



NSF Cooperative Agreement EEC-1160504



Entrepreneurship for Engineers Introduction

Presenter:
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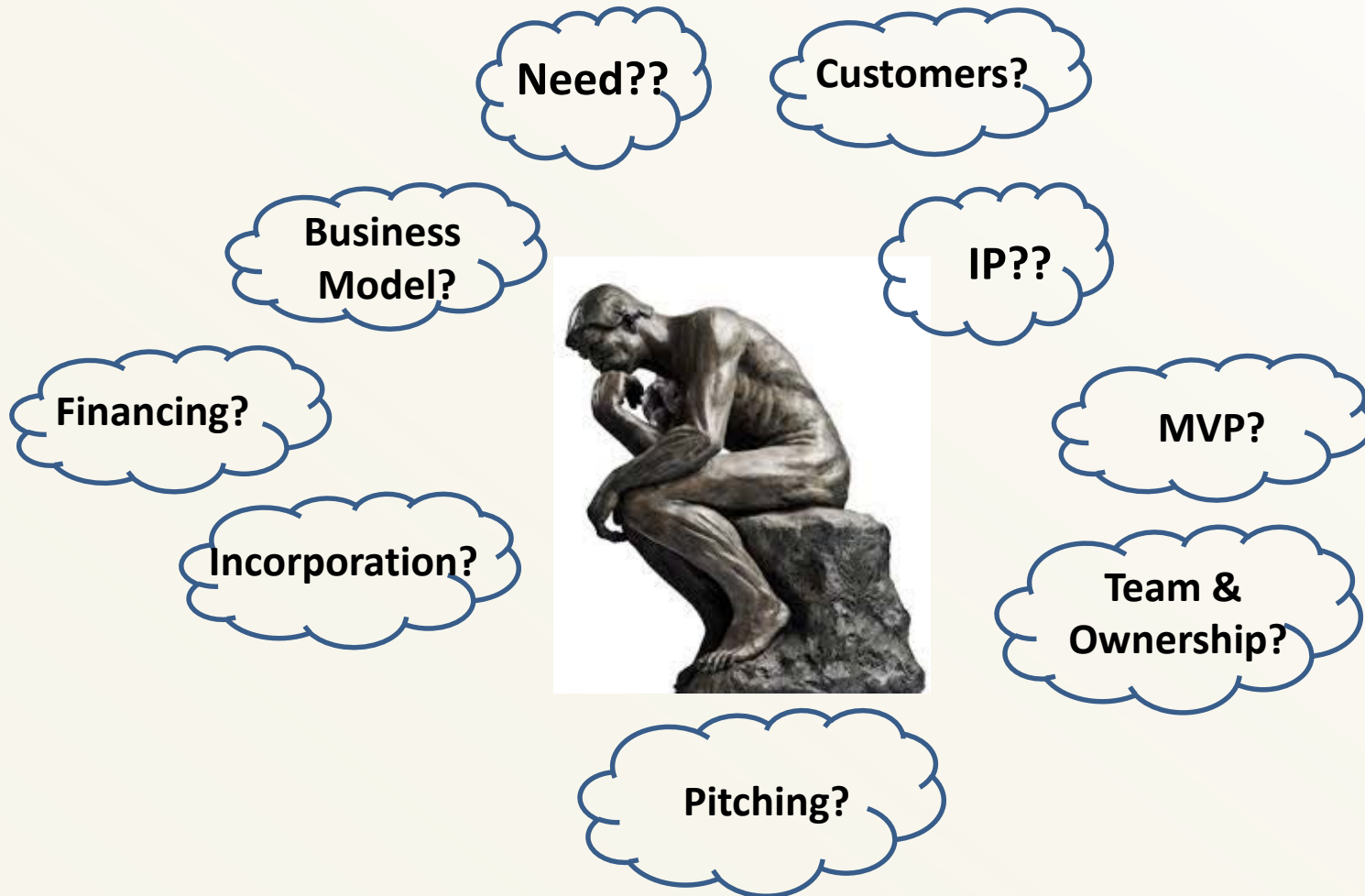


What is Entrepreneurship??

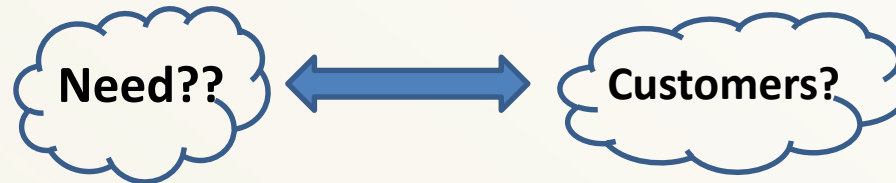
- **Definition of Entrepreneurship:**
- **The pursuit of opportunity without regard to resources currently controlled.**

The Starting Point!

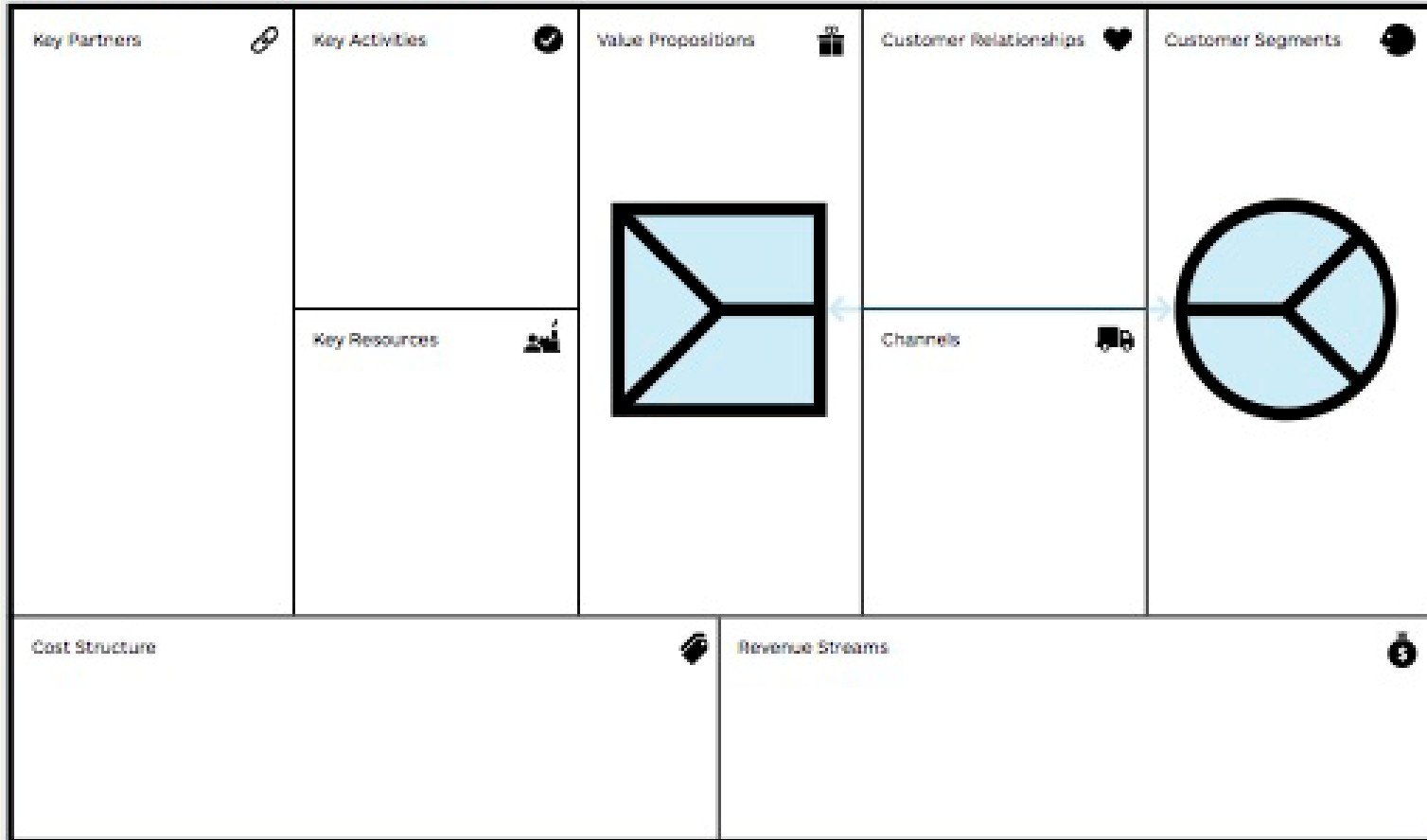
“I have an idea, so what is next???”



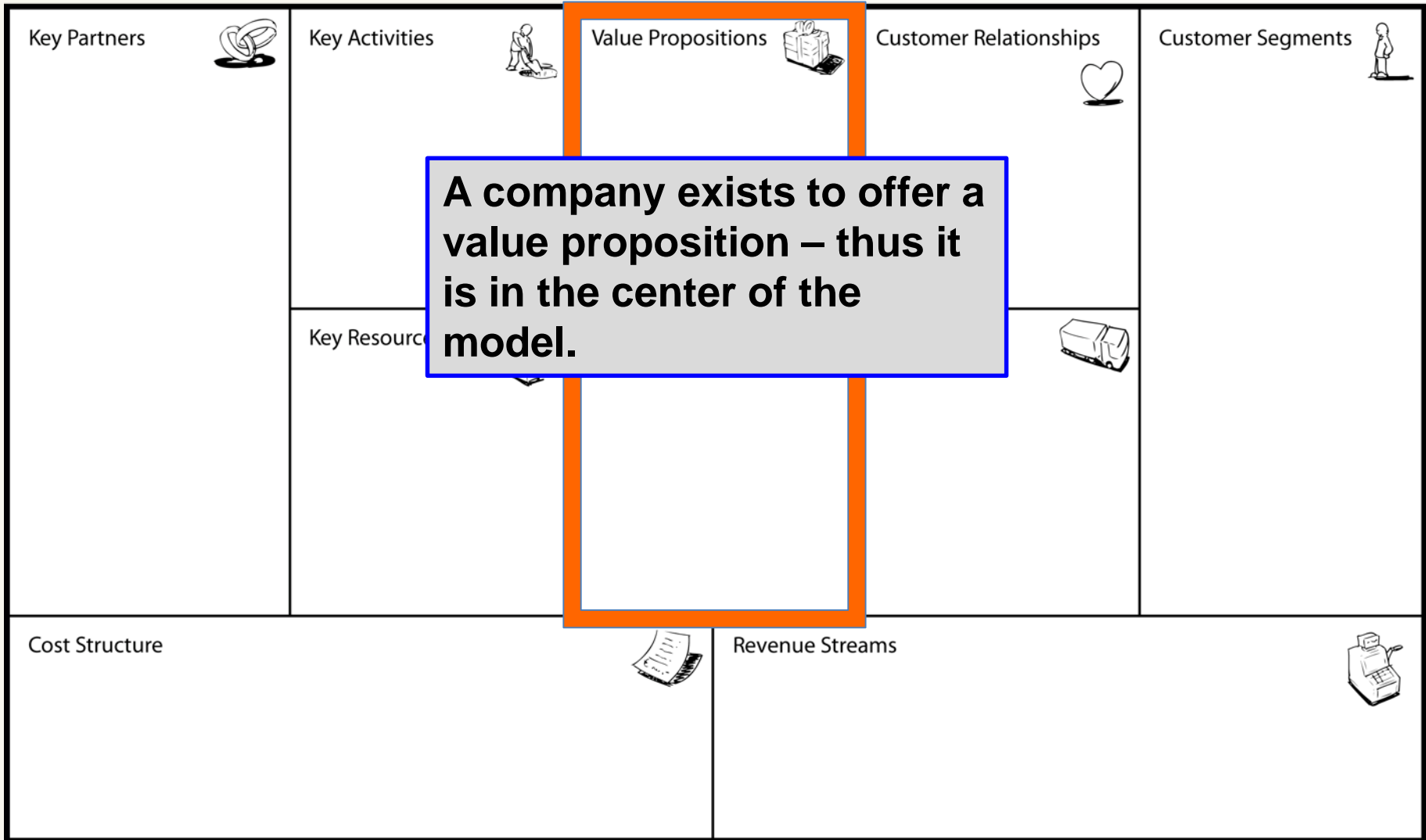
Is there a NEED???



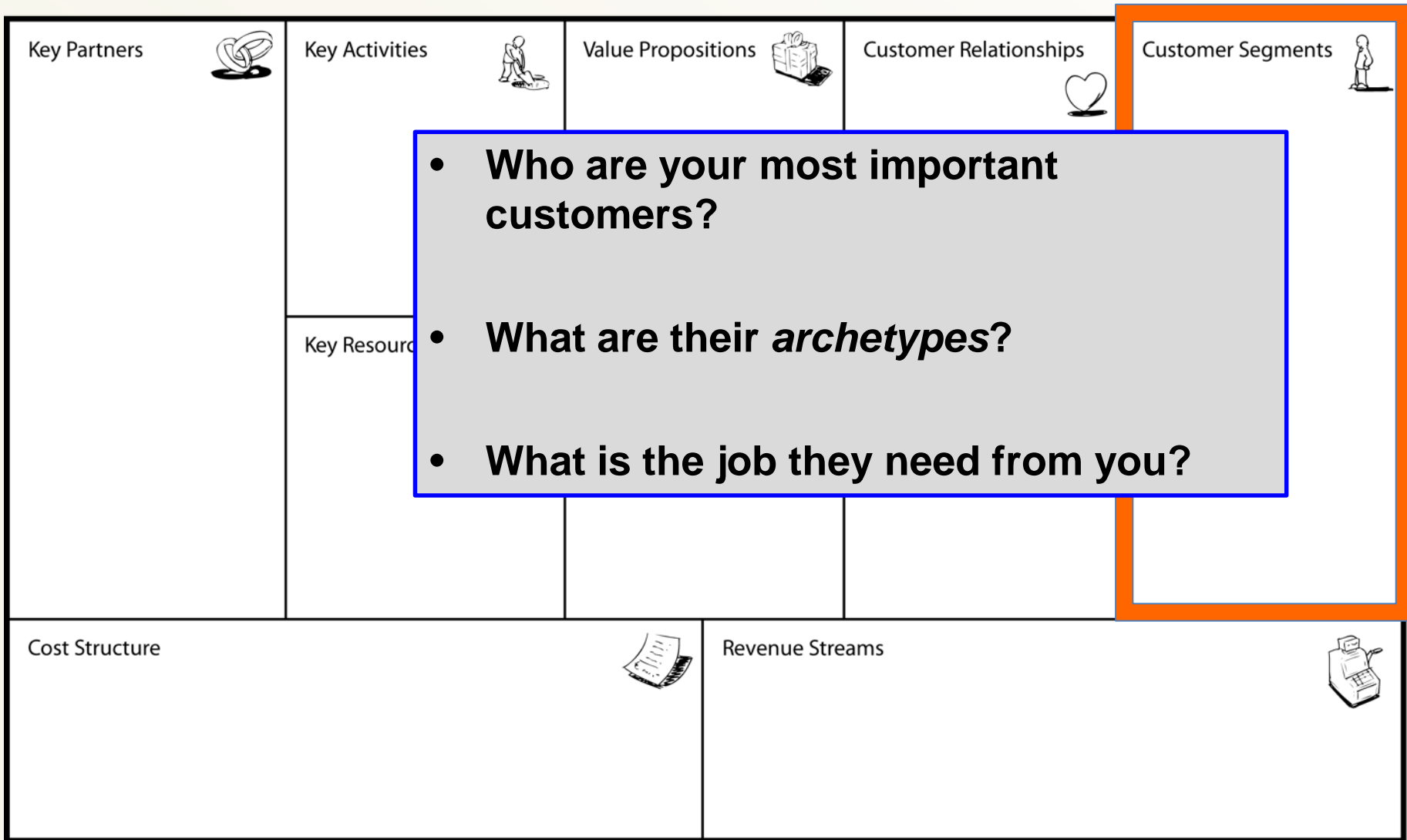
Value Proposition Canvas & Business Model Canvas



Value propositions



Customer segments



Customer segments

A customer segment:

A subset of the marketplace that makes decisions in a defined way

A customer type:

The role in the marketplace.

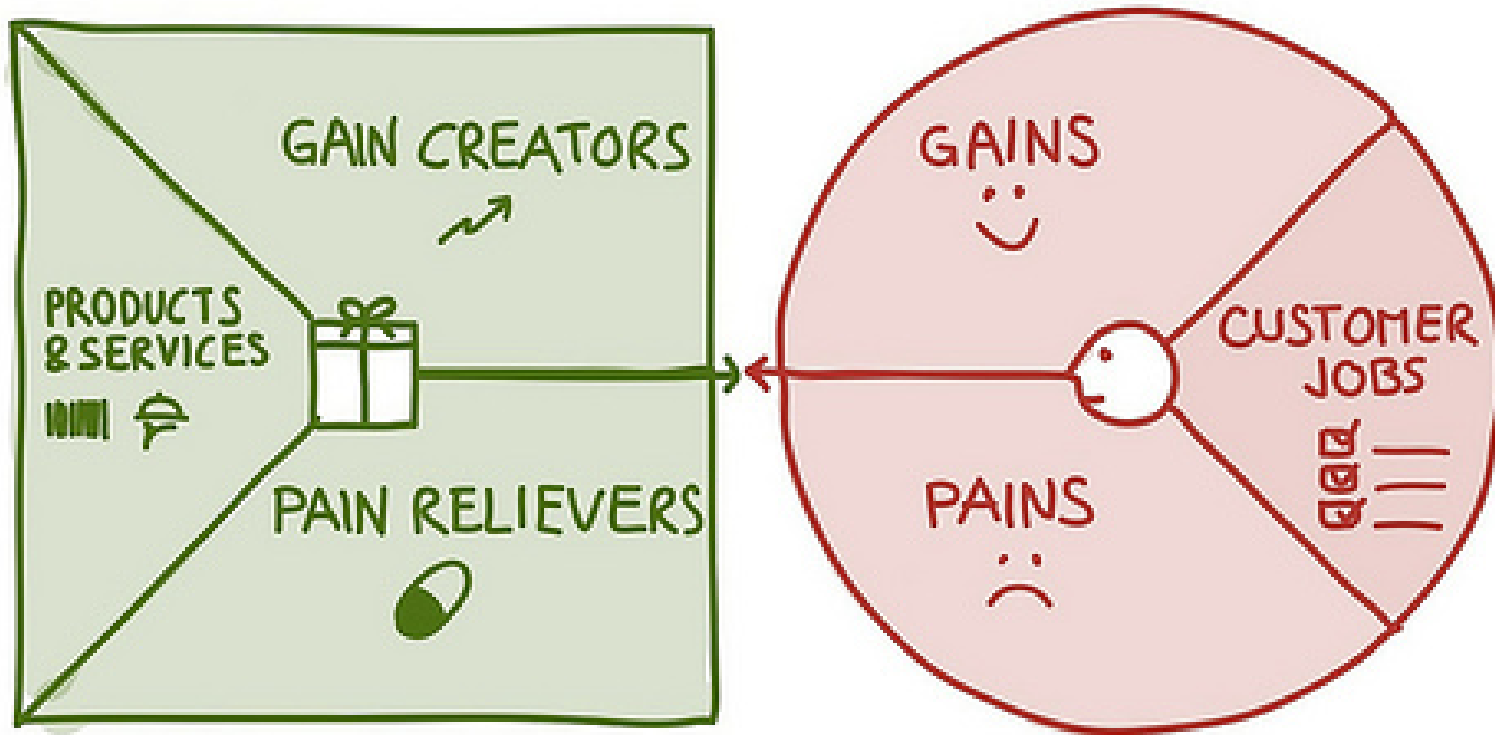
Customer types

- *End User*
- *Influencer*
- *Recommender*
- *Decision Maker*
- *Payer*
- *Saboteur*

Customer Segments



Value Proposition Canvas



Value Proposition Canvas



design



observe

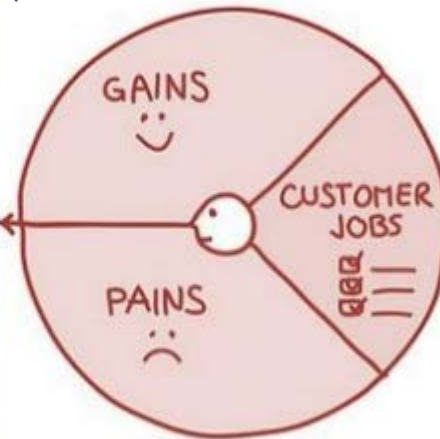
Design a Value Proposition for Your Case!



design



observe



Where do I start?

What does every company need??

CUSTOMERS!!!!

What do they want??

ASK THEM!!!!

Misconceptions:

- “Best science wins”
- “Customers care how problems are solved”

Get Out of the Building!



Six Techniques to Gain Customer Insights



- The Data Detective
 - Build on existing work with desk research.



- The Journalist
 - Talk to potential customers to gain customer insights.



- The Anthropologists
 - Observe potential customers in the real world to get good insights into how they really behave



- The Impersonator
 - “Be your customer” – spend a day in your customer’s shoes



- The Co-creator
 - Integrate customers in the process of value creation to learn with them



- The Scientists
 - Get customers to participate in an experiment

Interviewing: Rules of Engagement

- In person interviews: See their pupils dilate!
- Being an entrepreneur means be aggressive!
- Initial interviews are for learning
- Script it: Know what you want to say before
- Keep it informal/relaxed
- Plan to document it
- Ask for their help
- Tell them it'll be brief
- Play the researcher card

NSF I-Corps Program: > 100 interviews in 7 weeks

Competitive Benchmarking

How are companies solving the problem today???

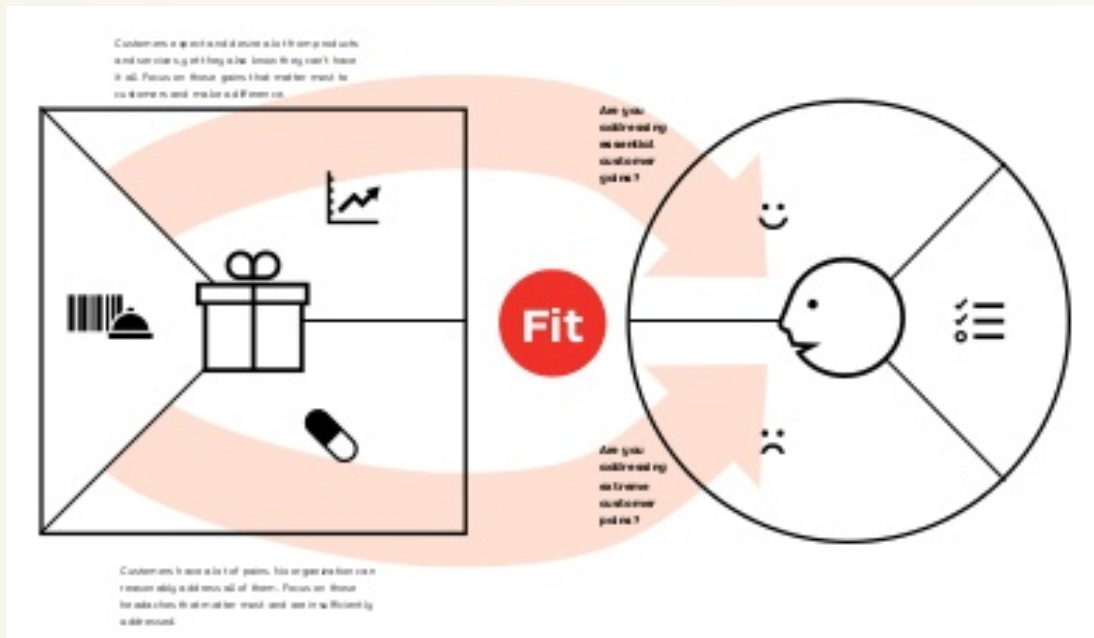
- What are the current solutions?
 - Pros and cons? – from the user / customer perspective
 - Price points?
 - Industry “Power” of current vendor(s)?
 - Implementation process?
 - **Metrics they care about**
- Who are the “key decision makers” for new technologies?
 - Users?
 - What level of manager needs to sign off?
 - Aversion to risk?

Need to answer:

1. Does your product provide a competitive advantage (“value proposition”) over current solution?
2. Who do you need to convince? (“customer segment”)

Problem Solution Fit

- You achieve fit when customers get excited about your value proposition which happens when you address important jobs, alleviate extreme pains, and create essential gains that customers care about.



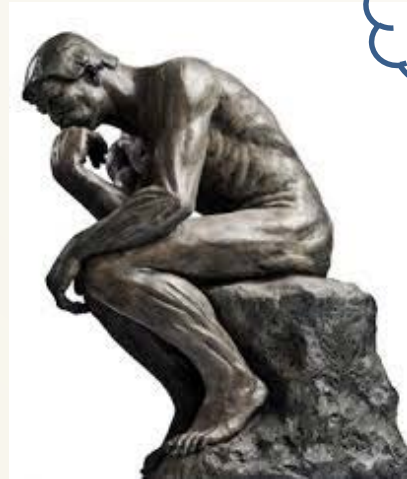
1 On Paper

Problem-Solution Fit

Problem-solution fit takes place when you

- Have evidence that customers care about certain jobs, pains, and gains.
- Designed a value proposition that addresses those jobs, pains and gains.

Intellectual Property Strategy



Preliminary Legal Questions:

- Whether our business and/or product could be legally protected?
- Whether the business idea infringes on existing Intellectual Property?

Discussing IP

“If I talk about my idea someone might steal it”

- Highly unlikely someone will steal the idea
- They don't have the passion, knowledge or drive that you do
- If you can't talk about it, how do you expect to get teammates, customers or investors to believe in you?

“I need an NDA in place to discuss my idea”

- No you don't need an NDA to discuss your ideas. Just make sure you don't disclose the secret sauce.
- Investors **WILL NOT** sign an NDA

Intellectual Property

- Intellectual Property is both a Sword and a Shield
- We need to **Protect** our nascent business through:
 - I. Patents ~ \$20,000 to \$100,000
 - II. Copyrights
 - III. Trademarks
 - IV. Trade Secrets
 - V. Agreements~ Free to implement
- We must worry about **Respecting** other parties IP:
 - Trade Secrets
 - Patented Ideas
 - Customer Lists

Do you have Freedom to Operate?

The Lean Startup



MVP

Minimum Viable Product

About MVP Tests

- **Minimum Viable Product (MVP):**
 - The smallest set of features and/or activities needed to complete a “Build-Measure-Learn” cycle and thereby test a business model hypothesis.
- MVPs may constrain **product** functionality and/or **operational** capability.
 - Constrained product functionality: only a subset of the features envisioned
 - Constrained operational capability: rely on a temporary or makeshift technology to deliver the MVP’s functionality.
 - Smoke Tests: a product that is truly minimal because it does not yet exist.
- Benefits of MVPs:
 - Shorten product development cycle accelerating customer feedback
 - Release feature revisions in small batches:
 - Easier to interpret test results
 - Easier to diagnosis problems

Disciplined prototyping

The test and learn approach is different than random trial and error.

- Effective prototyping begins with some analysis. You must have an informed point from which to begin testing.

The test and learn approach requires the willingness to walk away from our initial ideas.

- Effective prototyping requires that we avoid the sunk cost trap. We have to be willing to cut our losses and adapt quickly when we fail.

Why do we resist prototyping?

- We hate to fail.
- We fall in love with our initial idea.
- We worry about opportunity costs.
- We obsess over first mover advantage.



Concerns about MVPs

- Exposure to Idea Theft
 - Ideas are typically worthless unless executed
- Reputational Risk
 - MVP testing limits the target customer base to minimal scale necessary, thereby minimizing risk
 - Can potentially use an alternative brand name for the MVP
- **Can this be done at a University?**
 - Pros:
 - Sales & Services Model can test:
 - Demand
 - Pricing strategies
 - Cons:
 - Limited student / post-doc involvement
 - Increase value of IP for University

Is it time to Incorporate??

Incorporation Decision

Incorporation?



Preliminary Legal Questions:

- Need to sign contracts with external entities (Partners, Customers, etc.)?
- Need Investment?

Typical Legal Structure:

- C-Corp (investor friendly)
- In Delaware

Team Formation

Team &
Ownership?



Team Formation & Equity Divisions

“We’re all from the same lab and want to start a company together”

- Make sure the team is comprised of complementary skillsets
- Need people who can develop customers and raise funds
- **Need CEO / Management team**

“We’re friends and going to split up the company equally”

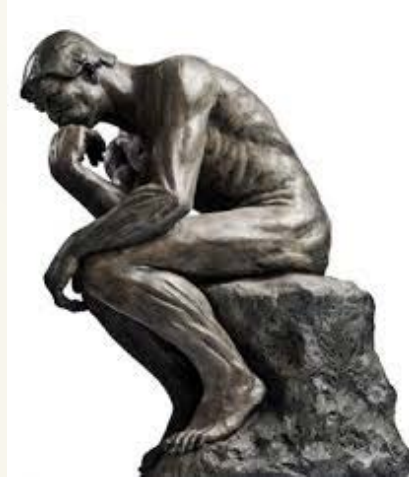
- **NEVER SPLIT EQUITY 50/50**
- Always insure that there is a tie-breaker – leading cause of failures

“We’re all on the same patent together and so should be given equity in the new company accordingly”

- No one cares about PAST contributions (i.e. investors)
- Divide up equity based on **FUTURE** contributions

Raising Capital

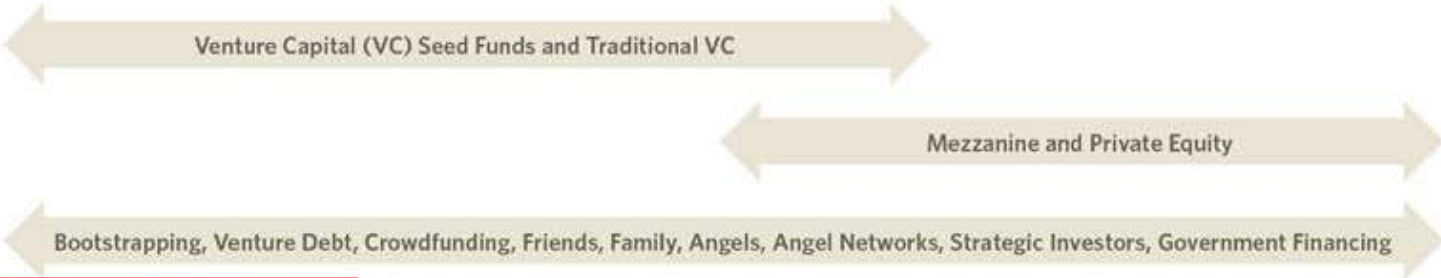
Financing?



Financing Models

- Bootstrapping
- Debt Financing
- Equity Financing
 - Seed & Early Stage
 - 1st , 2nd , 3rd Rounds: Professional Investors
 - VCs (Institutional)
 - Strategic
 - Later Stage / Growth Stage
 - Private Equity
 - Initial Public Offering (IPO)

Financing Options and the High-Growth Venture Life Cycle



Seed and Early-Stage Investing Overview³³

- Friends & Family
- Incubators
- Accelerators
- Angel Investors
- Super Angels
- Crowdfunding

Friends & Family

- Group of investors also called: Friends, Family & **Fools**
- Small \$ from close relatives
- Benefits
 - Usually friendly investor terms
 - Willing to invest in you vs. the idea / company
 - Higher classes of investors (i.e. Angels & VCs) want to see them
 - Shows that you have “skin in the game”
- Issues
 - May negatively impact relationship
 - No way to scale up as funding needs increase

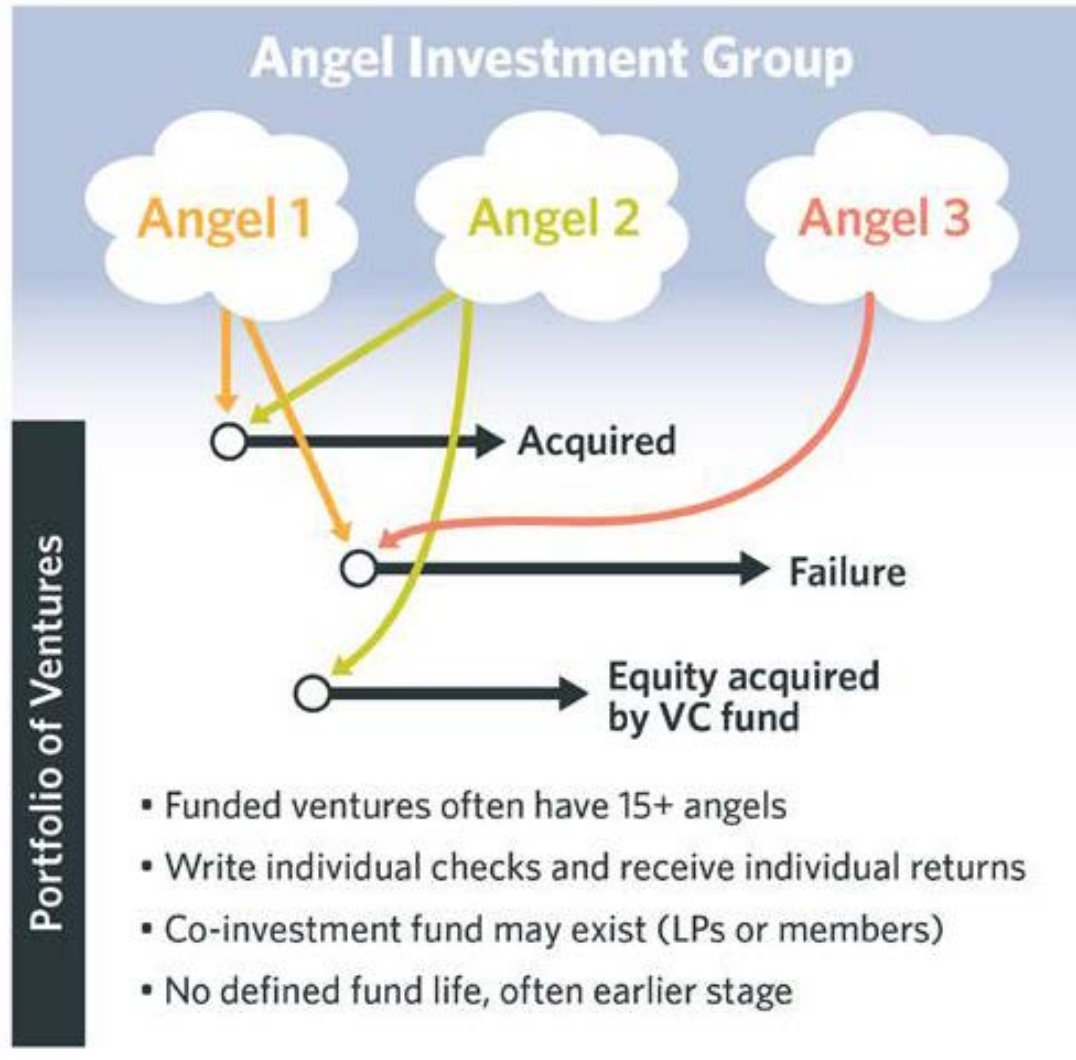
Incubator and Accelerators

- Incubators
 - Help entrepreneurs launch companies by providing office space, assistance with access to funding and basic business services, etc.
 - Can be non-profit or profit driven
 - [UCLA Incubator: CNSI – California NanoSystem Institute](#)
- Accelerators
 - First accelerator: Y Combinator (2005)
 - Famous accelerators: TechStars, AngelPad, 500 Startups, etc.
 - Instead of office space, provided “boot camp” like intensive coaching and networking
 - Hold “demo days” at the end of each session
 - Almost always for-profit
 - [UCLA Accelerator: Startup UCLA](#)

Angel Investors

- Statistics (2014)
 - **\$24.8 billion** invested in **73,400** entrepreneurial ventures by Angels
 - **298,000** active angels
 - **\$328,000** was the average capital raised by US companies from angels
 - Angel investments help create **~290,000 new jobs** in the United States,
 - Top sectors receiving investment were:
 - Healthcare / Medical (30%)
 - Software (16%)
 - Biotech (15%).
 - **79% of investments** were in the seed, start-up and early stage

Structure of an Angel Investment Group



Crowdfunding

- Goal: to enable companies to raise funds from individual investors online.
 - Rewards-based (Kickstarter)
 - Donation-based (Indiegogo)
 - Lending-based (Kiva)
 - Equity-based

Ideal for consumer products or items that appeal to the masses

Financing Options and the High-Growth Venture Life Cycle



Where VCs Enter

Raising Funds from VCs

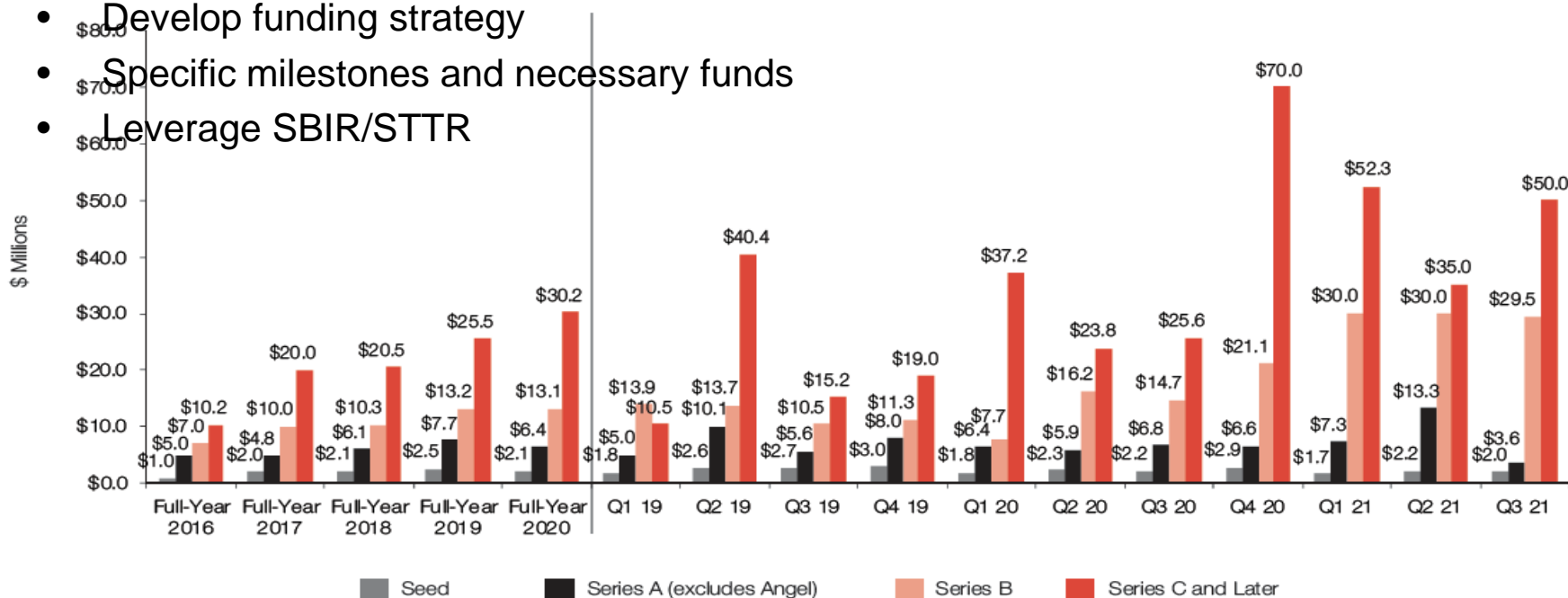
“I don’t need much – only about \$1M”

- Need to raise funds from Friends & Family first – show you have skin in the game
- Typical Angel investments ~ \$300K
- \$1M is the WORST amount – too big for angels, too small for VCs

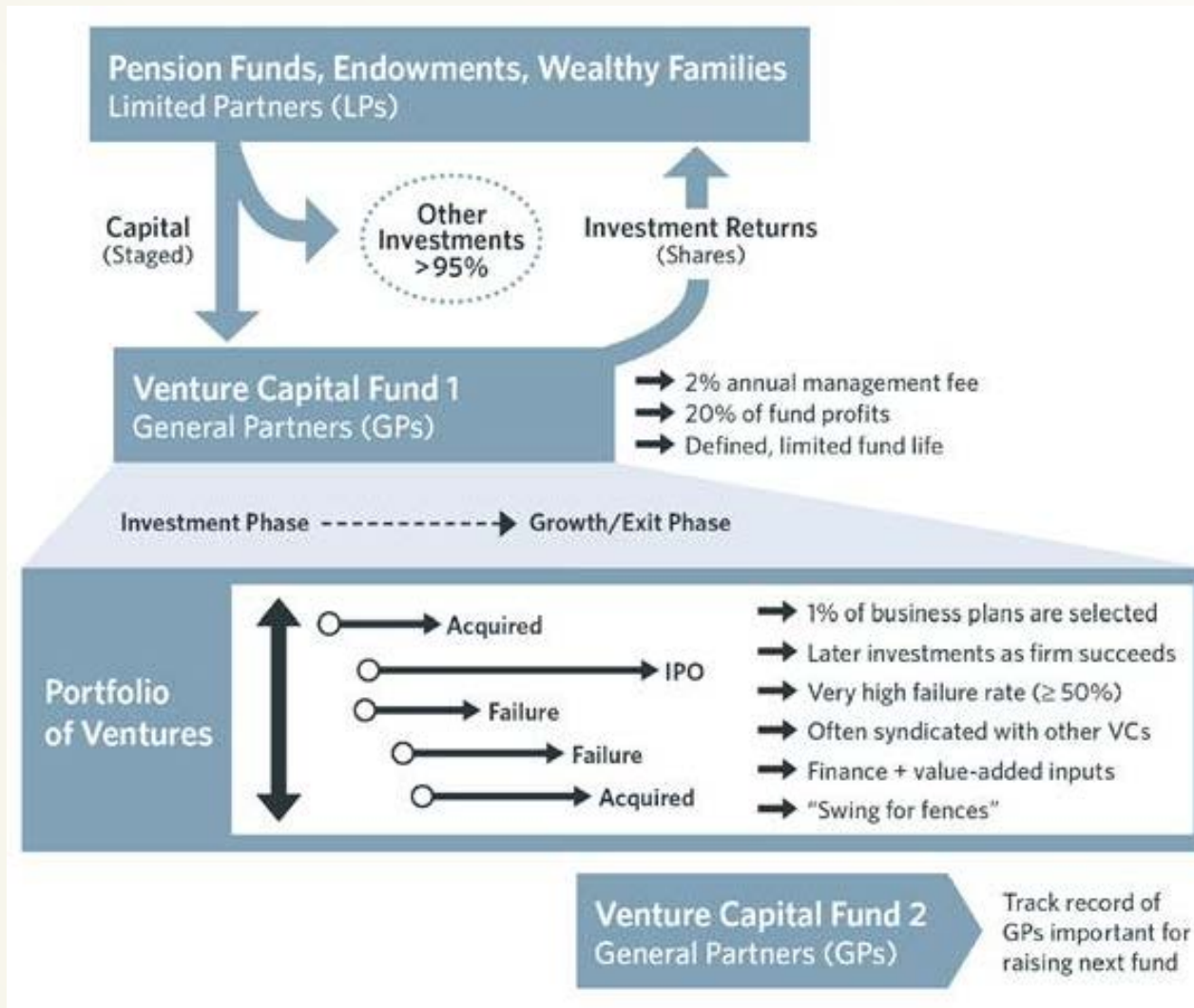
Median Amount Raised – Equity Financings

Response:

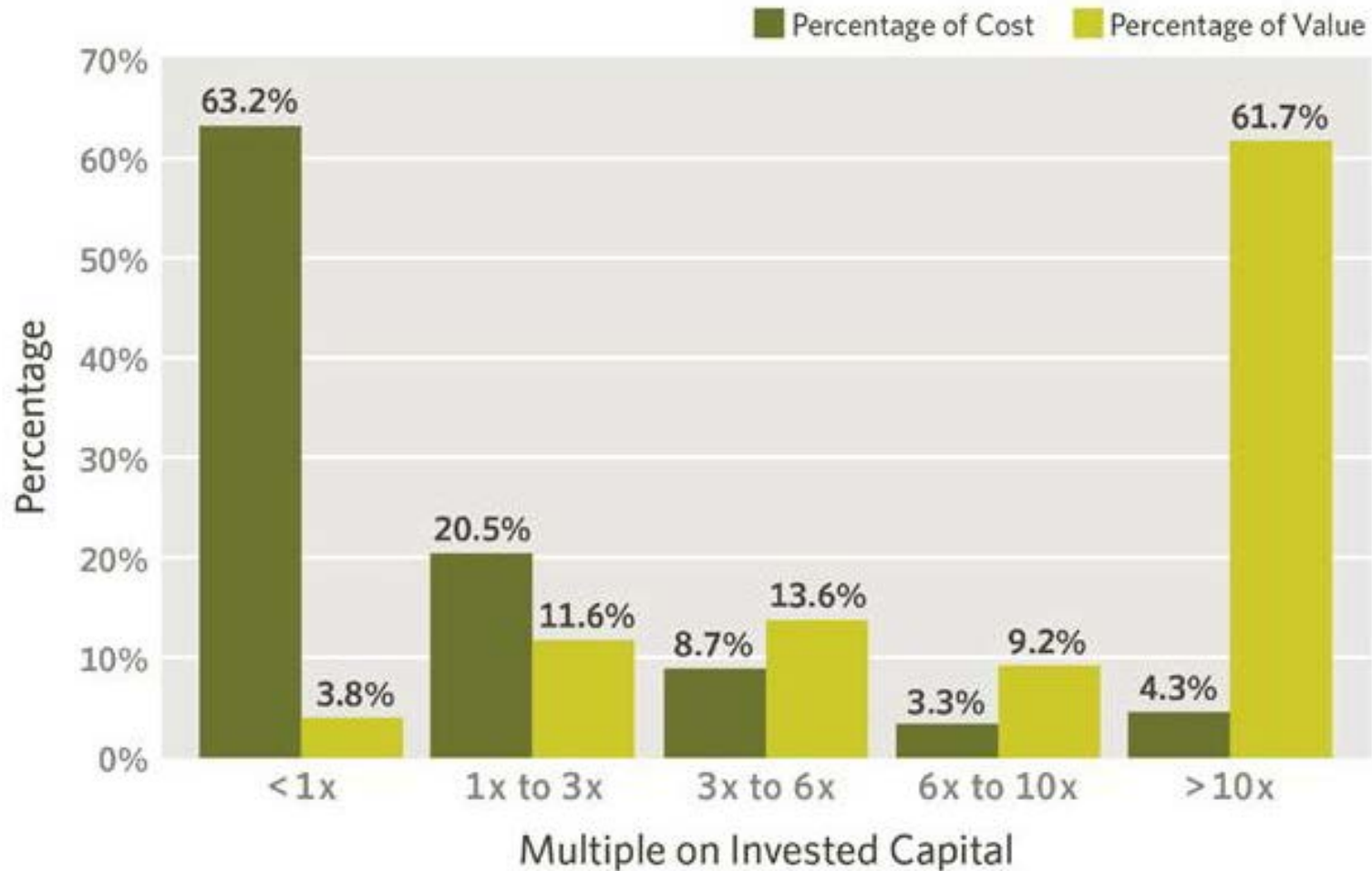
- Develop funding strategy
- Specific milestones and necessary funds
- Leverage SBIR/STTR



Structure of a Venture Capital Fund



Breakdown of Prominent VC's Portfolio



VC Factors: Control

- One extensive area of negotiation: Control
- Control: Venture Capitalists > Angels
 - **WHY?**
 - Need to show returns to investors
 - Past returns impact raising new investment funds
 - **GREATER AMOUNTS OF \$\$\$\$**
- Control includes:
 - Seat on the board – influence direction of the company
 - Covenants that prevent major undertakings
 - Different direction, asset sale, merger, etc.
 - Replace CEO

VC Investment Strategy

- Venture Capitalists invest in stages
 - **WHY?**
 - Reduce:
 - Risk
 - Financial Exposure
 - Uncertainty
 - Induces:
 - Pressure to achieve milestones
 - Test of management to deliver

VC Investment Strategy

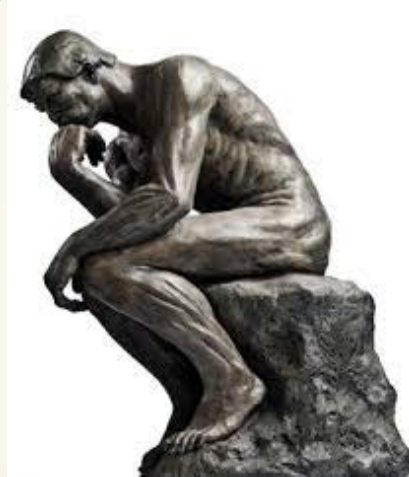
- Venture Capitalists invest as a syndicate
 - Rarely will a VC fund an entire round themselves
 - **WHY?**
 - Reduce:
 - Risk
 - Financial Exposure
 - Uncertainty
 - “Collective knowledge vs. Individual knowledge”
- One VC will act as “The Lead”
 - Sets investment terms
 - Highest % of the funding round
 - Takes a seat(s) on the board to represent that funding group
 - Performs greatest amount of due diligence
- Benefit to other VCs:
 - Reduce time spent on assessing deal
 - May trust their diligence (from past deals)

Strategic Investors

- Corporations
- **Motivation?**
 - Exposure to important new technology
 - Pipeline of new products
 - Pharmaceutical products
 - Options for first-right-of-refusal to purchase
 - Blocking mechanism
 - Prevent competitors from entering market or gaining market share
 - Access to new markets
- Benefit to startup companies:
 - Exposure to key partner
 - Higher valuation
 - ROI is not as critical an element

Pitching Strategy

Pitching?



Preparing the Pitch

- Do your homework!
 - Is the objective of the pitch to gain financial commitments, attract partners, or some other purpose?
 - **TAILOR IT ACCORDINGLY!!!**
 - Research (i.e. stalk) your pitch audience
- Practice, practice, and practice some more!
 - Do several “dry runs” with partners and advisers who already understand the business
 - After early test runs, practice presenting the pitch to supportive audiences who are in a position to give valuable feedback but who do not understand the new venture
 - Make different versions based on different needs

Pitch Tips – Answer the Three Whys

- Answer the Three Whys
 - Why this?
 - Why now?
 - Why this team?
- Need to tell a story that makes the market’s “pain” real and that your solution is the right way to solve the pain
- Typically the CEO does the talking for an investor pitch

The Introduction

- Include facts, but remember the goal is to deliver a compelling story!
 - The pitch should be designed to grab the listeners attention and spark interest in learning more
 - The beginning is CRITICAL!
 - If you lose the audience early, it is almost impossible to get them back!
- **TIPS:**
 - Make it easy to understand!
 - Use techniques to QUICKLY orientate the audience
 - Use easily understood comparisons:
 - Similar products
 - Similar business models
 - Based on current competitors and what they do wrong

Investor Pitch Deck Template

- Slide 1: Title Slide
- **Slide 2: Executive Summary**
- Slide 3: Market Positioning / Problem Description (“Pain”)
- Slide 4: Product Positioning (“Product”)
- Slide 5: Size of the Opportunity (Market size)
- Slide 6: Business Network (Ecosystem) Positioning
- Slide 7: Competition or Substitutes (“Players”)
- Slide 8: Marketing & Sales
- Slide 9: Operations
- Slide 10: Financials (“Projections”)
- **Slide 11: Risks**
- Slide 12: Team
- Slide 13: Implementation, Status and Traction, and Financing
- Slide 14: Closing Slide (the “Ask” or “Proposition”)

Requires a key understanding of complete Business Model!

Business Model Strategy

Business
Model?



Business Model

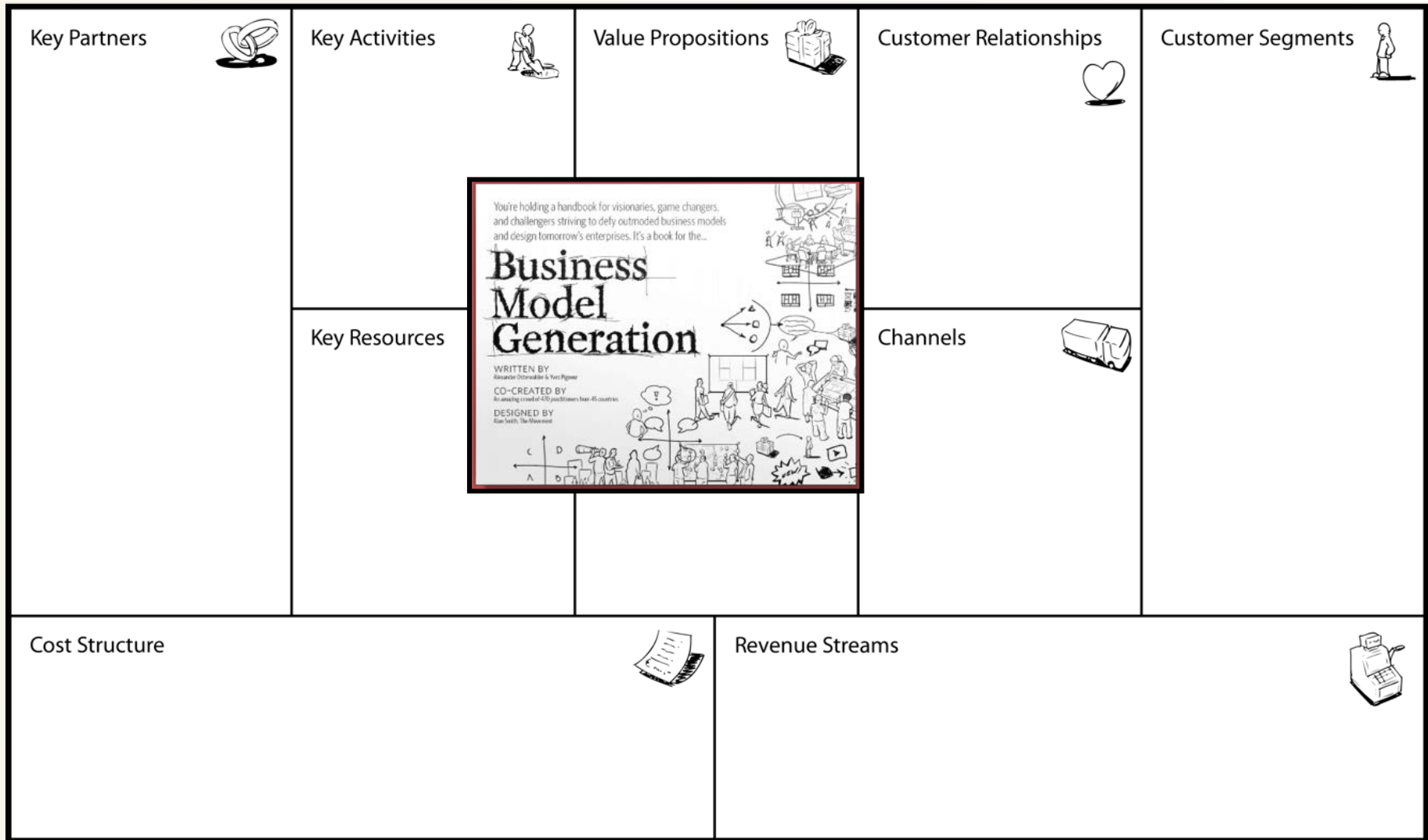
Definition of a Business Model*: describes the rationale of how an organization creates, delivers, and captures value.

Motivation:

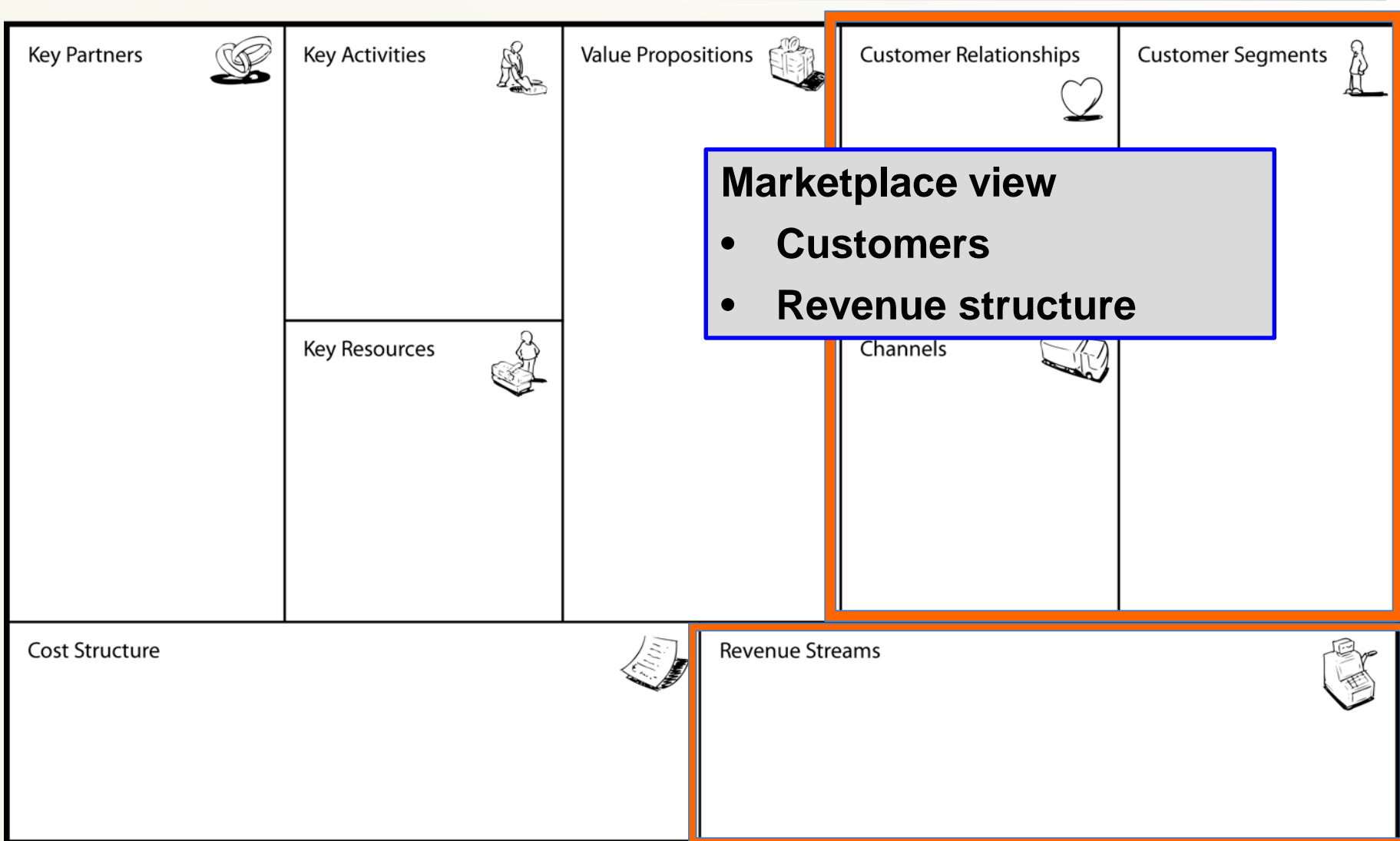
- We focus on products and features too much and not on how we create value for customers
- We often end up making stuff nobody wants, despite our good ideas and good intentions

* Osterwalder & Pigneur, Business Model Generation.

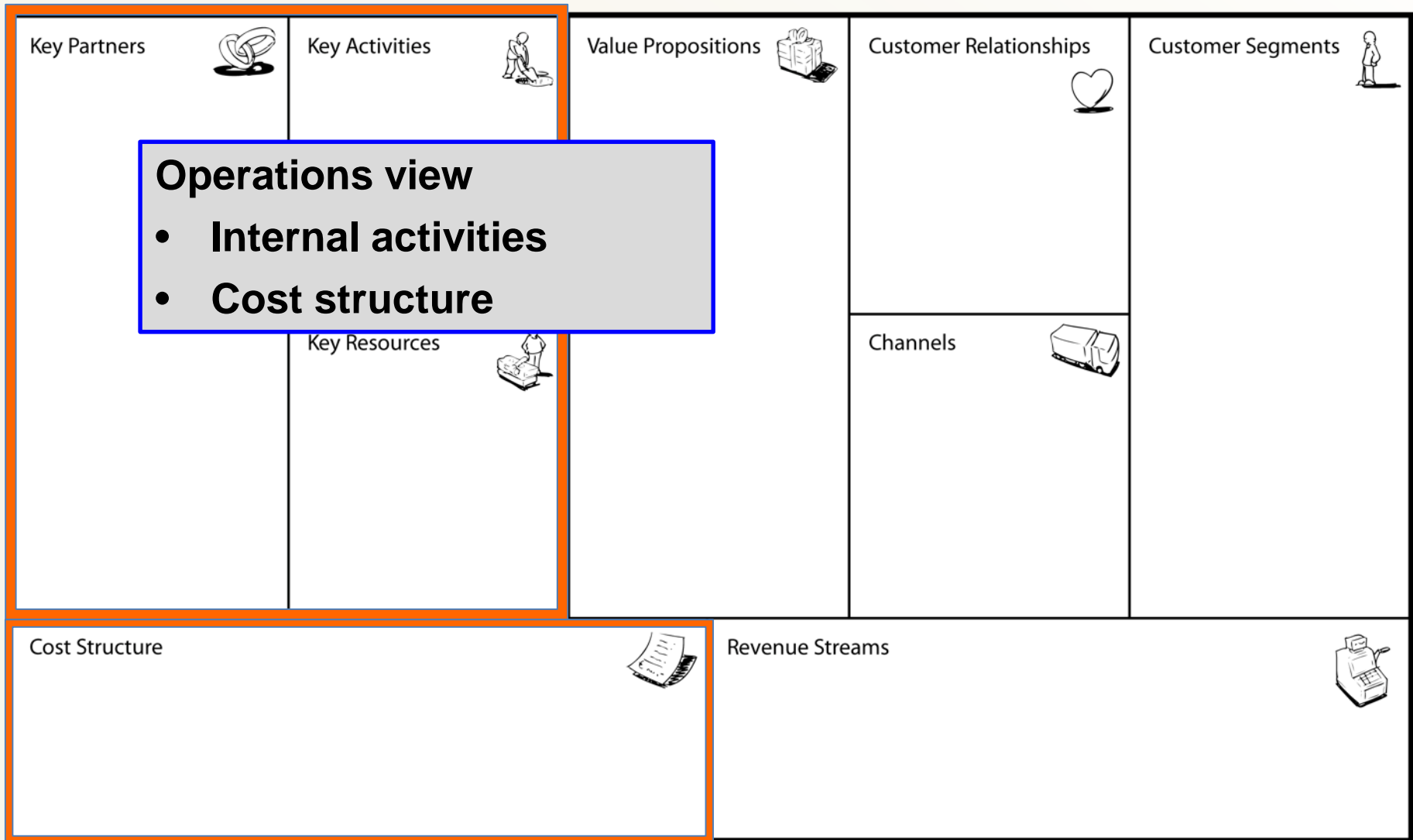
Business Model Canvas



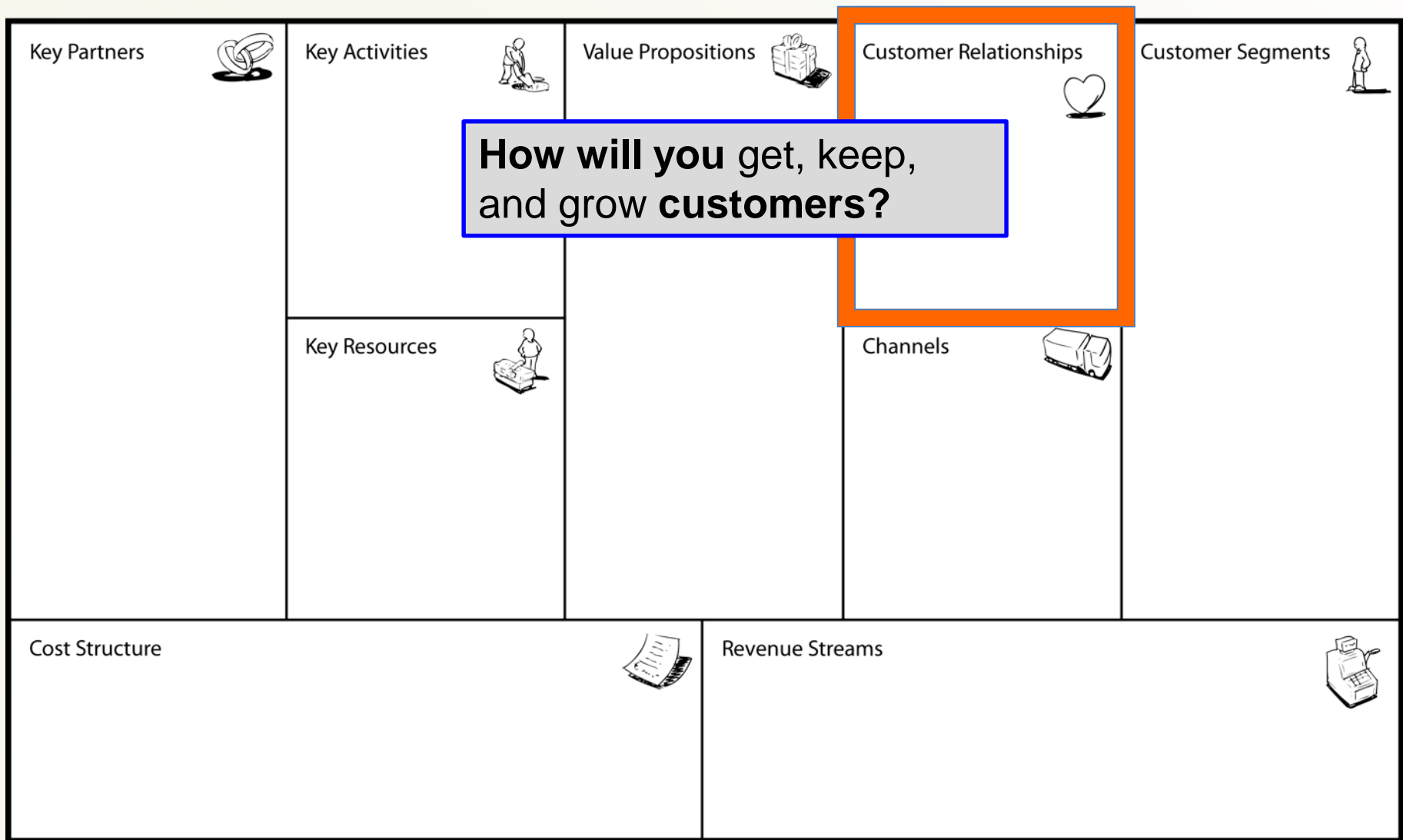
“Right side” of canvas



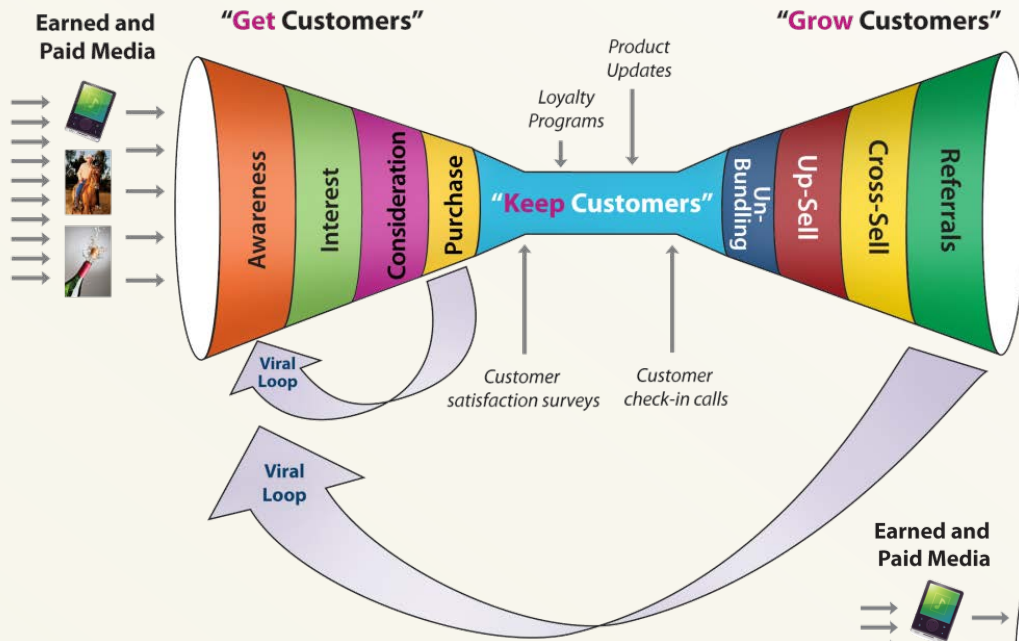
“Left side” of canvas



Customer Relationships

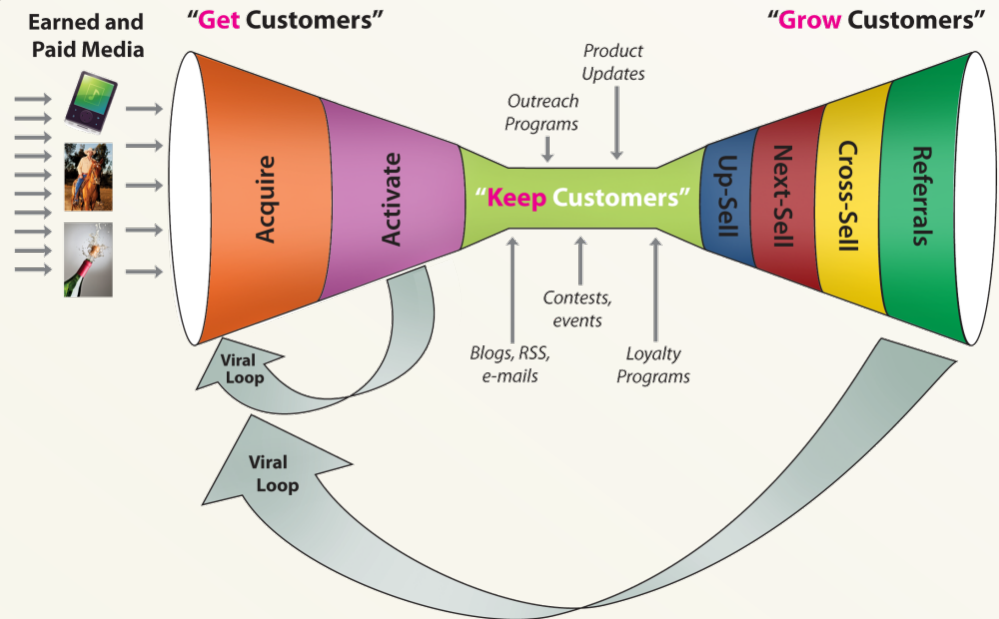


Customer Relationships



Physical & Web Mobile
Are Different

Web Mobile



Customer Relationships

Customer Acquisition Cost versus Sales Complexity

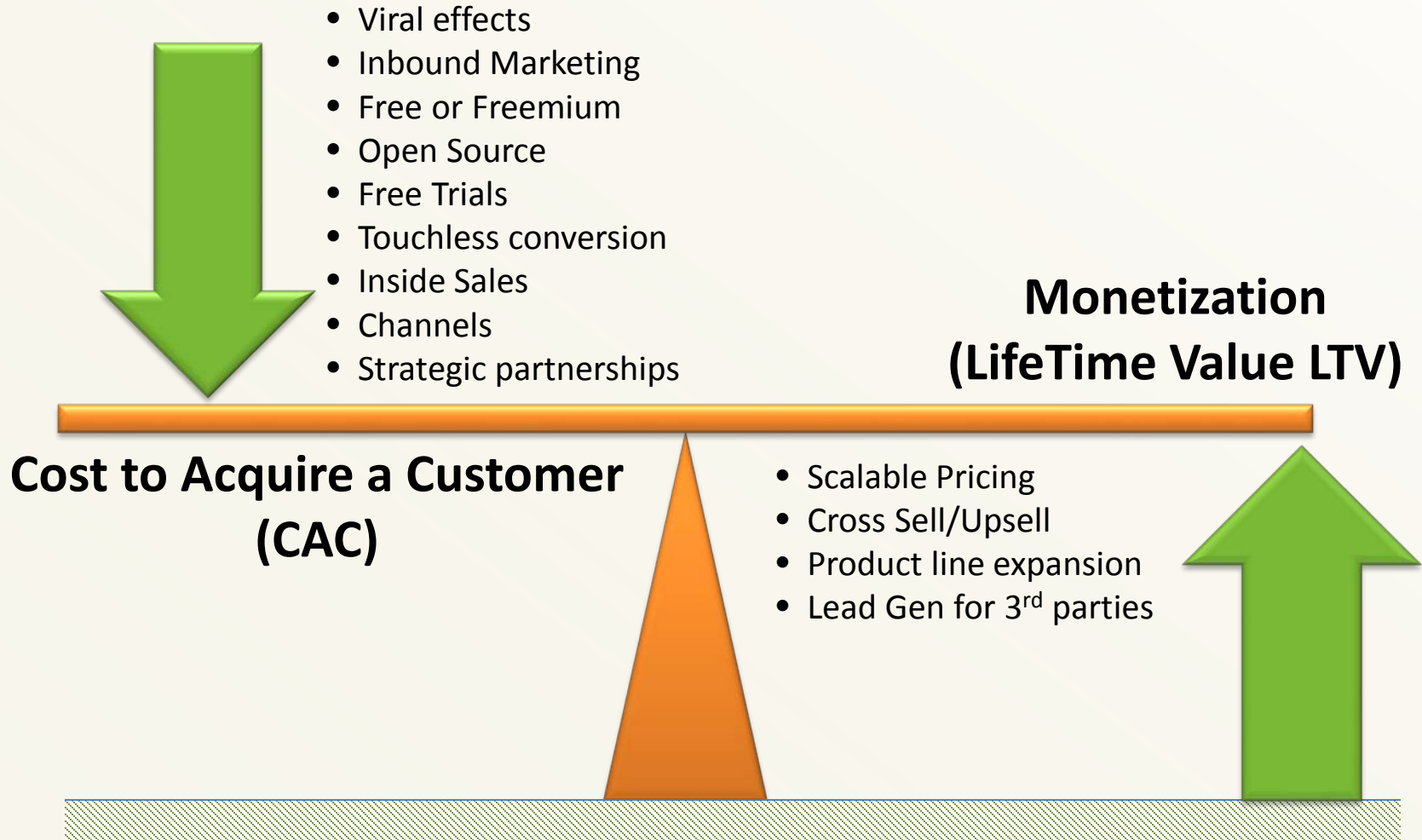


Rough Estimates of Cost of Customer Acquisition (CAC)



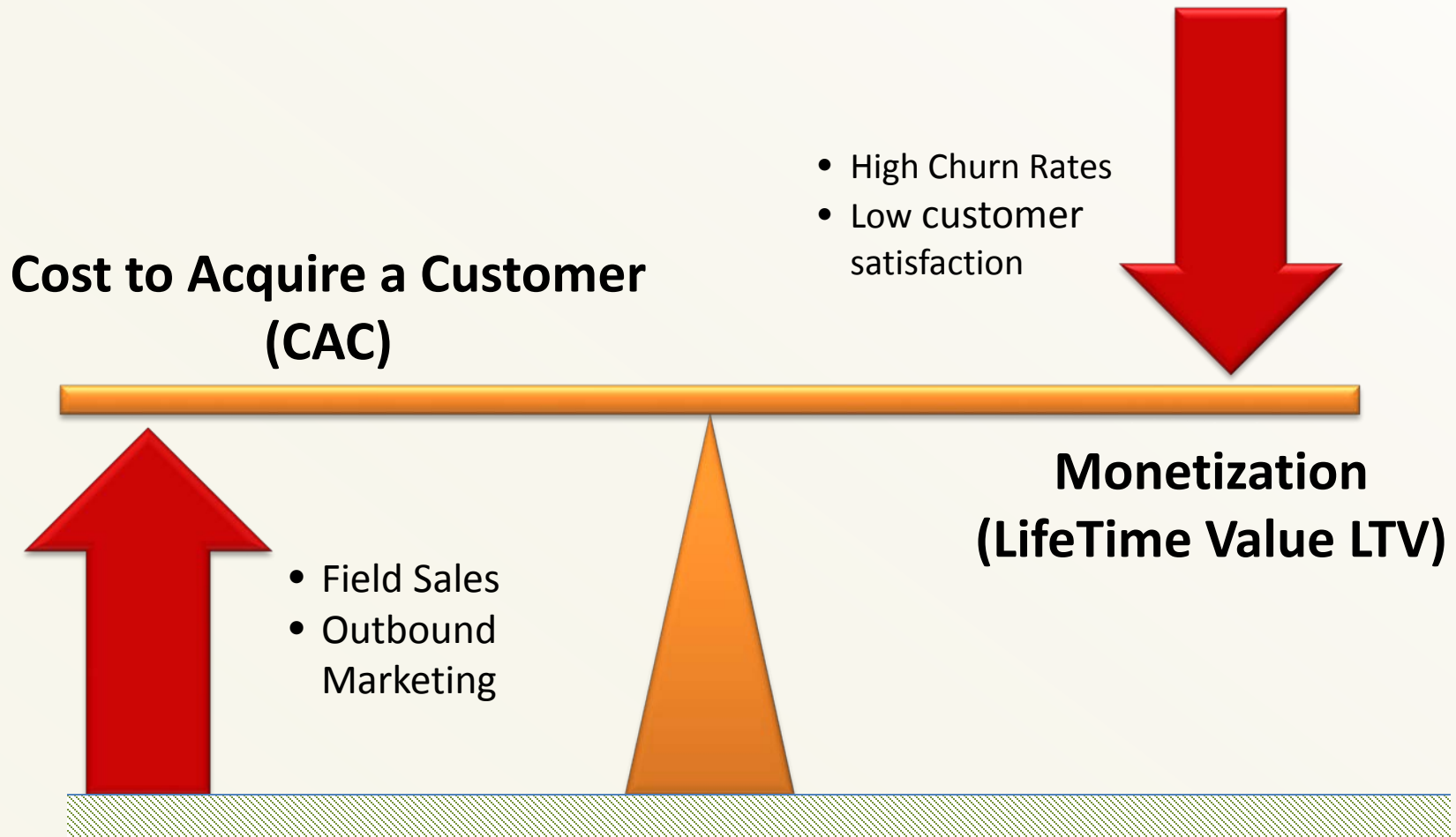
Customer Relationships

The Balancing Act

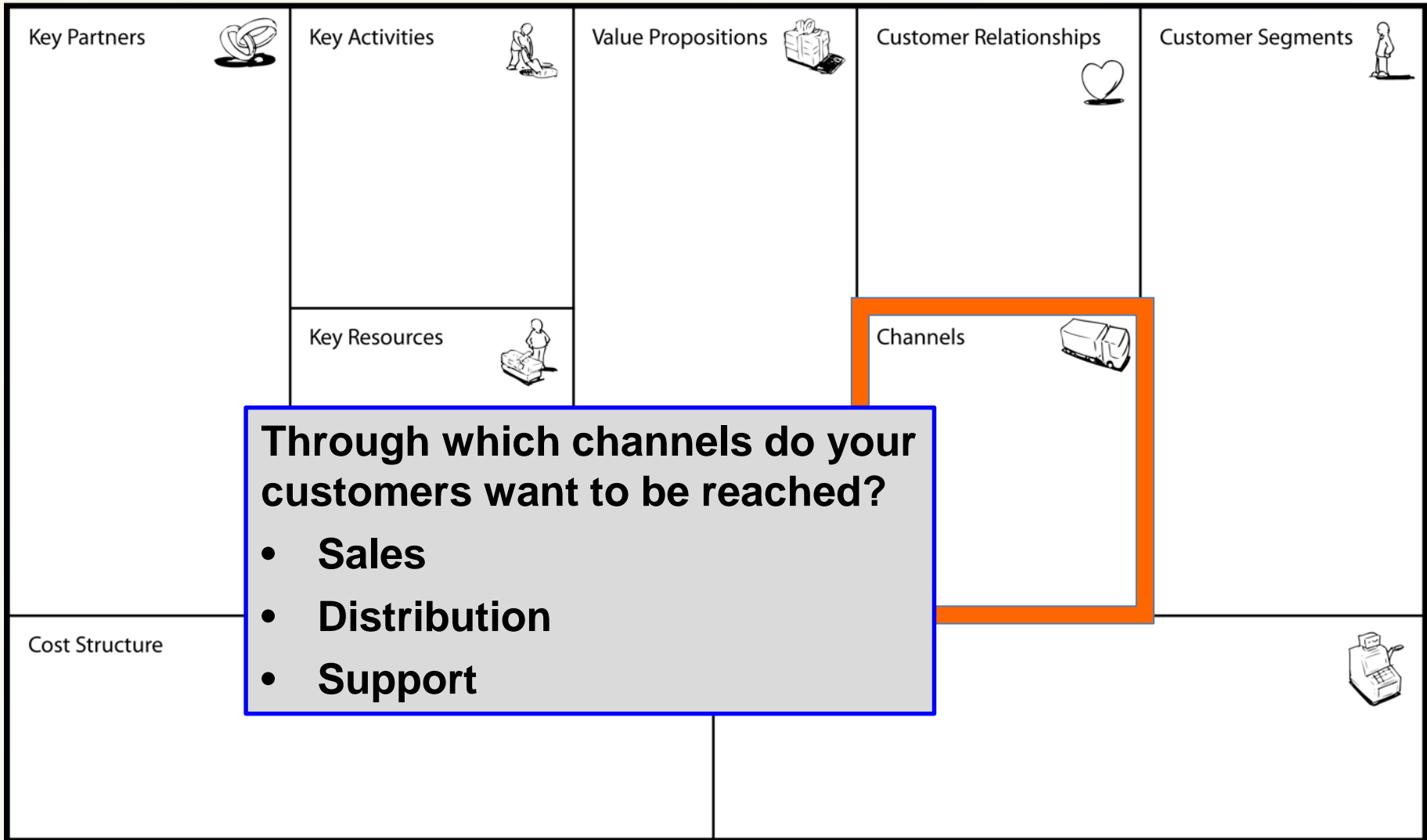


Customer Relationships

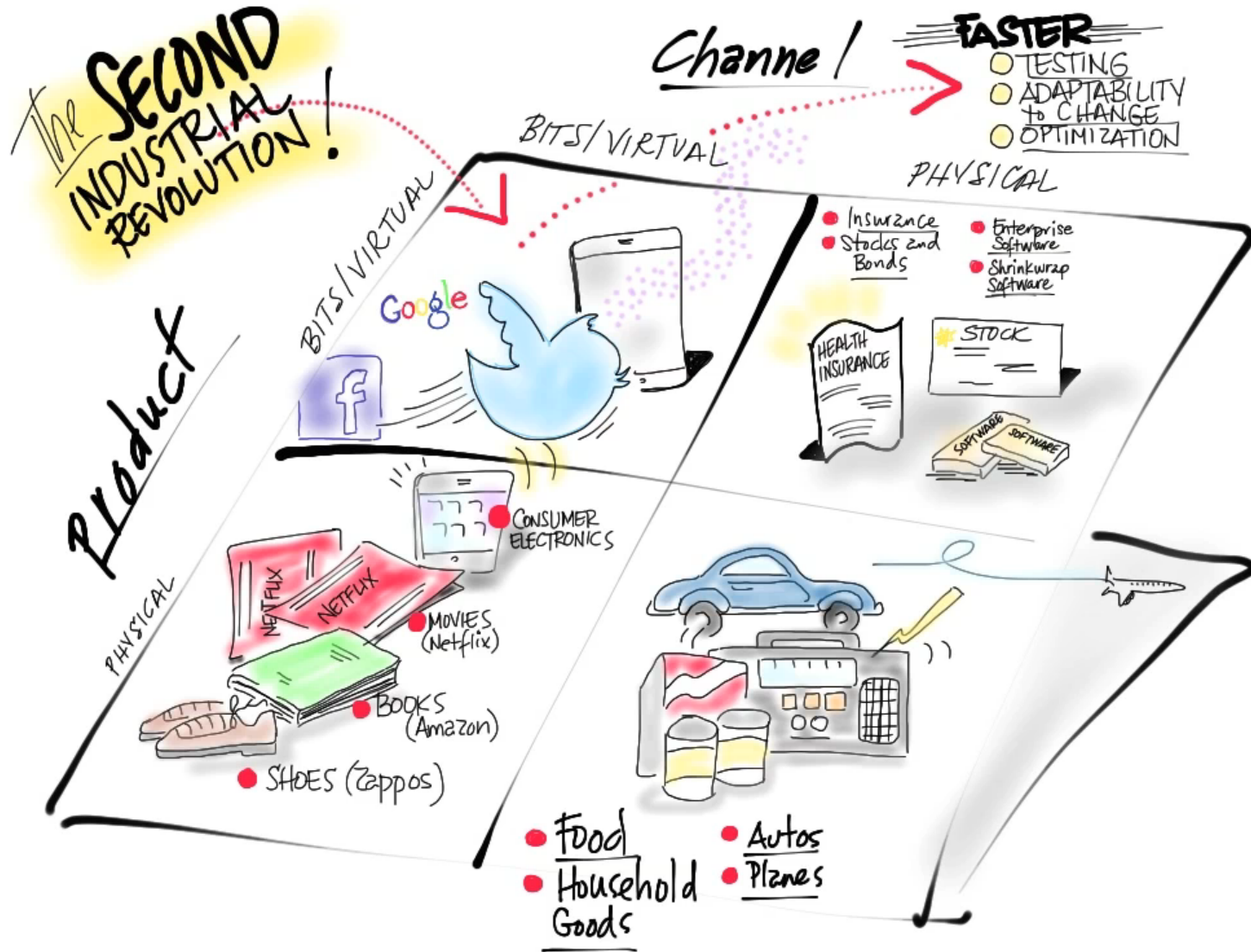
The Balancing Act



Channels



Channels

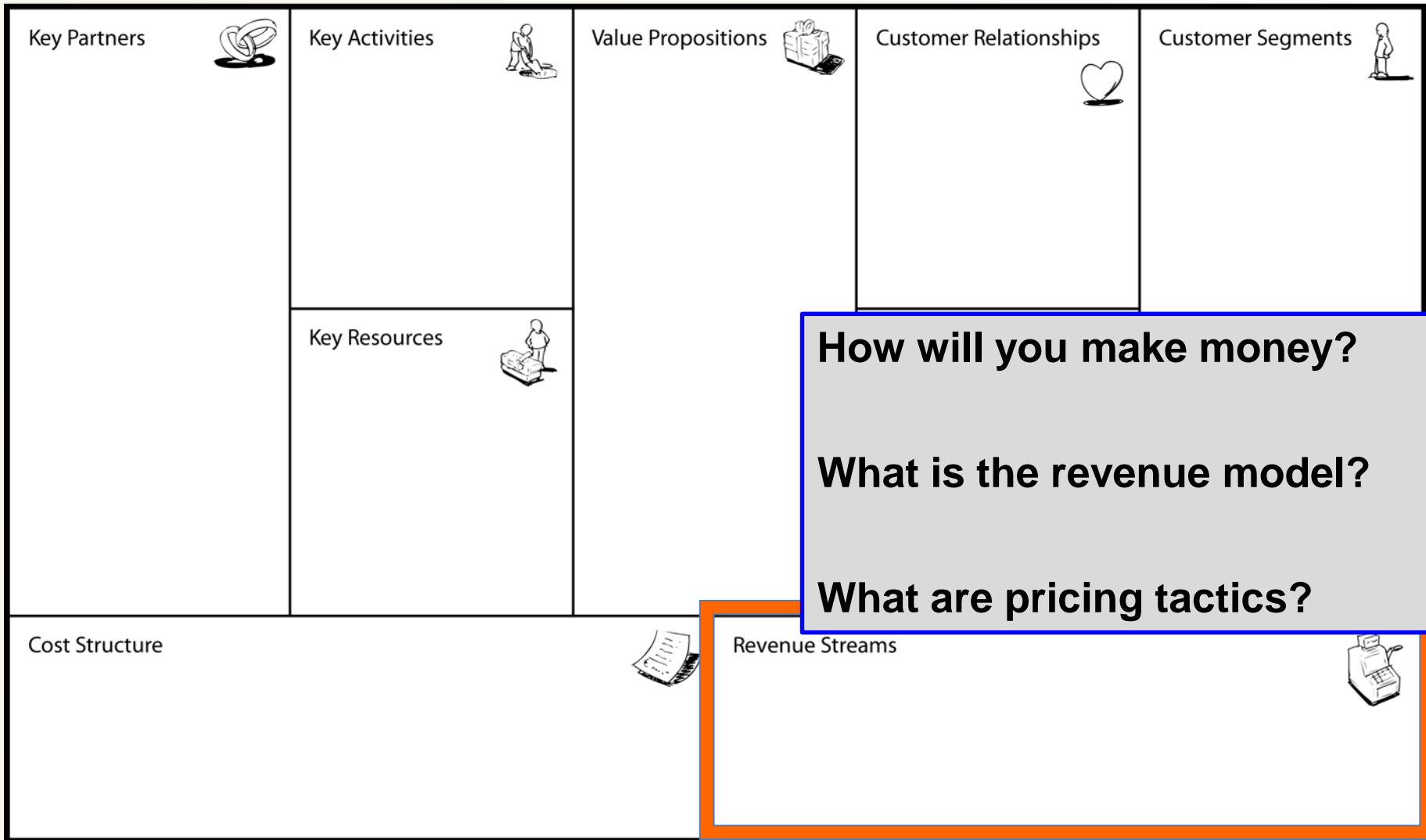


Channels

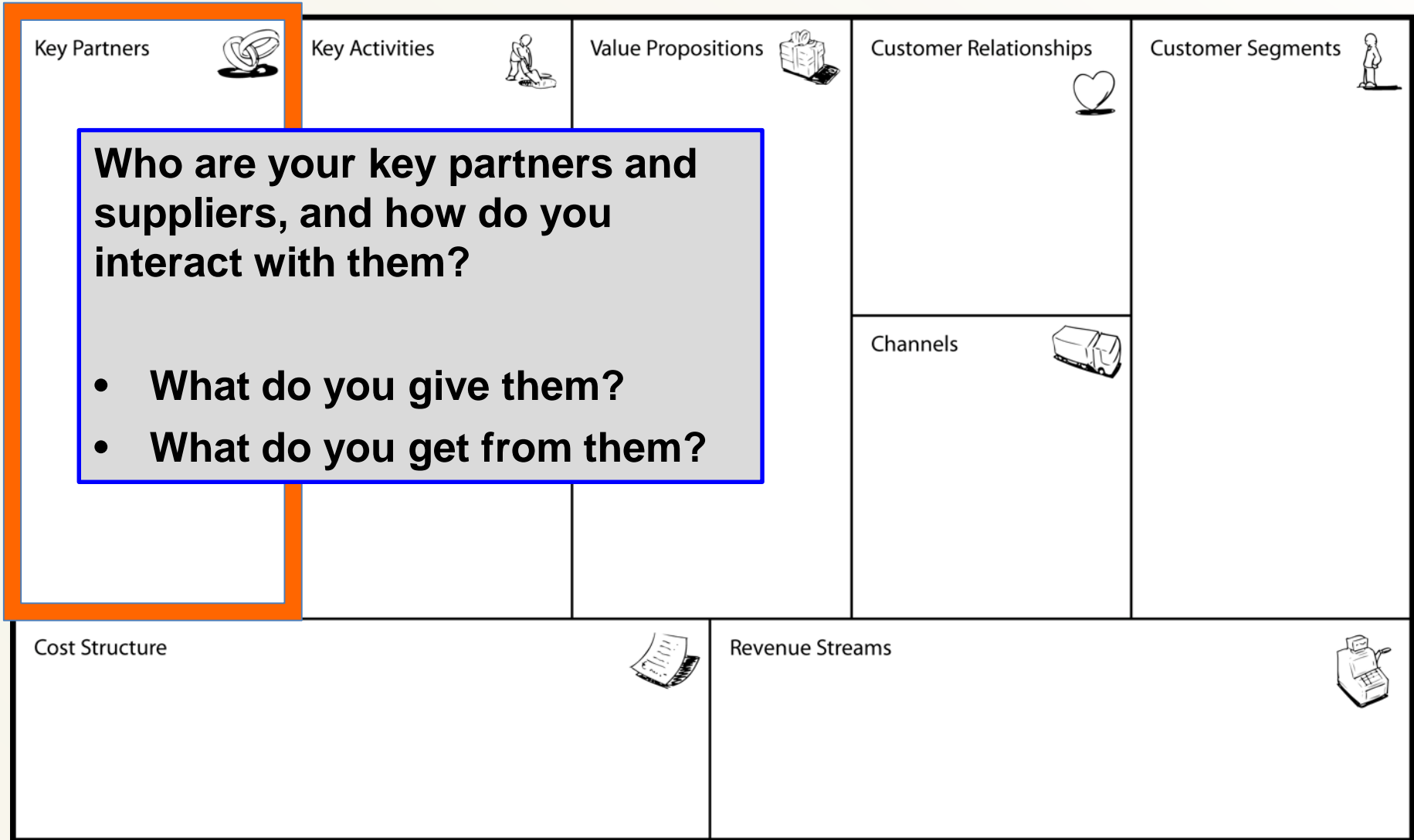
Channel Economics: Distributors/Resellers



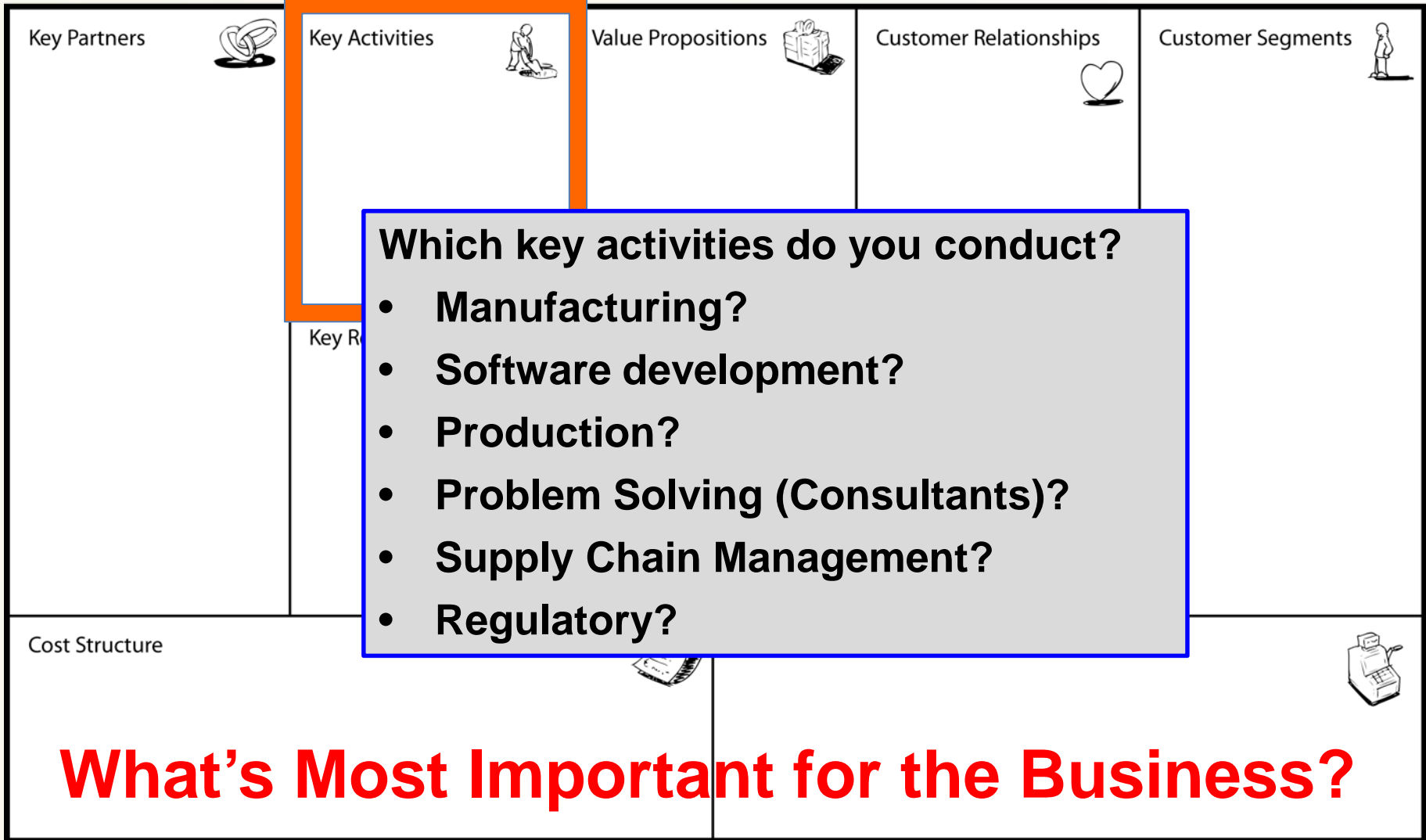
Revenue streams



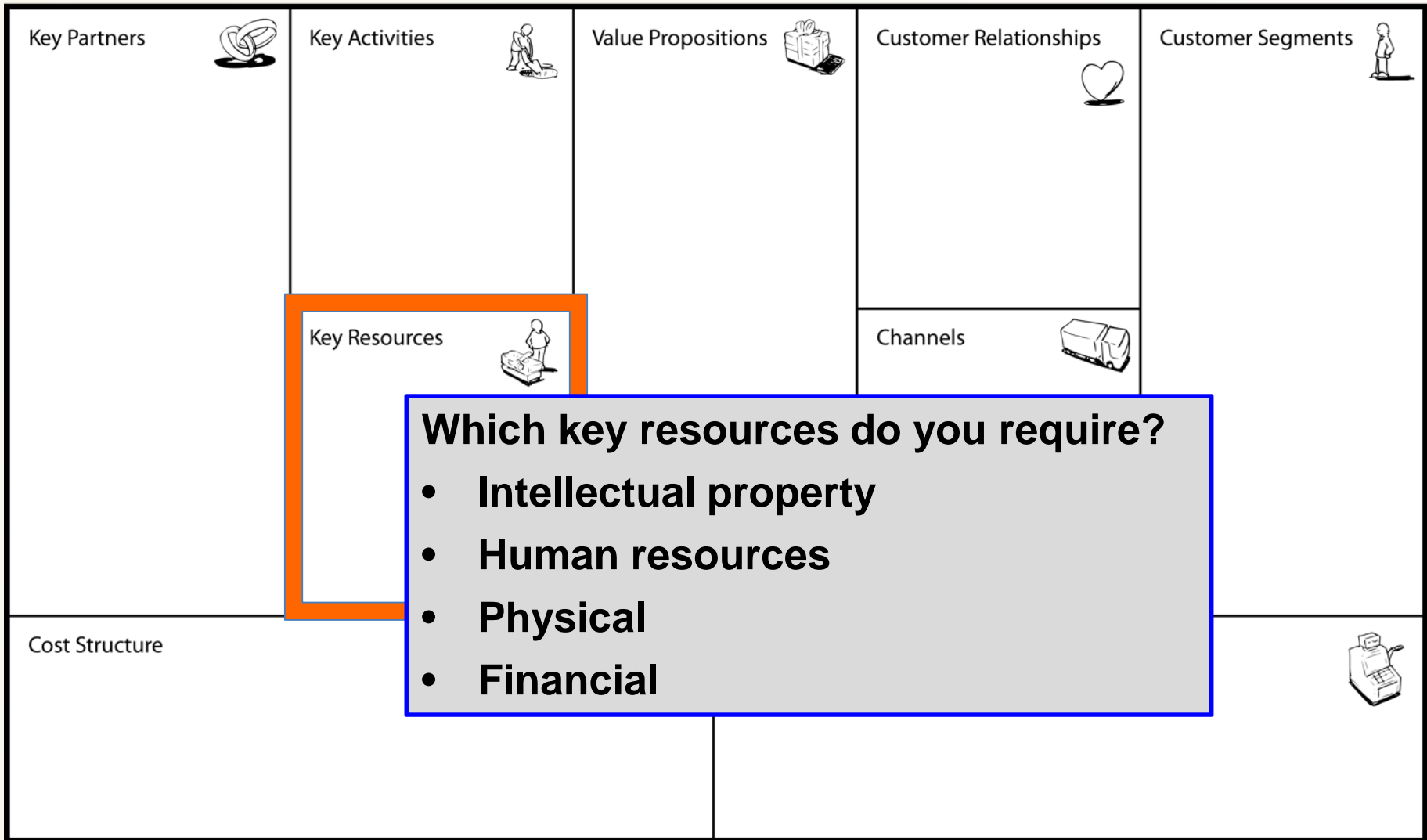
Partners



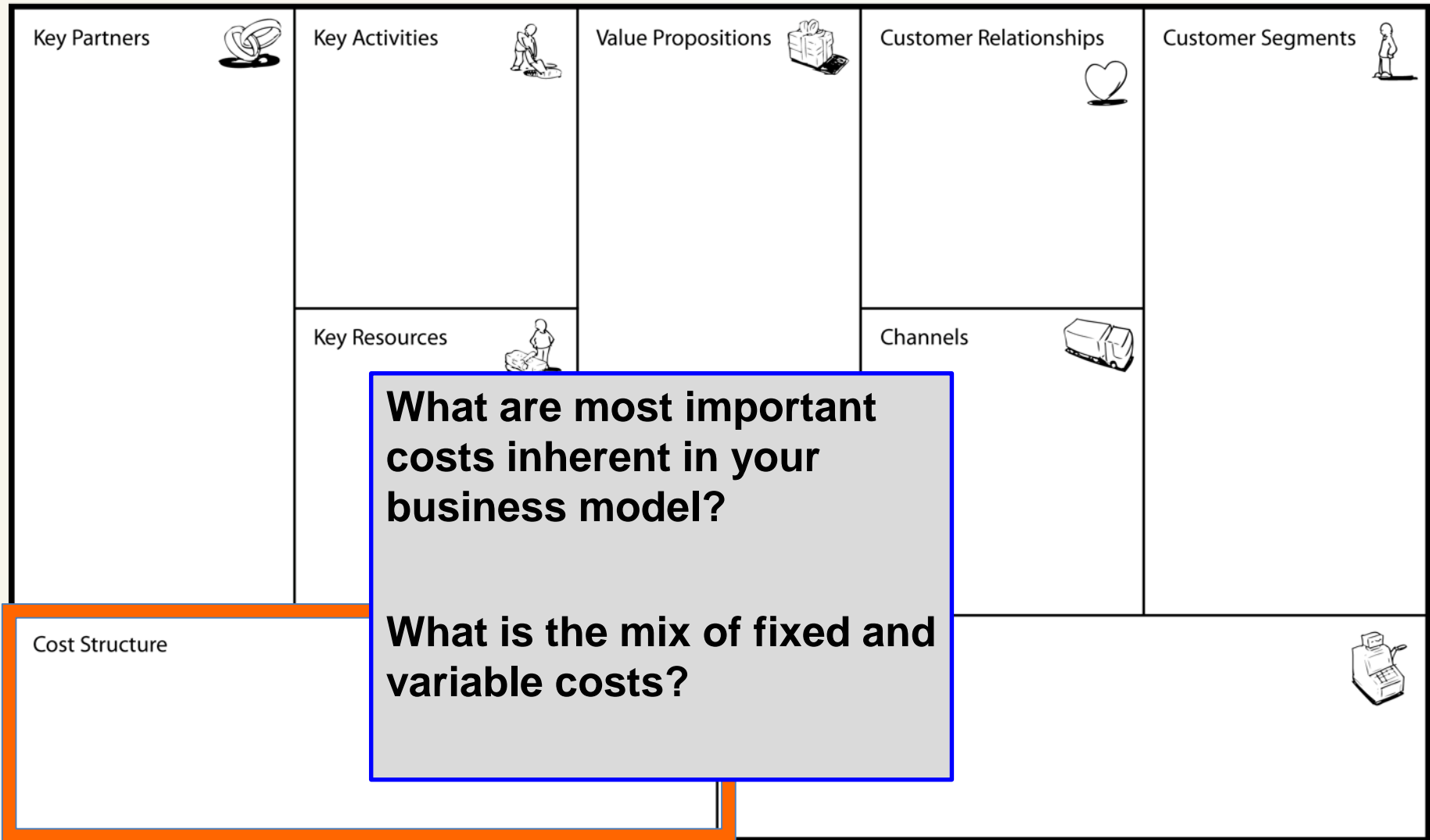
Activities



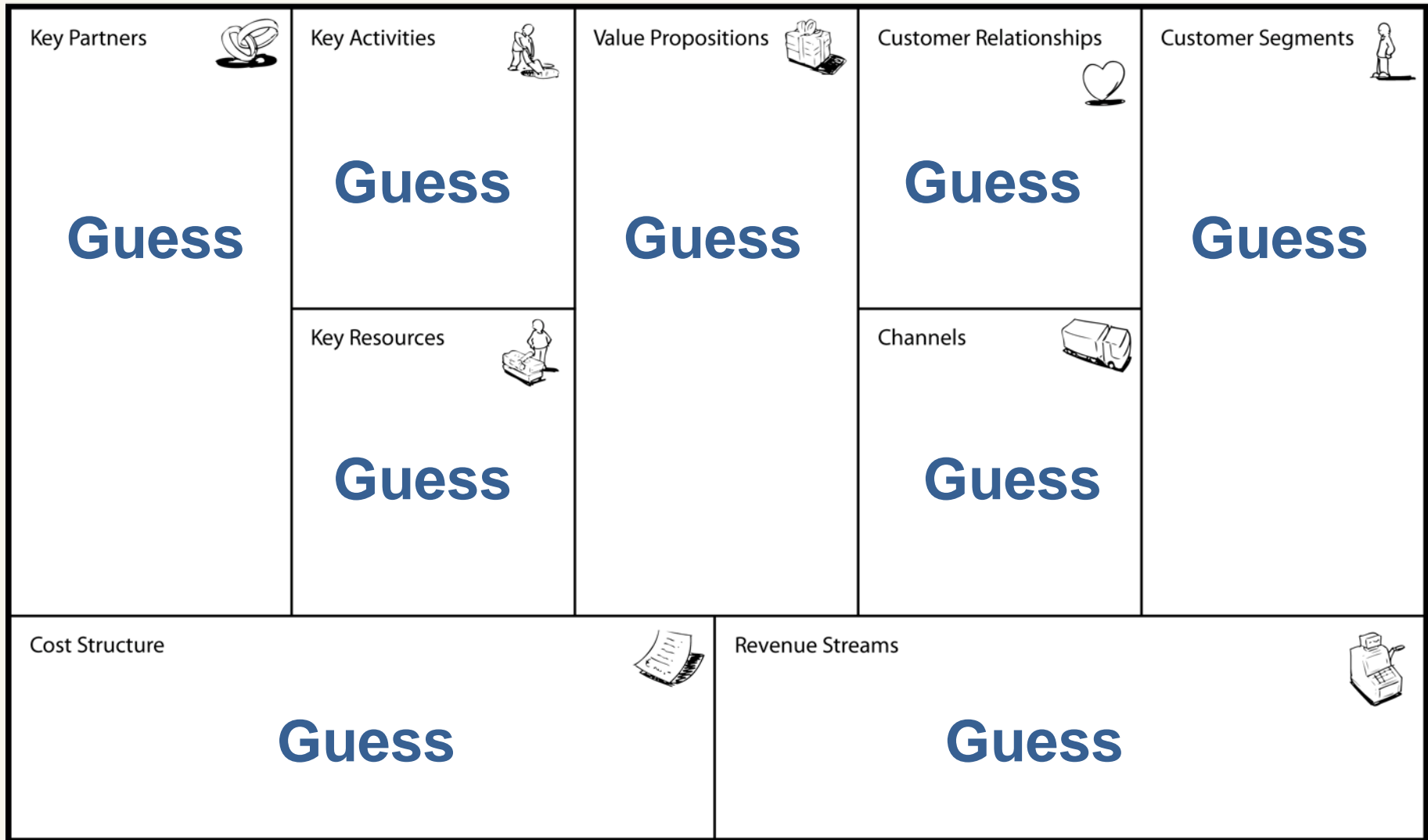
Resources



Cost structures



Initial business model canvas



Collect Data – Turn Guesses into Facts!

