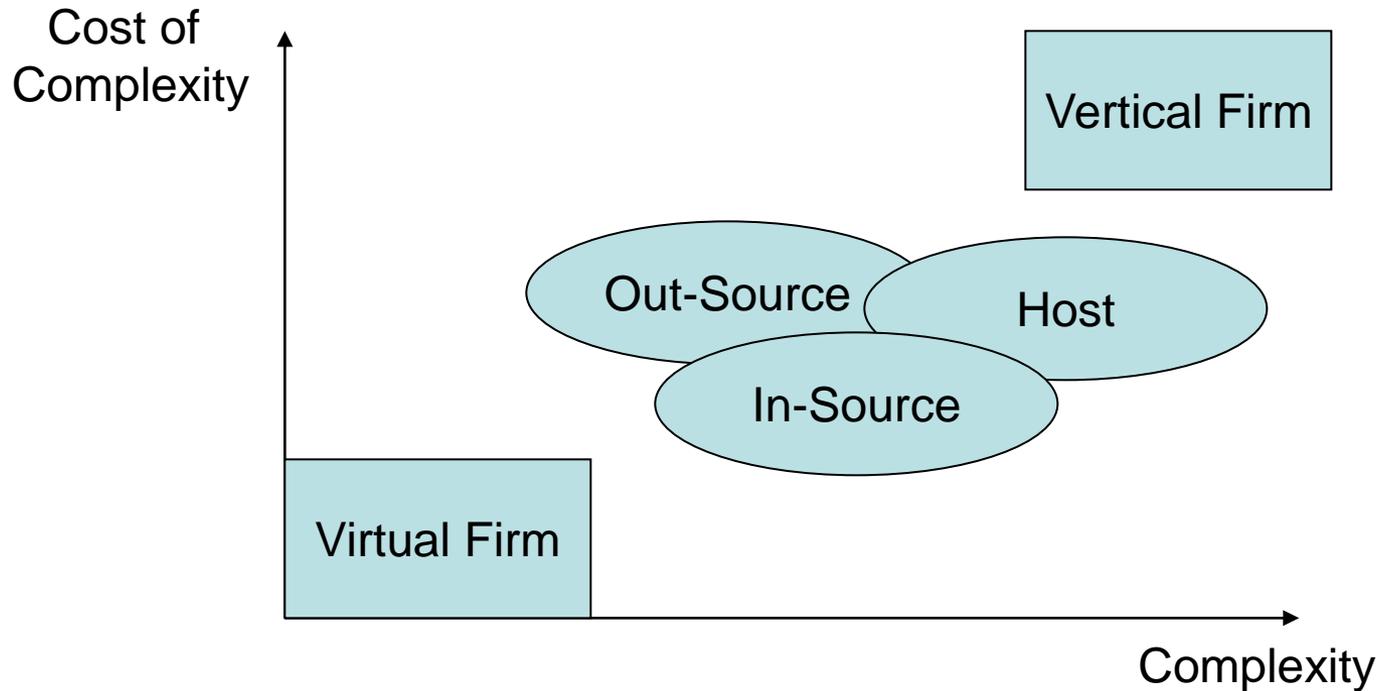
# What is the Confidence That? VC Want to Know, So Should You

- Product is wanted in niches by anyone
- Product has sufficient value for its price
- Product priced is less than 15% of competitor's
- Advertising message is correct to get sales
- Effective word-of-mouth advertising
- Management is focused on product
- Product is in long-term interests of mgmt.
- Venture will return 3X in 3 years/8X in 1 yr.
- Product manufacturing cost can be lowered
- Company can be lowest cost manufacturer
- Product is easy to understand
- Company can satisfy regulatory requirements
- Securing outside investments sufficient to sustain growth
- Vendors will supply parts and software on schedule/budget
- No key items will be obsoleted or unsupported
- Legislation is pending that impacts business

# What is the Confidence That?

- Company's story will appeal to investors, employees, partners
- Have access to resources when needed
- Product upgrades will maintain or enhance market position
- Can upgrade and innovate without change in product image or advertising message
- Image is culturally appropriate here and elsewhere
- Distribution channel strategy is sufficient to access an ever increasing number of customers
- Product has appropriate support and warranties
- Product is positioned not to compete with recognizable brands
- Product performs are advertised for as long as valued by customer
- Product degradation over time is accepted by customer
- Product does not change existing habits

# e-Business Firms Require Less Time to Maturity and Lower Costs



# Product Life Cycle Has Three Major Stages

- Development Stage (begins when you find and develop an idea)
- Operated Stage
  - Build product awareness and develop a market for the product
  - Growth
  - Maturity
  - Decline
- Junked or Replaced Stage

# Product Development

- **Product Development (begins when you find and develop an idea)**
  - Requirements
  - Concept
  - Design
  - Development
  - Build / Manufacture
  - System Integration
  - Test
  - Operation, Maintenance
  - Modification
  - Dispose / Replace

# Operations Stage (Introduction)

## **Build product awareness and develop a market for the product**

- Product branding and quality level is established, and intellectual property protection are obtained
- Pricing may be low penetration pricing to build market share rapidly, or high skim pricing to recover development costs.
- Distribution is selective until consumers show acceptance of the product.
- Promotion is aimed at innovators and early adopters. Marketing communications seeks to build product awareness and to educate potential consumers about the product.

# Operations Stage (Growth)

## **Market Growth (build brand preference and increase market share)**

- Product quality is maintained and additional features and support services may be added.
- Pricing is maintained as the firm enjoys increasing demand with little competition.
- Distribution channels are added as demand increases and customers accept the product.
- Promotion is aimed at a broader audience.

# Operations Stage (Maturity)

**Maturity Stage (strong growth in sales diminishes. Product may be repositioned to broaden audiences and uses)** Objective: increase economies of scale to lower costs and extend the product life.

- Product features may be enhanced to differentiate the product from that of competitors.
- Pricing may be lowered because of new competition.
- Distribution becomes more intensive and incentives may be offered to encourage preference over competing products.
- Promotion emphasizes product differentiation

# Operations Stage (Decline)

## **Decline Stage (various options)**

- Maintain the product, possibly rejuvenating it by adding new features and finding new uses.
- Harvest the product – reduce costs and continue to offer it, possibly to a loyal niche market.
- Discontinue the product, liquidating remaining inventory or selling it to another firm that is willing to continue the product.

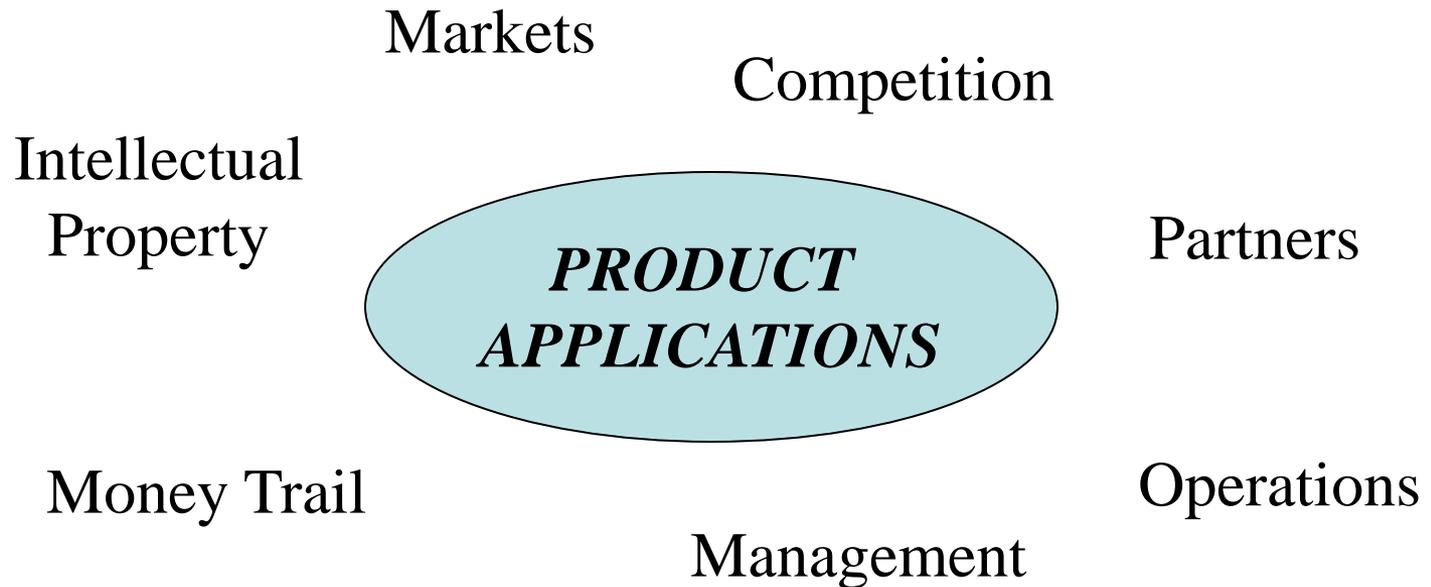
# Research is tough

- Time consuming
- Need keen sense of what should be included and excluded in
- Requires close observation and analysis
- Historical perspective



**Beer**

# Business Model = Architecture Overlaid With Use Cases



# Attributes of Business Models

- Business models convert ideas to economic value
- Business models are a form of intellectual property that can be patented as a business method, and bought and sold

## Business Model

- Create value for company and customers
- Results in business architecture
- Limited knowledge of business environment

## Strategy

- Builds sustainable competitive advantage
- Delivers business (economic) value to shareholders
- Requires more certainty of business environment