TE 250: Week 7
Market Validation

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Agenda

- Assignments – Past/Present/Future
- Ecosystem Mapping
- Market Validation
- Examples
- Team Work Time
Homework policy

• Receiving a lot of late submissions – getting too confusing
• Late assignments accepted but at 50% penalty to grade would have received if on time.
  • 8/10 becomes 4/10 etc
• Missing in-person class presentation results in 50% penalty unless absence is excused according to university policy (assumes you participate online)
• Missing in-person class presentation completely results in 0 unless absence is excused according to university policy
• Excused absences will be made up with additional assignment
Assignment #3 – Individual Assignment

• Build a petal diagram to highlight your competition and

• Perform a SWOT analysis for your team’s idea.

• This is an individual assignment, not a team assignment.

• Submit in any format you prefer, graphic or list.
Assignment #4 – Individual Assignment

Draft 3 value propositions for 3 different stakeholders within the same industry/customer segment (9 total). Use the VP format provided in class.

Pick one role/VP that best represents the PRIMARY VP best. Now complete a Business Thesis Template format as provided in class (Elevator Pitch).

The Business Thesis Template is available in the Resources Tab in Compass as well.
Assignment #5 – Individual Assignment

- Build a Customer Interview Plan Template
- Use the provided Customer Interview Plan Template as a guide
- Completing it as a guide for your first 2-3 team interviews
- In subsequent weeks, your team will "divide and conquer" to complete more interviews.
- At this point, use the template individually to prepare for your own personal interviews.
- Note due date extended to Saturday Mar 5
Interview plan example

- INTERVIEW TOPICS (you won’t cover all of these in any given interview)

- CURRENT ECOSYSTEM/MARKET UNDERSTANDING
  - Process (Information, S’s, Product/Materials or Service): typical day, steps, dependencies, flows, timing, bottlenecks, things that go smoothly, interruptions/pauses. Place in overall system/ecosystem, key equipment, important system resources.
  - Question 1: Tell me about your school.
  - Question 2: Tell me about a typical day in your classroom.
  - Question 3: Tell me about a typical lesson or lab that utilizes microscopes in the lesson.
  - Question 4:
  - Question 5:
  - People: roles, titles, interactions, key players
  - Question 1: Tell me about how your microscopes are purchased and maintained.
  - Question 2: Who decides how much can be spent on microscopes? When is that decision made?
  - Question 3: Who decides where to purchase microscopes?

- CURRENT HYPOTHESIS/ASSUMPTIONS TO TEST
  - Problem/Needs: You are trying to uncover problems that are big enough that they MUST HAVE your solution. Think about: satisfaction, dissatisfaction, problems, needs, quality, delays, excessive costs, what best performance looks like, what upsets the system?
  - Pains (with detail about magnitude and who else is affected)
  - Question 1: What is the hardest part of teaching a lesson that uses microscopes?
  - Question 2: How often do microscopes get damaged during class?
  - Question 3: What is the hardest part of maintaining and storing microscopes in your school?
  - Question 4: What happens if the students can’t finish their work during class because of limited supply of microscopes?

  - Potential Gains (with detail about what a better system might look like)
  - Question 1: If you could make one change to teaching lessons or labs utilizing microscopes that would have the biggest positive impact on student learning, what would it be?
  - Question 2:
Interview plan example

- **Value Proposition** Test/validate hypotheses on the value your product or service provides. When you can connect pains and gains with your value proposition statements, ONLY THEN have you figured out how to communicate the value of your product/service.

- **Value Prop A: unlimited microscope availability** Question 1: We have been talking to teachers like you about having enough microscopes in classroom so that each student has their own device. How do you think this might change learning outcomes?

- **Value Prop A: unlimited microscope availability** Question 2: How would having the ability to have microscopes for your classroom for only the time you need them impact your classroom space or layout?

- **Value Prop A: unlimited microscope availability** Question 3: How would eliminating microscope repair costs and hassles free up time in your schedule?

- **Value Prop B: utilize smart phone for microscopy** Question 1: Tell me about your students smart phone use.

- **Value Prop B: utilize smart phone for microscopy** Question 2: How do you incorporate technology like smart phones, tablets and the internet in your teaching plans?

- **Value Prop B: utilize smart phone for microscopy** Question 3: How might your teaching plans change if student had access to microscopes at home when doing their homework?
Each team will give an 8-10 minute (max) presentation in class on March 9.

- The presentation might cover:
  - 1. Market Validation
  - 2. Competitive Analysis
  - 3. Target Customer Segment(s)
  - 4. Key Value Prop(s)
  - 5. Business Model Canvas (focus on VP & CS) or Value Prop Canvas
  - 6. What's next? Advance, pivot, redirect, etc.

- It's a good idea to address all topics listed above, but the order and format for presenting is up to you.
- The team can break up the material or you can elect one or two individuals to deliver everything.
- You may include any additional information that you feel is relevant, such as an ecosystem map.
- There is no rubric. I'm not concerned with you completing a checklist, but instead making a case for what you feel is important to your analysis.
- You MUST be concise since timing is limited and you will be cut off if you run over.
- Time will be provided in class on March 2 to work on this project.
Team Presentation
Order

Lottery Draw
Case Study; Due March 22, Individual Assignment

• Read the Trexel case study found in the appendix of BDN (Resources folder).

• Appendices --> B. Cases --> Trexel (PDF p.539)

• At the end of the case study, answer Question #3 (PDF p. 558): What criteria should you use to evaluate the projects at Trexel? Which project (molded structural foam, injection molding, blow molding, PVC extrusions, or meat trays and food packaging) should Bernstein recommend to the board? Why?

• Be sure to support your position. There is a strong case to be made for all options and no choice is right or wrong. I'm most concerned with your rationale supporting the application you chose, as well as why you declined the other options. 1-2 total pages should be sufficient. Due March 22.
Agenda

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• Market Validation
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This is the first ecosystem map most of us saw
Ecosystem – Our working definition

How your product interacts with the world once it is in the hands of the customer.
So how do we build one?

• Start with a list of anyone who you think might play a role in your ecosystem (your stakeholders)
  • Customers
  • Suppliers
  • Distributors
  • Servicers
  • Infrastructure/platform providers
  • ...

• Learn how they interact
An example from the agricultural equipment industry. Equipment sellers like to show harvest running like this:
However... there are logistical, equipment and traffic challenges...
Grain Harvest Logistics Ecosystem – who should we consider?

• Farmers
• Combine Operators
• Grain Cart Operators
• Grain Truck Drivers
• Public Grain Elevators
• Farmer Owned Grain Storage
• Grain Originators (learn the vernacular!)
• ...

(learn the vernacular!)
A simple map for the farmer during harvest

- Combine Operator
- Grain Cart Operator
- Grain Truck Operator
- Grain Originator
- The Farmer
- Private Grain Facility
- Public Grain Facility

ILLINOIS
What goes where?

- Combine Operator
- Grain Cart Operator
- Grain Truck Operator
- Grain Originator
- Private Grain Facility
- Public Grain Facility

Grain
What goes where?

Combine Operator

Grain Cart Operator

Grain Originator

The Farmer

Public Grain Facility

Private Grain Facility

Grain Truck Operator

Grain
Money
What goes where?

- The Farmer
- Grain Originator
- Combine Operator
- Grain Cart Operator
- Grain Truck Operator
- Private Grain Facility
- Public Grain Facility

Grain, Money, Information
Insights and takeaways

• The map is a tool to help you achieve an understanding of your ecosystem by making it visible.

• Use it to help figure out
  • Who the players are
  • Who you need to interview
  • What to ask them about

• The map will change as you learn more
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Define the Market

- **Total Addressable Market**
  - The entire universe

- **Segmented/Served Available Market**
  - Those in my channel

- **Served Obtainable Market**
  - AKA Share Of Market or Target
  - Likely buyers
How big is the pie?
Assumes 100% of applicable customers adopt your solution

- How many people want/need the product?
- How large is the market (in $$s) if they all bought?
- How many units would that be?
How big is my slice?
Assumes all customers buying either a competitors solution or a substitute

- How many people need/can use my product?
- How many can afford it?
- How large is the market (in $$s) if they all bought?
- How many units would that be?

TAM
Served Available Market
How much can I eat?
the initial market you hope to address where your solution has the strongest value proposition and competitive advantage assuming everyone purchases

• Who will I sell to in first years?
• How many customers is that?
• How large is the market (in $$s) if they all bought?
• How many units would that be?
Key Points

• TAM must be relevant
• Must be congruency between TAM/SAM/SOM
• Don’t just assume a certain percentage
• SOM/Target is the MOST critical
• SOM/Target will be bigger than the sales you project to achieve
## Two Approaches Market Sizing

### Top Down
- Secondary Research Anchored
- Most applicable to existing (similar), re-segmented, clone products/markets
- Similar or adjacent market data available
- Process – Guess/Assume
  - Smallest addressable segment matching product attributes
  - Market share and growth rate (how many?)
  - Pricing relative to available competition (how much?)
  - Market growth rate
  - Resource constraints

### Bottom Up
- Primary Research Anchored
- Only option for new products/markets
- Limited or no specific market data available
- Process
  - Starts (and ends) w/ Customer Discovery
  - Defining your Archetypes Demographics, Psychographics, Behaviors & Reqs
  - Insights into how to define segments
  - Enables identification of beachhead market – “must have” reason to buy
  - Validates value pricing, full product offering, competitive differentiation
  - Allows for better assumptions on market sizing (how many) and financial model (how much)

### Often Misused

**Often ONLY and best option**
## Top Down Market Sizing aka Market Research (Smell Test)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry / market profiles for overall picture</td>
<td>Patents</td>
<td>Trade Associations</td>
</tr>
<tr>
<td>• Market research databases, OneSource (Library) in Business Information Services (<a href="http://guides.library.illinois.edu/c.php?q=347372&amp;p=2343225">http://guides.library.illinois.edu/c.php?q=347372&amp;p=2343225</a>)</td>
<td>• R&amp;D leaders, emerging players</td>
<td>• Tech overviews, companies, markets, etc.</td>
</tr>
<tr>
<td></td>
<td>• Current Industrial Reports (CIR)</td>
<td>• Find association Web sites through Associations Unlimited or Google query</td>
</tr>
<tr>
<td></td>
<td>• Other statistical tools for world data – <a href="http://guides.library.illinois.edu/ct.php?q=347372&amp;p=2343225">StatisticalUniverse</a> (Library)</td>
<td>Key player lists and profiles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OneSource, Hoovers, Buyers Guides</td>
</tr>
</tbody>
</table>
Bottom-Up Market Sizing

Starts (and ends) w/ Customer Discovery

- Defining your Archetypes
  Demographics, Psychographics, Behaviors & Reqts
- Insights into how to define segments
- Enables identification of beachhead market - “must have” reason to buy

Who are these people?

Why will they buy?

End-User Density

Beachhead or Target Market Size

Equals

Avg. Annual Sales per End User

Times

“Countable Units” in the Market

Times

End-User Density
Bottom-Up Market Sizing

Starts (and ends) w/ Customer Discovery

- Countable units
- End-user density
- Avg. annual sales per end-user
  - Units (use) and $’s/countable unit
- “Typical #'s” via customer discovery w/ “select” sources - or- “instances”
- Total # of countable units in the market can be from secondary sources

Seek REAL, VERIFIABLE Numbers

Beachhead or Target Market Size

Equals

Avg. Annual Sales per End User

Times

“Countable Units” in the Market

Times

End-User Density
Bottom-Up Market Sizing

Additional Benefits

● Citing real market examples build credibility
● The exercise will force a better understanding of your market segments and how to reach them
● Validates value based (vs. cost-based) pricing, full product offering, competitive differentiation
● Allows for better assumptions on market sizing (how many) and financial model (how much)
● Learn more about:
  ○ Where your customers reside
  ○ What easily findable information correlates to a concentration of customers?
Overall Factors to Consider

What is the Landscape?
Current state of the industry
  • Size
    • Compare to historical
    • Is it nascent or mature?
  • Expanding or contracting?
    • Historical pricing & profit characteristics
    • Existing channels

Industry trends?
  • Seasonality, cyclicality
  • Regulatory affairs
  • What’s new, hot desirable?

Where do you fit?
  • Leader: dominant position
  • Follower: me too
  • Challenger: attempting to unseat incumbent leader
  • Niche: specialty product or service

Who is the Competition
  • Direct
  • Indirect
  • Inertia
Agenda

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Assignment Deliverables

Great use of colors / connections + humans! Still missing definition of connections
Assignment Deliverables

Team 4: Multi-Frequency MEMS-based Acoustic Device

- Specific roles
- Supply chain
- Relational
- Clean/clear

Great job!
Assignment Deliverables

Team 16 :: Home-based Balance Training (Safa Jabri)
Assignment Deliverables

Team 16 :: Home-based Balance Training (Safa Jabri)

Identifying patient as the decision maker
Assignment Deliverables

Timeline style - different way of visualizing flow

MD Prescription → Orthotist Evaluation → Central Fabrication 5-15 days → Shipping → Adjustments at Delivery

~ 30 min

Clinical assessment, Detailed measurements, Cast patient, Send cast & work order to central fabrication

~ 3 - 4 hrs

Fill Patient Cast → Modify Positive Model → Thermoform or Laminate → Finishing Steps

Insurance Prior Authorization, Insurance Payment

Team 6 :: rAFO
Market Opportunity - UBER

- **TAM**
  - $5.7T Worldwide Market

- **SAM**
  - $4.2B US Market

- **Target**
  - $1B 25% US Market

- **Beachhead**
  - 5% of Top 5 Cities Beachhead Market
Top Down – Hearing Aids

Component Mfgs
- Knowles Electronics
- Sonion Inc.
- ON Semiconductor

Hearing Aid Mfgs
- Oticon
- Siemens
- Starkey
- **Phonak**
- ReSound
- Widex

Audiologists
- Independent
- Amplifon
- Gears
- Audika
- HearUSA

Hearing Impaired User

Citibank Market Report: $5bn Hearing Aid Market
Citibank Market Report: Phonak 20% market share
Phonak Reported Revenue $300m
Total hearing aid market: $1.5bn
Bottom Up – Hearing Aids Retail

- 31 million hearing impaired
- 6 million hearing aid purchasers (installed base)
- 80% bilateral fitting rate
- 2.5 million hearing aids sold annually
- Average sales price ~$1800/unit
- Market size = $4.5bn
Bottom Up – Hearing Aids

Wholesale

- 31 million hearing impaired
- 6 million hearing aid purchasers
- 80% bilateral fitting rate
- 2.5 million hearing aids sold
- Average sales price ~$1800/unit
- Market size = $4.5bn
- Average wholesale price ~$500/unit
- Market size = $1.25bn

Retail ($4.5bn) vs. Wholesale ($1.25bn)
Wholesale Hearing Aid Market

- **Total Addressable Market**
  - Assume all aid-able hearing-impaired purchase (50% of all HI, 31m)
  - 4.32-year service life (calc from data)
  - 80% bilateral fitting rate
  - Wholesale $500/unit

- **Served Available Market**
  - TAM x Buyer Adoption x 1.8 units/person
    - Adoption = 6m ÷ 31m = 19.35%
    - SAM = $1.13bn
  - Using Bottom Up = $1.25bn
  - Using Top Down = $1.5bn

- **Target = Premium Hearing Devices**
  - Assume 25% – 30% of market
  - SAM Bottom Up x .275 = $344m
  - Using Top Down = 20% is $300m revenue
Agenda

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Backup
Value Chain = WHO

The chain of steps a product takes from FIRE and EARTH to the END USER

A value chain map traces the flow of money, materials, personnel, and data
Example: Wireless Phones

Texas Instruments
Qualcomm
On Semiconductor
Chipset & Electronics Suppliers

American Tower
Nortel
Lucent
Communication Infrastructure Equip

Samsung
Apple/Foxconn
Motorola
Handset Manufacturer

Carriers
AT&T
Verizon
Vodafone

OS Provider
Apple
Google

Application Developer
Rovio
Zynga
OnStar

Application Distributor
Apple (iTunes)
Google (Google Play)

Media Developer
NBC
Disney

Media Distributor
Netflix
Spotify

Phone Retailers
Apple Store
Verizon Store/Web
Independent

Consumers
Value Chain – Key Takeaways

- Who supplies whom?
- Each block is a key STEP in the process NOT a company
  - Companies will often do multiple blocks
  - Which block(s) do YOU do?
- Who is your customer(s)?
- Get the detail where you need to
- What is your Value Prop for every step of the chain?
- Is the industry’s organization changing?

*Informs WHO to talk to*
Ecosystem Map = WHAT

How your product interacts with the world once it is in the hands of the customer.

Helps you identify the value to the end user.
Eco-System Map
Battery Supplier into the Electric Car Industry

- Warranty
- Service
- Claims
- Insurance
- Premium
- Passengers
- Resale
- End of Life/Recycle

Customer Segment

- OEM
- Digital Services
- OnStar
- Recall
- Media
- Home
- Public
- Recharging
- Utility
- Auto Trader
- ILLINOIS
Eco-System Map – Key Takeaways

• When in use …
  • How does money flow?
  • How does information flow?
  • What actions are associated with your product?
  • What other services/products are associated with your product?

• Questions to ask
  • Service, maintenance, repair, upgrades, …
  • End of life, disposal, recycling, resale
  • Data associated with the product/service?
  • Liability

• How does your innovation affect this system (pro or con)?

Informs WHAT to ask
Work Flow Map

How does your immediate customer solve the problem today?

• What are the steps in the process?
• What materials/data/people are needed when?
• What are the key decision points and how do they get made?
• How does this workflow change when your solution is adopted?
Work Flow

Cathode supplier -> Battery Cell Manufacturer

Start with the value chain and identify your immediate customer

You

Key Materials

Cathode Supplier

Separator Supplier

Anode Supplier

Electrolyte Supplier

Other

Battery Cell

Battery Module

Battery Pack

Vehicle System Integration

Vehicle Assembly

Dealer

Your Customer
Work Flow – Key Takeaways

- How do people, information, materials and money flow? Who does what/when?
- Where does your product come in?
  - What form should it be in?
- Will your customer have to change their process?
  - If so, how much will that change cost?
- Does everyone have the ability/desire to do what you need them to?

*Informs Value Proposition - we’ll talk more about this in two weeks*
Hypothesis testing should be used to populate the tools with data.
The Opportunity

Chemical Catalyst Market = $7 B

Hydrogenation Catalyst = $1.5 B

Pd/C Catalyst = $1.1 B

Global Catalyst Market = $29.5 B

- Emissions
- Refinery
- Chemical
Market Size

- Total embedded software market: $2.5B (2010)
- Embedded software development tools: $290M (2009)
  - Lack of data here – not confident in this number
  - Total addressable market (TAM): $290M
  - Seems small, but # customers growing (e.g., wireless sensor network)
  - SET should raise average selling price – need to test this hypothesis
- How can we make our TAM $2.5B instead of $290M?
SKIN + ORAL
140 M / yr
(~20% of overall)

SKIN + ORAL
30 M / yr

SKIN + ORAL
10 M / yr
(1/3 of served)

OVERALL
Served
Targeted
Americans Love to Eat Meat and Snacks

- **Giant Markets**
  - Meat: $160B / Snacks: $70B
  - Meat Snacks: $4B

- **Varying Growth Rates**
  - Meat: + 5%
  - Snacks: + 15%
  - Jerky: + 5%

- **Mega Consumer Trends Converging**
  - Healthy, More Flavorful, Higher Quality

- **Snacks Driven by Innovation / News**

- **Meat Snacks / Jerky Generally Sleepy**
  - Limited Innovation
  - “Gut Stuffer” Image

- **Change Underway Driven by New Entrants**
  - All-Natural
  - 10% Growth Latest 52 Weeks Nielsen F/D/M

Source: US Package Facts

2009 US Snack Food Retail Sales

- Sweet: $35B
- Salty: $30B
- Meat: $4B

Source: Nielsen F/D/M
$50 Billion Dollar Protein Therapeutic Market

$1.4 Billion Dollar Cell Line Sales Market

$140 Million Dollar Target
SYNC: MARKET SIZING

TAM
- Grad students 20-27 yrs of age
  - Developed countries
  - Top 30% by income
  - 15% LDR
  - ~60 M individuals
  - Spend $10/yr on tech
- Commuting couples
  - Developed countries
  - Top 20% by income
  - 2% LDRs in target industries
  - ~15 M individuals
  - Employers spend $25/yr on tech

~$950

SAM
- US only, all states, higher average revenue/yr

~$500

SOM
(Short term serviceable, obtainable, target market)
- Grad students from ~100 largest universities
- 100 largest enterprises with commuting employee base

~$50

Source: US Census, World Age Pyramid (200), Google Insights Trends for "Long Distance Relationships", Team Analysis
Nitrate Sensor Market

TAM: $6 B/yr
>100K systems worldwide

SAM: $1.5B/yr
Assumptions:
25K pivots w/ 1 sensor/acre
(125 sensors/pivot)

Target Market: $50-75M/yr
Assumptions: 3-5% licensing
Recurring consumable costs would add to revenue
Market size - Landlords & Rental Units

Rental Real Estate is the Largest “Mom and Pop” business in America:
The vast majority of properties are owned by a single individual
that owns only one property.

Source: US census data
Market size

- Total available market: Measuring industry in the US
  - $30 billion*

- Served available market:
  - Construction
  - Appraisal
  - Forensic / insurance
  - Homeowners

- Target market:
  - Measuring with cm level of accuracy

* KPMG Construction Industry 2011 Annual Report
Assume 0.5% share of total construction spent
Market size (roofing industry)

Total available market:
Roofing industry in the US

$17.9 billion

~ $8-10 billion

Served available market:
Roof construction or renovation

$20 million

Target market:
Roof surveying
Linear Lighting Market Size

- Global lighting market: $100B
- Global Fluorescent market: $50B
- Global commercial linear tube lighting market: $10B
- Global LED linear tube lighting market: $400M
- US LED linear tube lighting market: $200M

- 3,000,000 bulbs

- Initial Target Market
- Served Addressable Market: (40% growth)
- Total Addressable Market: (40% growth)