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# CS7CS6: Part 3: Business Model Canvas Blocks continued

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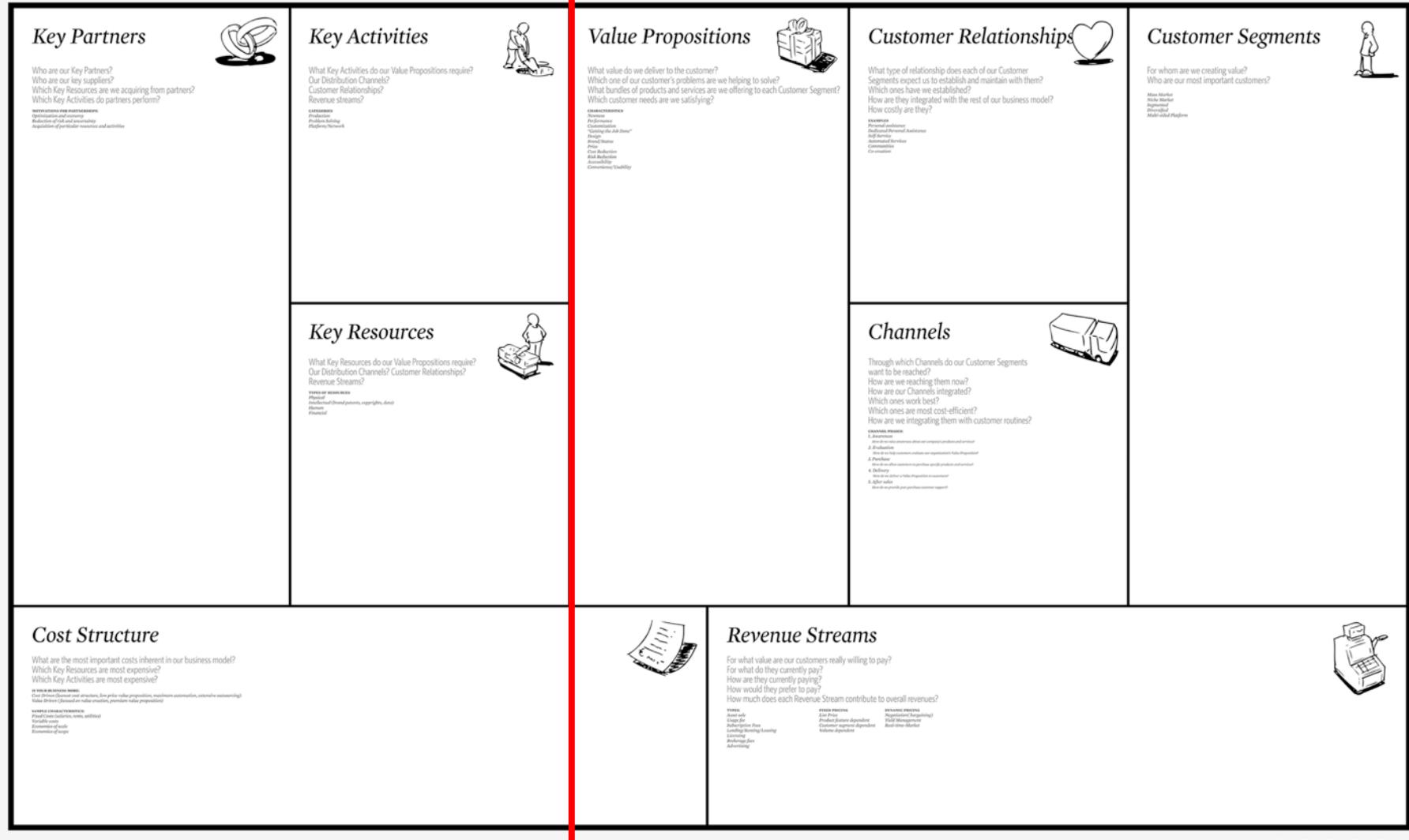
# The Business Model Canvas

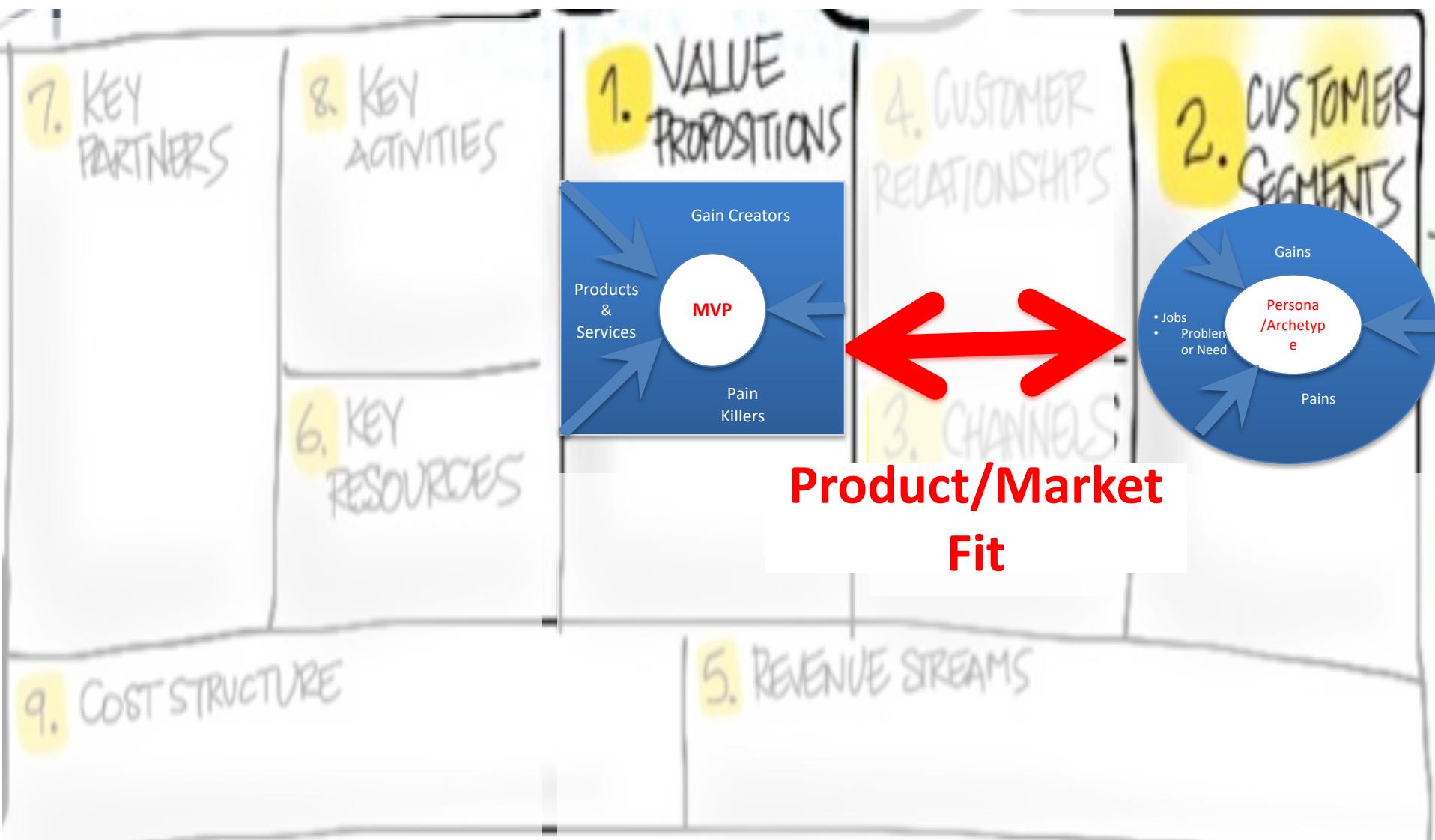
Designed for:

Designed by:

On: Day Month Year

Iteration:







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# Channels

7. KEY PARTNERS

8. KEY ACTIVITIES

1. VALUE PROPOSITIONS

**Who Are Our  
Customers? and  
How Do We Reach  
Them?**

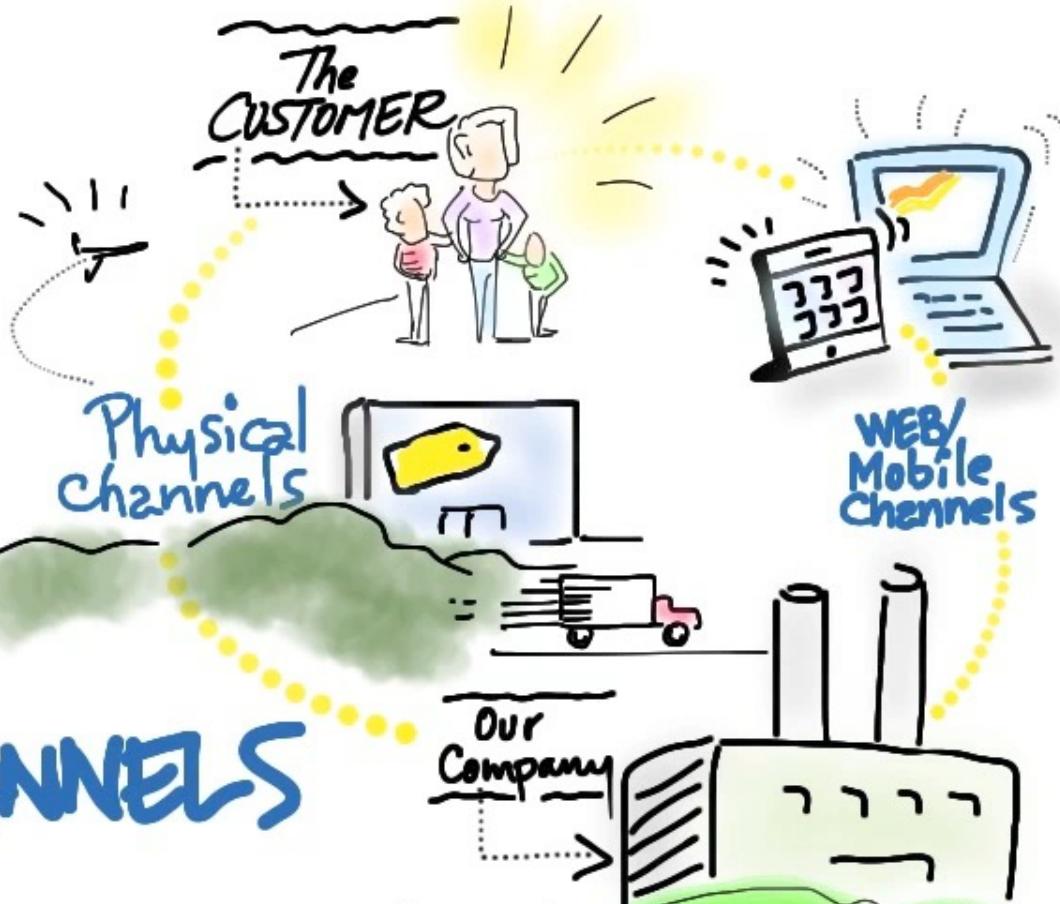
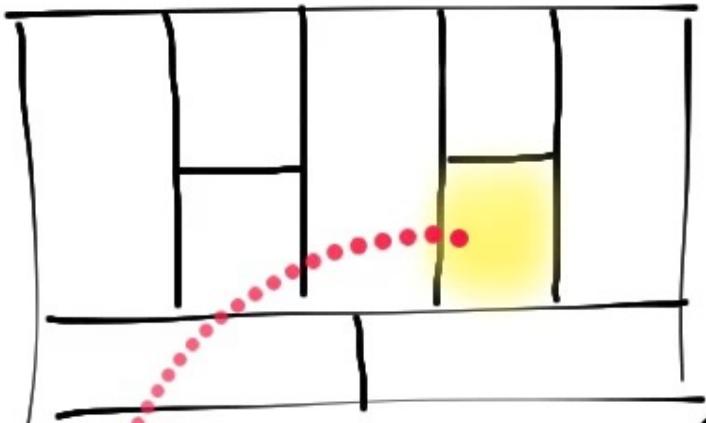
3. CHANNELS

6. KEY RESOURCES

9. COST STRUCTURE

5. REVENUE STREAMS

1. CUSTOMER SEGMENTS



## 3. CHANNELS



How does the product get from our company to the customer?

# Physical versus Virtual Channels

# The SECOND INDUSTRIAL REVOLUTION!

Product

Channel!

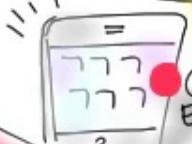
FASTER

- TESTING
- ADAPTABILITY to CHANGE
- OPTIMIZATION

BITS/VIRTUAL

BITS/VIRTUAL

Google



CONSUMER ELECTRONICS



Movies (Netflix)



Books (Amazon)



Shoes (Zappos)

Food  
Household Goods



Autos  
Planes

PHYSICAL

Insurance  
Stocks and Bonds

Enterprise Software  
Shrinkwrap Software



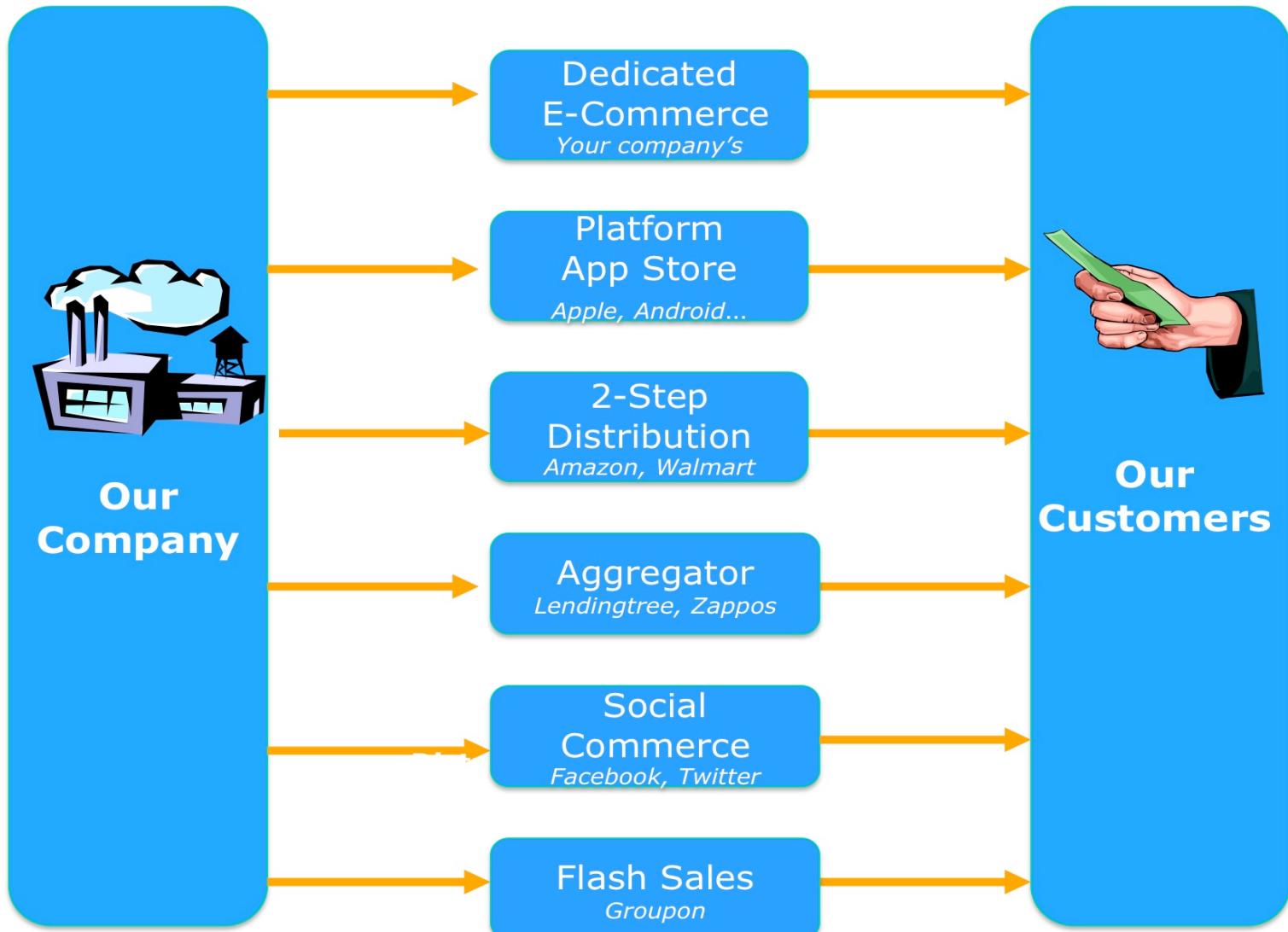
# How Do You Want Your Product to Get to Your Customer?

- Yourself
- Through someone else
- Retail
- Wholesale
- Bundled with other goods or services

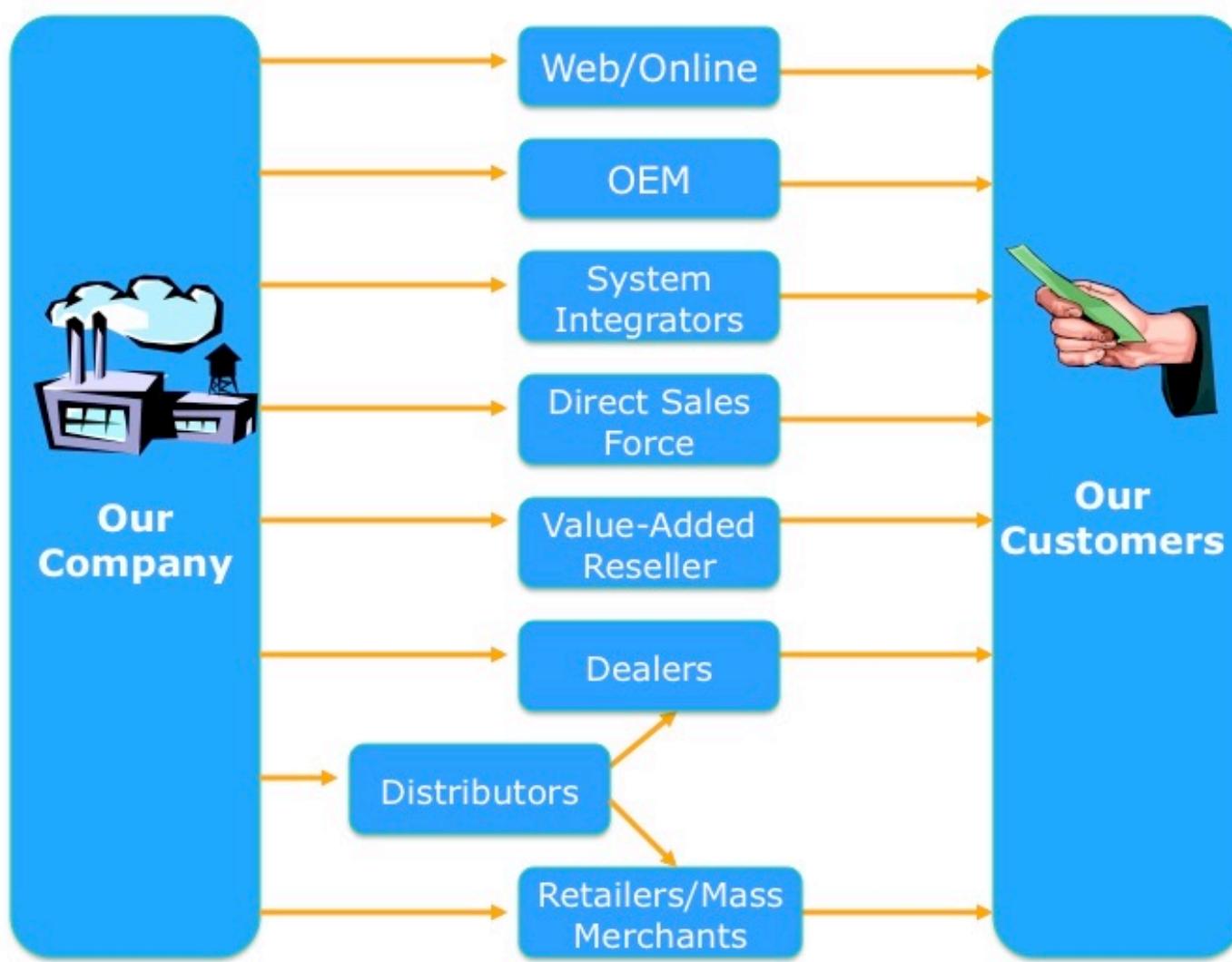
Different Economics

Different options for different Customer Segments – Customer Relationships

# Web Channels



# Physical Channels

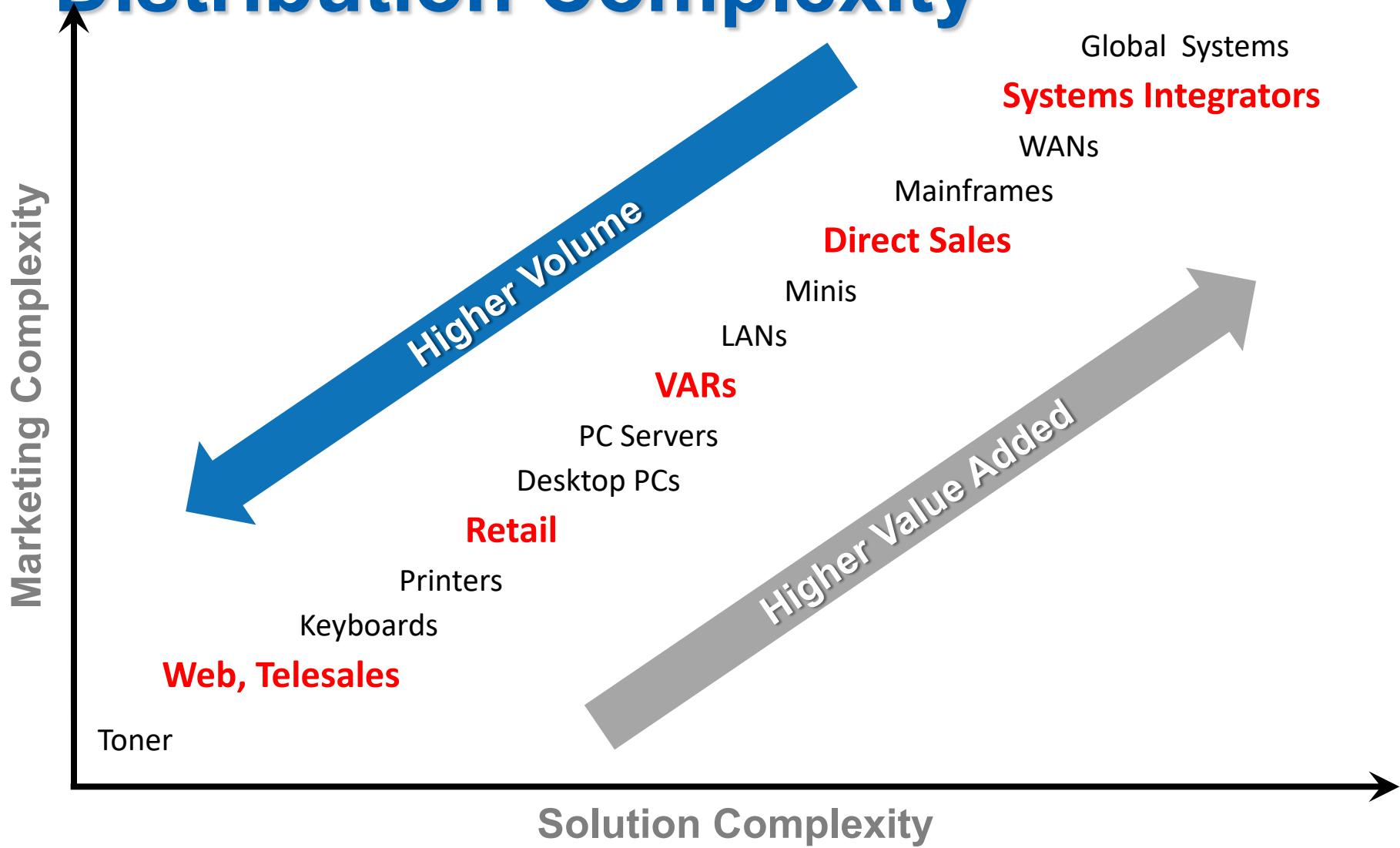


# How Does Your Customer Want to Buy Your Product from your Channel?

- Same day
- Delivered and installed
- Downloaded
- Bundled with other products
- As a service

...

# Distribution Complexity



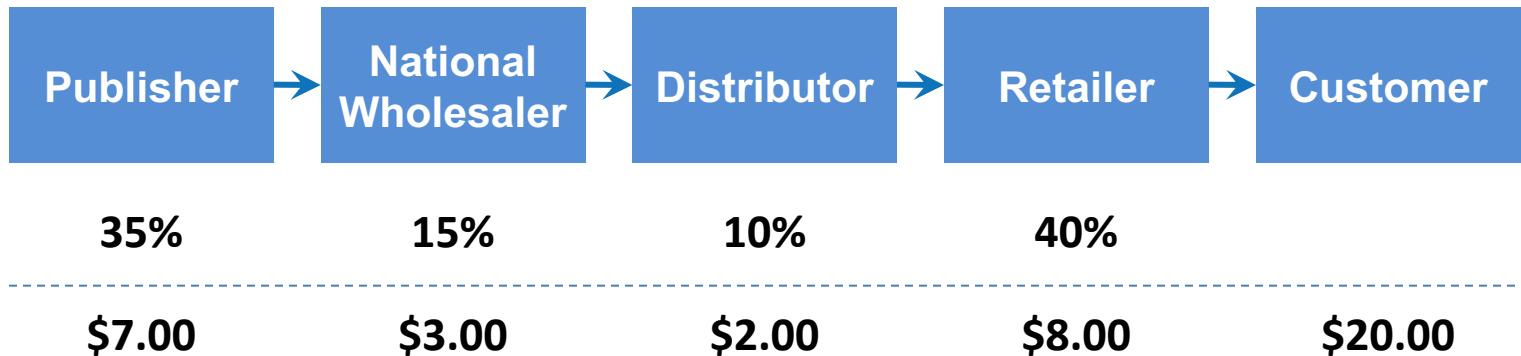
# How Are Channels Compensated?

- Commission
- Percentage of sales price
- Discounted pre-purchase

# How Are Channels Motivated or Incented?

- Money! – what makes them the most?
- Training
- Marketing to the channel
- Sales Performance Incentive Fund (SPIF)

# Book Publishing

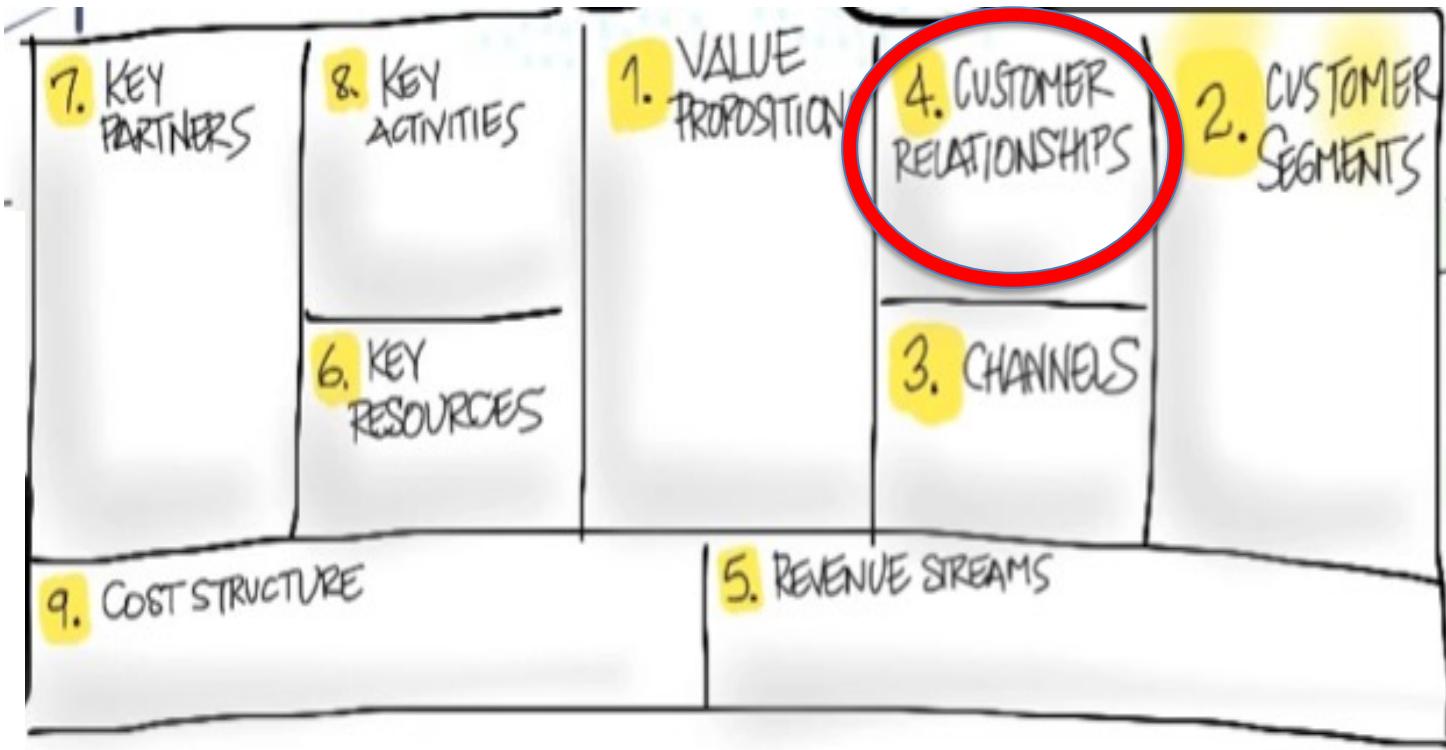


- You get
  - 35% of retail
  - the distributor gets 10%
  - the wholesaler gets 15%
  - the retailer gets 40%
    - less any *discount* they offer the customer



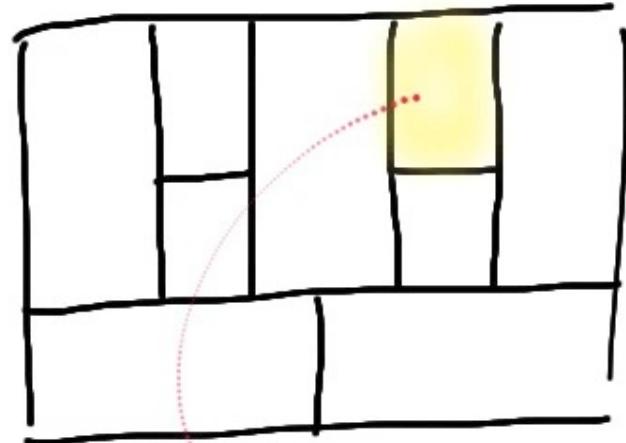
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# Customer Relationships

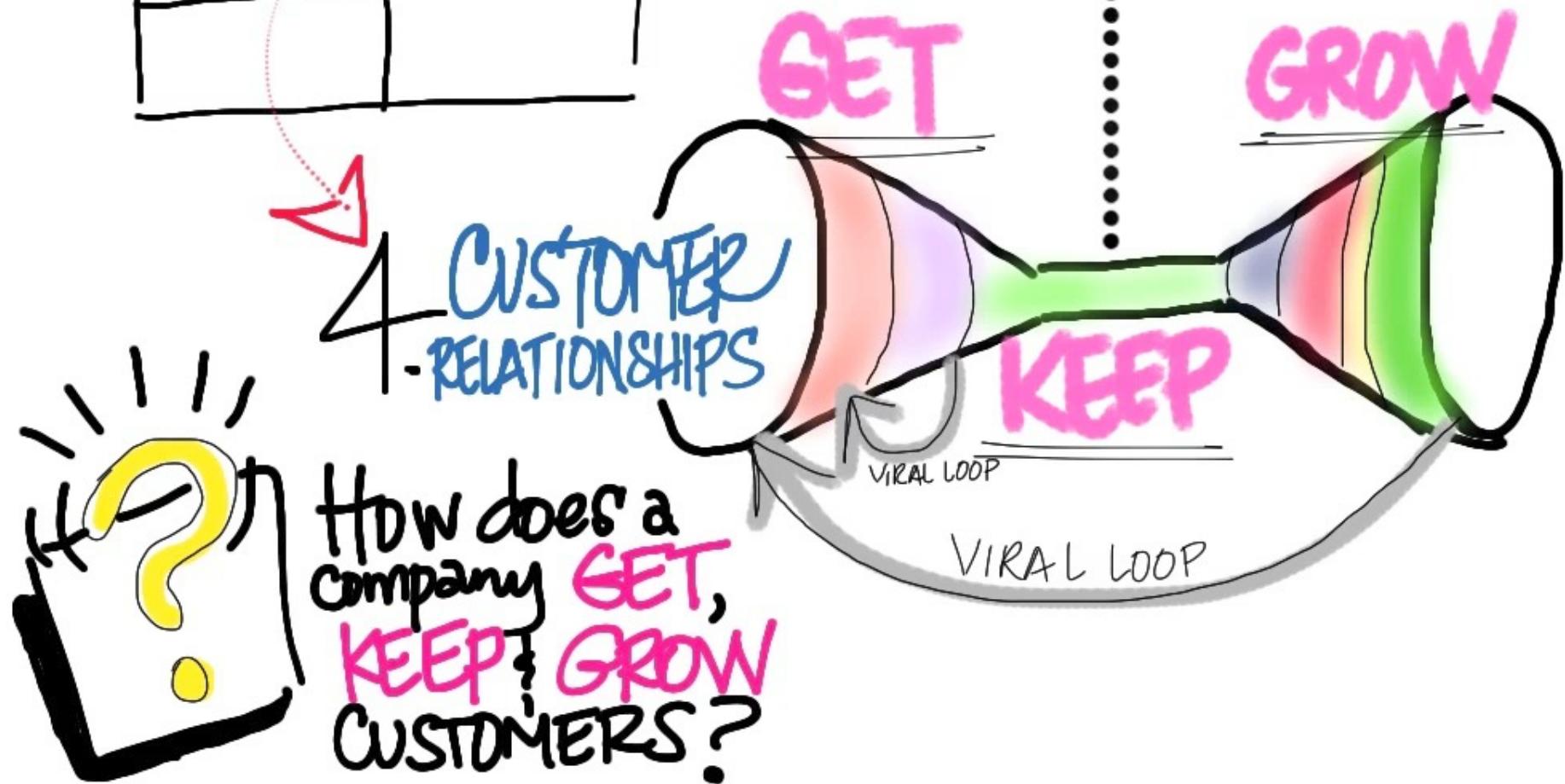


# Customer Relationships

How do you Get, Keep and Grow Customers?

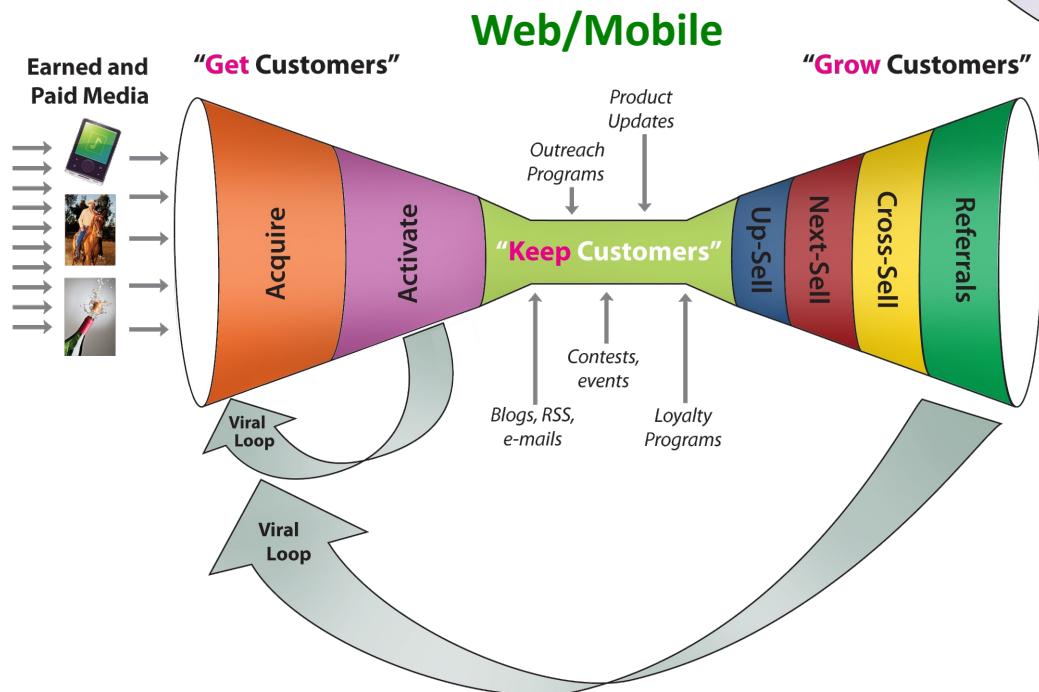
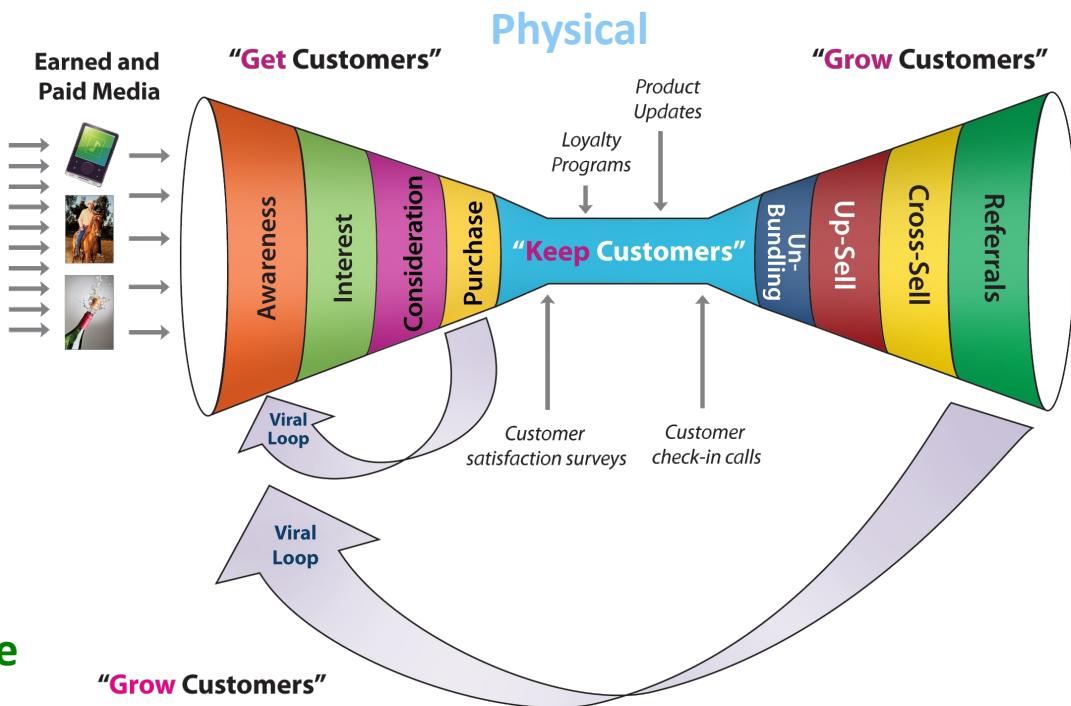


Just like in Channels,  
these are DIFFERENT for  
**WEB/MOBILE** versus  
**PHYSICAL**



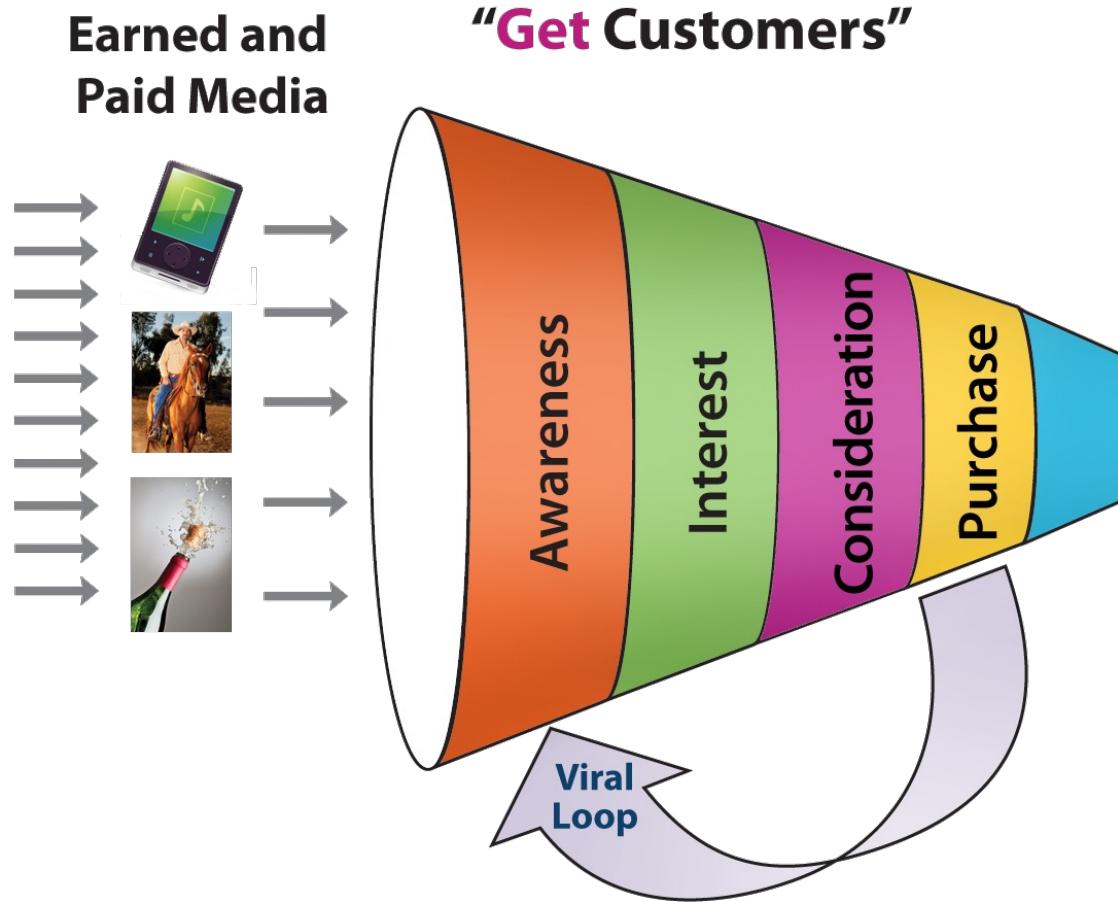
# Customer Relationships

## Physical & Web Mobile Are Different



# Customer Relationships

## Physical Products – **Get Customers**



# Paid Demand Creation Activities

## “Paid” Media

### Demand Creation



Public Relations

Advertising

Trade Shows

Webinars

Email marketing

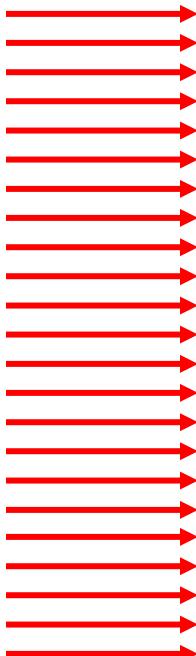
On-line Search Engine Marketing  
(SEM)

Biz Dev

# Free Demand Creation Activities

## “Earned” Media

### Demand Creation



**Publications in journals**

**Conference speeches/papers**

**Educational seminars**

**Public relations**

**Blogging / Sharable content**

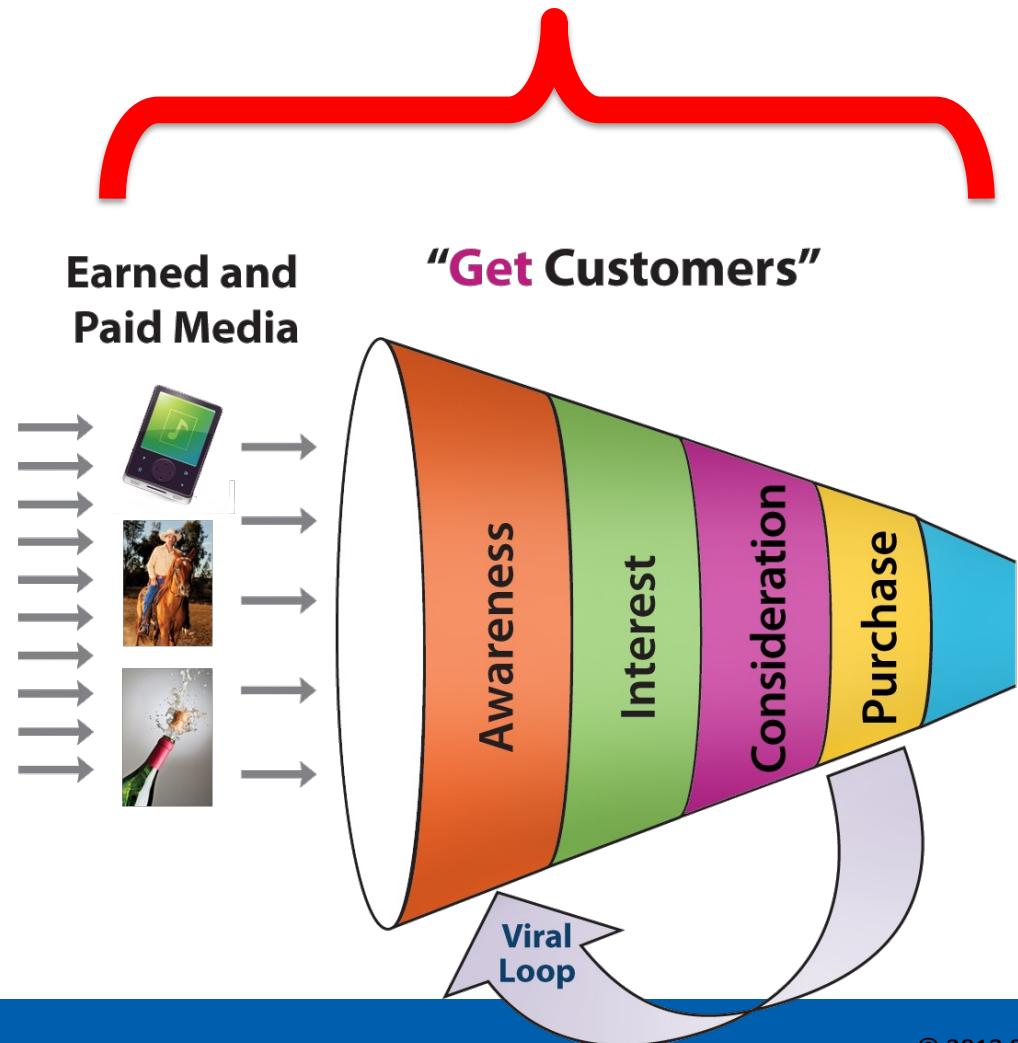
**Social Media**

**Communities**

# Customer Relationships

## Physical Products – **Get Customers**

**CAC = Customer Acquisition Cost**

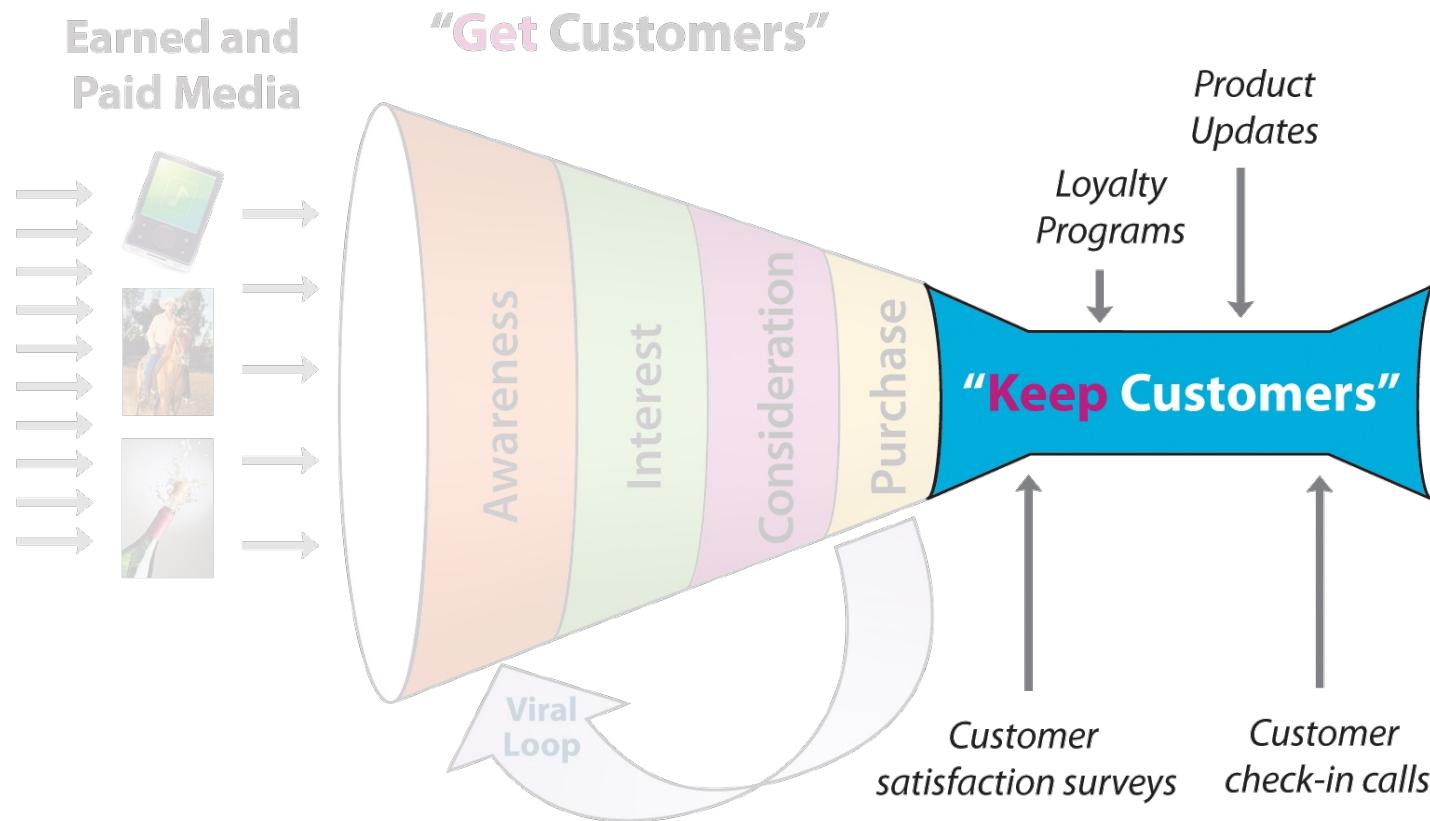


# Customer Acquisition Cost versus Sales Complexity



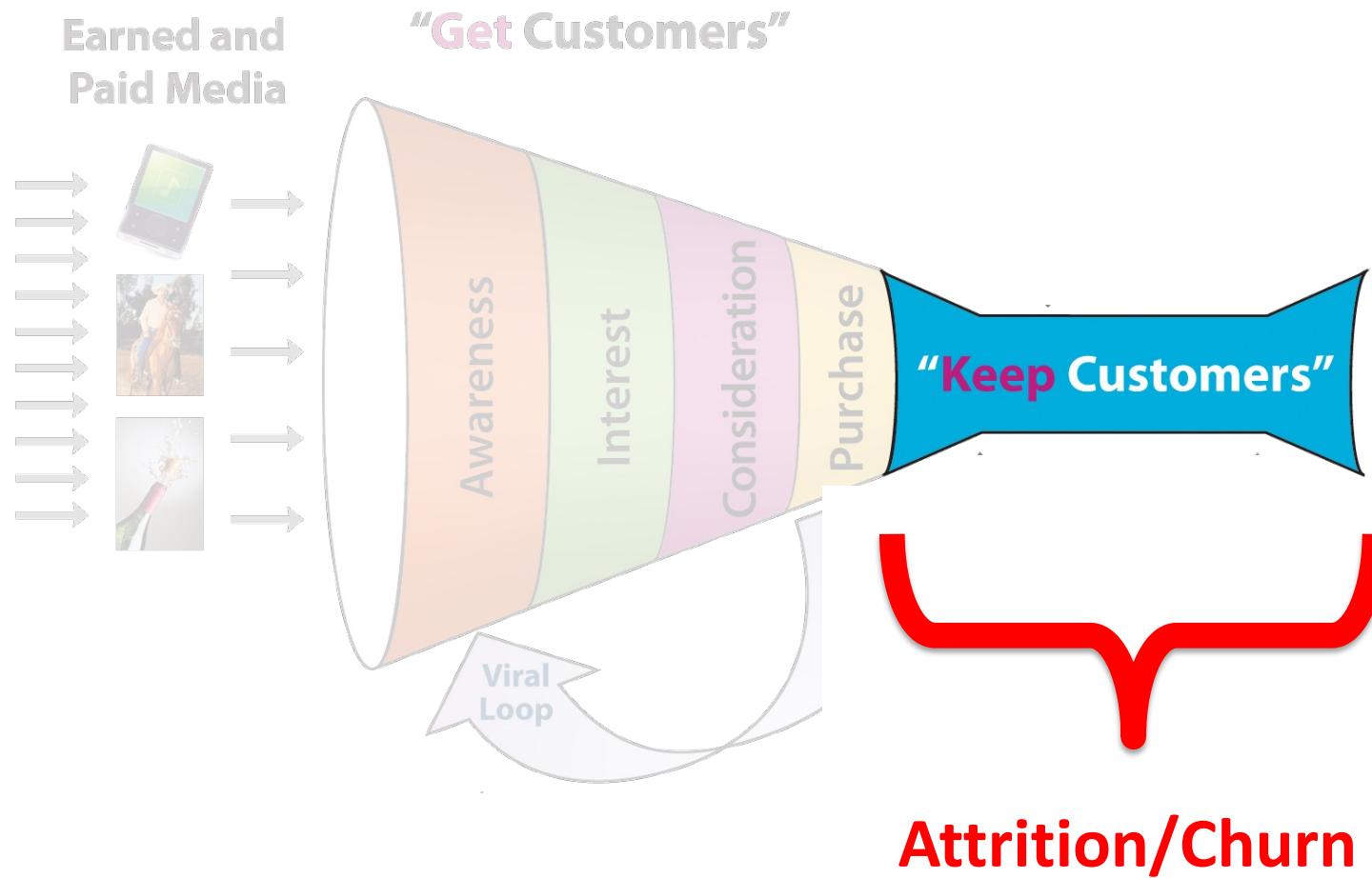
# Customer Relationships

## Physical Products – **Keep Customers**



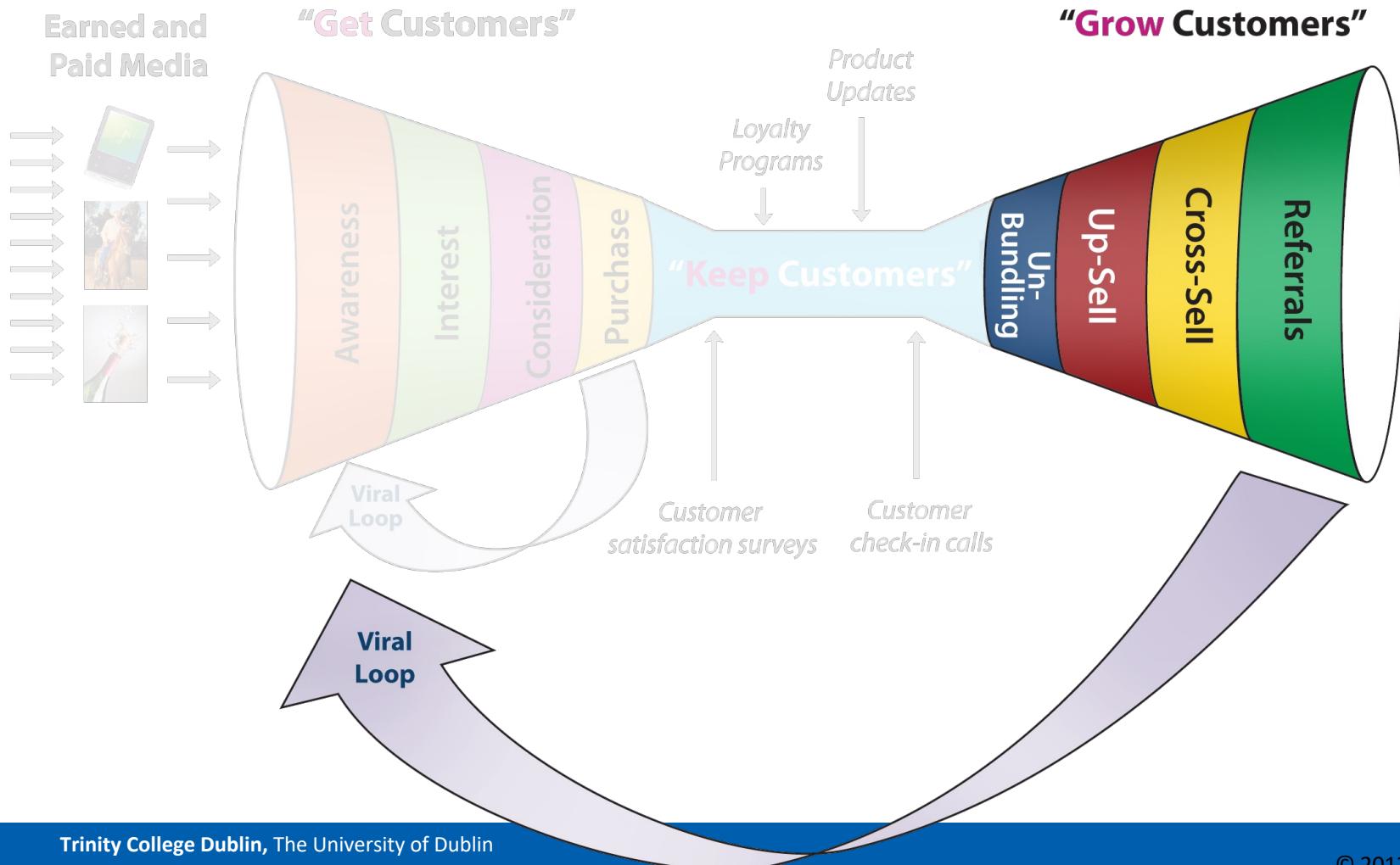
# Customer Relationships

## Physical Products – **Keep Customers**



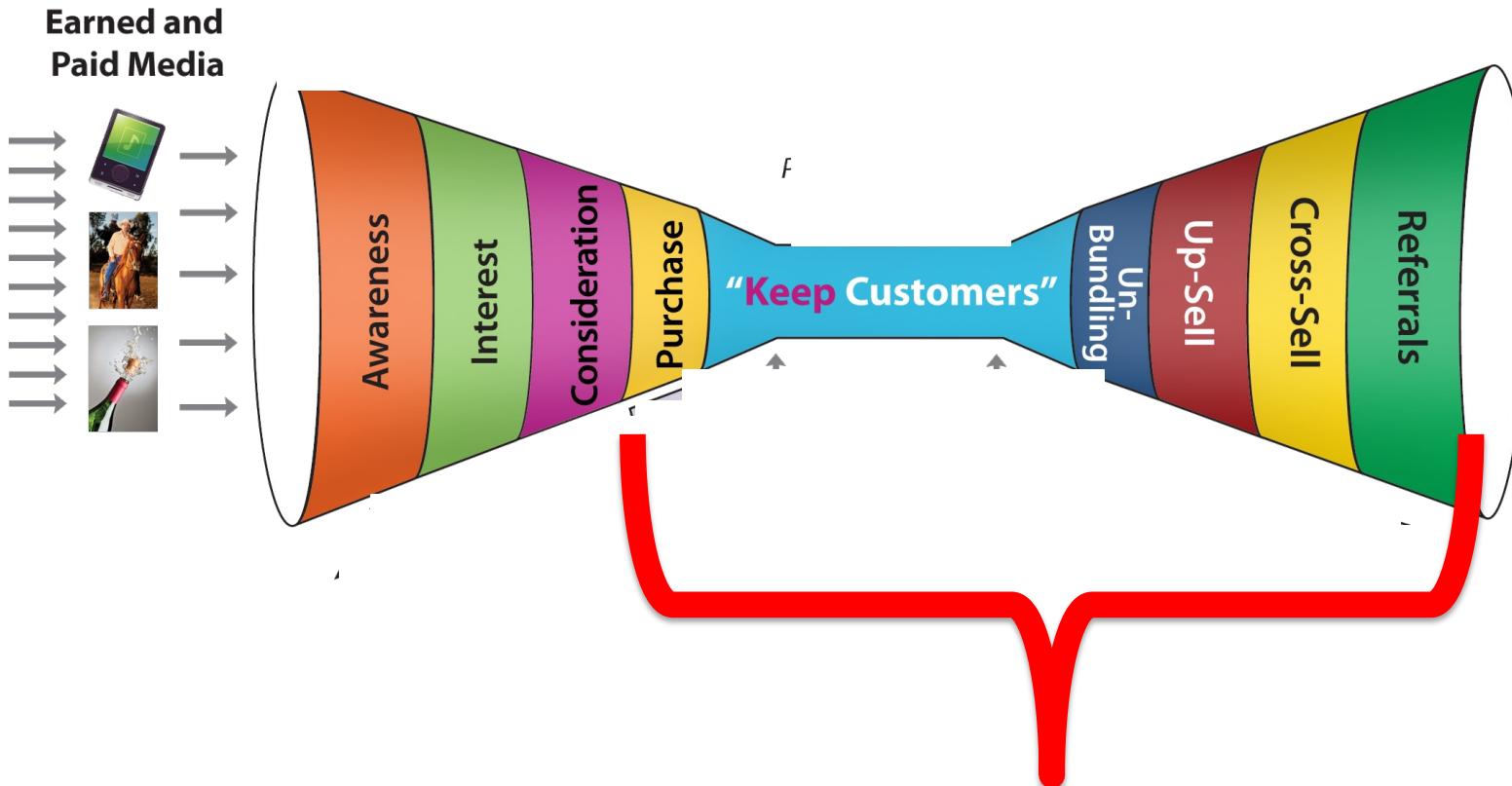
# Customer Relationships

## Physical Products – **Grow Customers**



# Customer Relationships

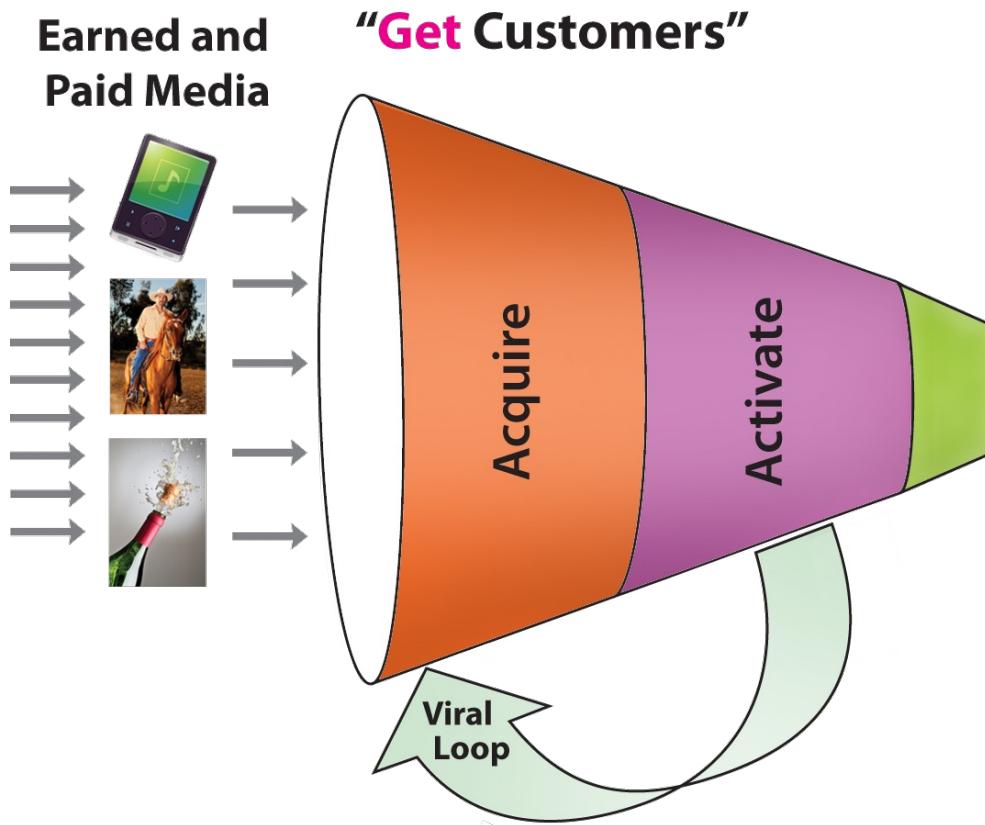
## Physical Products – Get/Keep/Grow



**LTV = Customer Life-Time Value**

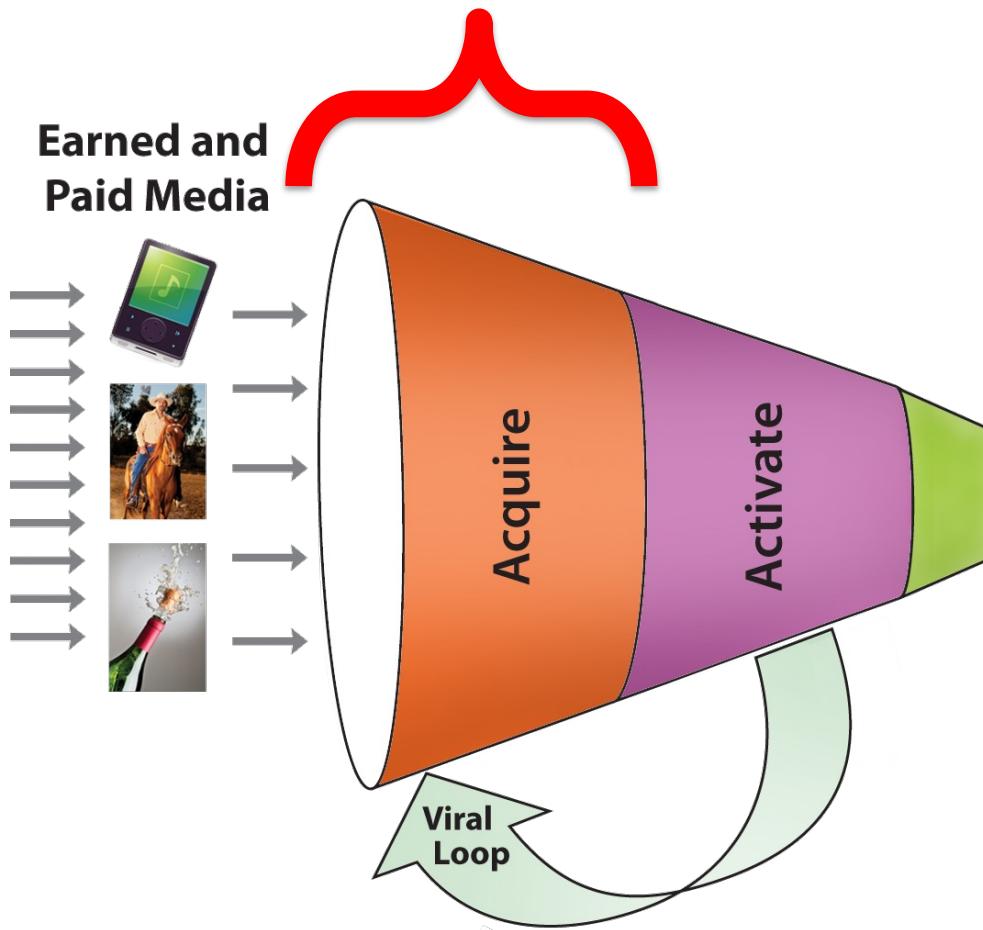
# Customer Relationships

## Web/Mobile Products— **Get Customers**



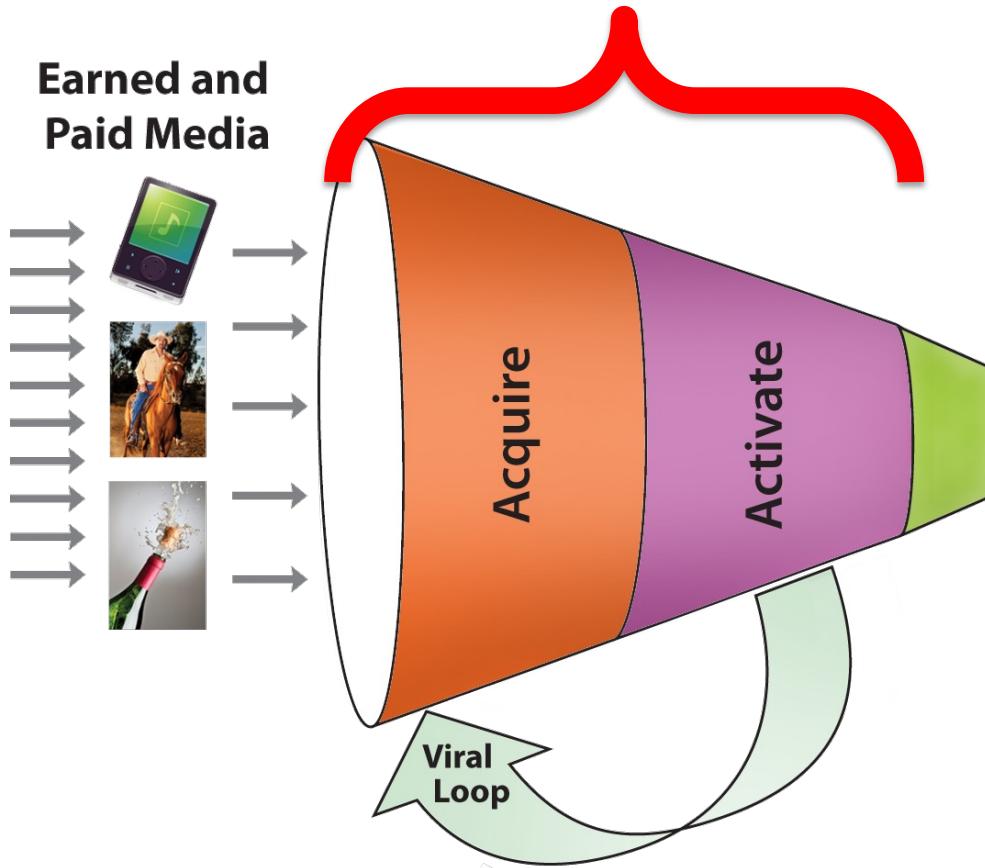
# Web/Mobile Products—**Get Customers**

**CPM = cost per thousand hits (“cost per mille”)**



# Web/Mobile Products—Get Customers

**CPA = Cost per Action**



# Exsample: SaaS Products– Get Customers

Organic Traffic,  
SEM, Other Paid  
Sources



# Our Example Marketing Funnel

## Quick Marketing Calculation

50% amount of traffic that is organic versus paid

\$1.50 cost per paid visitor (Google AdWords, etc.)

\$ 0.75 Cost per visitor (both paid and unpaid)

3% visitors convert to raw leads

20% number of raw leads that turn into qualified leads

1 qualified lead

5 raw leads required

167 Visitors required

**\$125 Cost per qualified lead**

Cost per Qualified Lead

\$125

Leads to closed deal

10

Marketing Costs per closed deal

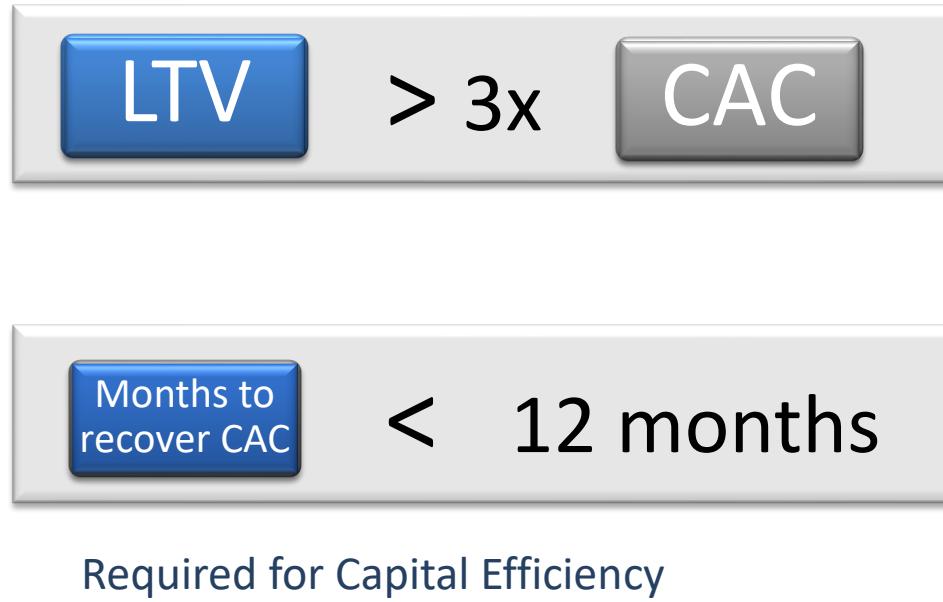
\$1,250

# We Can Compute CAC and LTV

<b>Lead Gen costs per deal</b>	\$ 1,250	Excludes people costs (Cost per qualified lead x no of leads required per closed deal)
<b>Selling costs per deal</b>	\$ 1,620	<b>Excludes cost of sales management</b>
<b>Total CAC</b>	\$ 2,870	Excludes people costs in marketing, and sales management. (CAC=Customer Acquisition Cost)
<b>Total LTV</b>	\$ 16,000	Calculated by dividing average monthly gross profit per customer (ARPU x Gross Margin ) by the churn rate

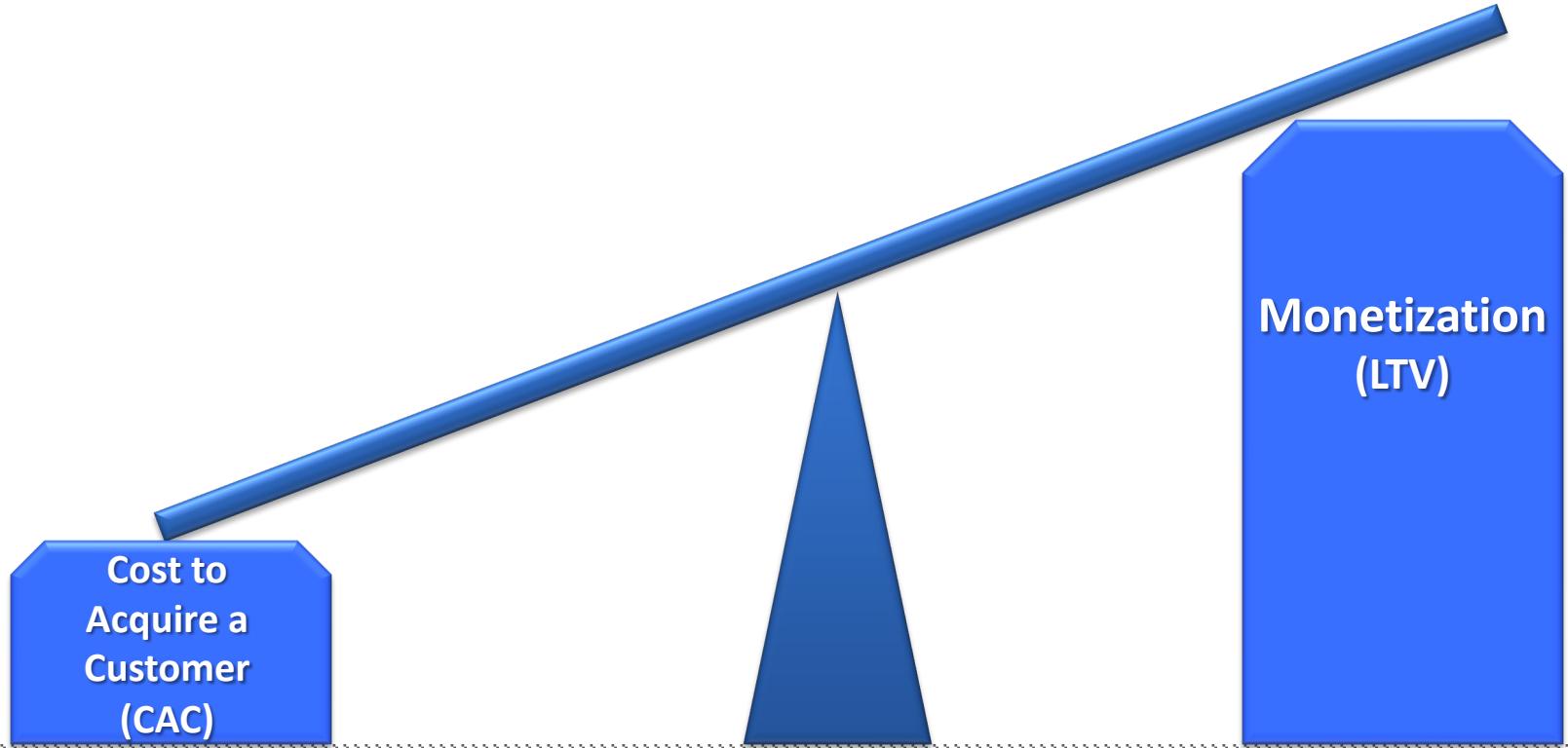
This excludes people costs in marketing, and sales management costs

# Balancing CAC/LTV in a SaaS model

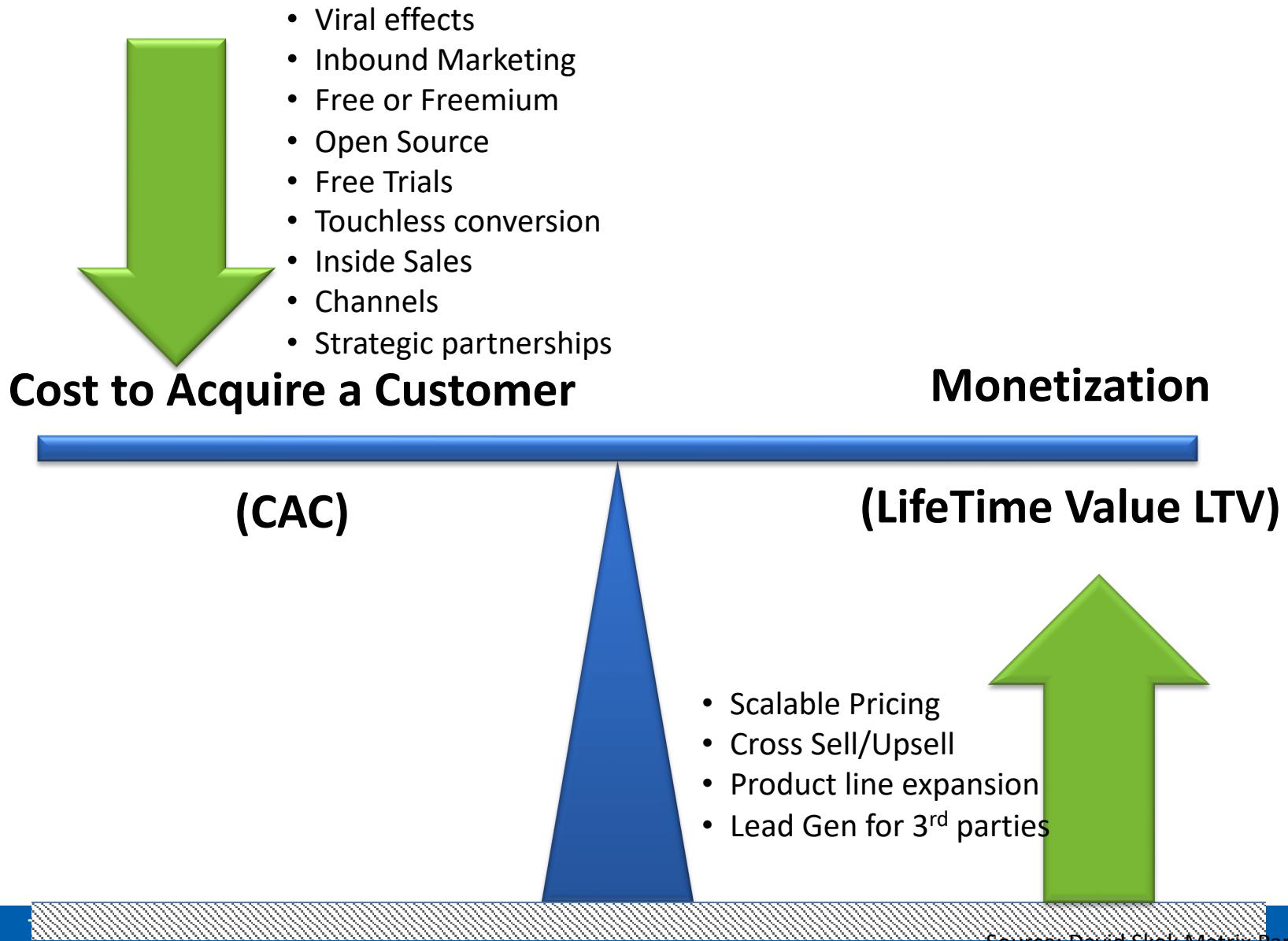


# What Investors are Looking For

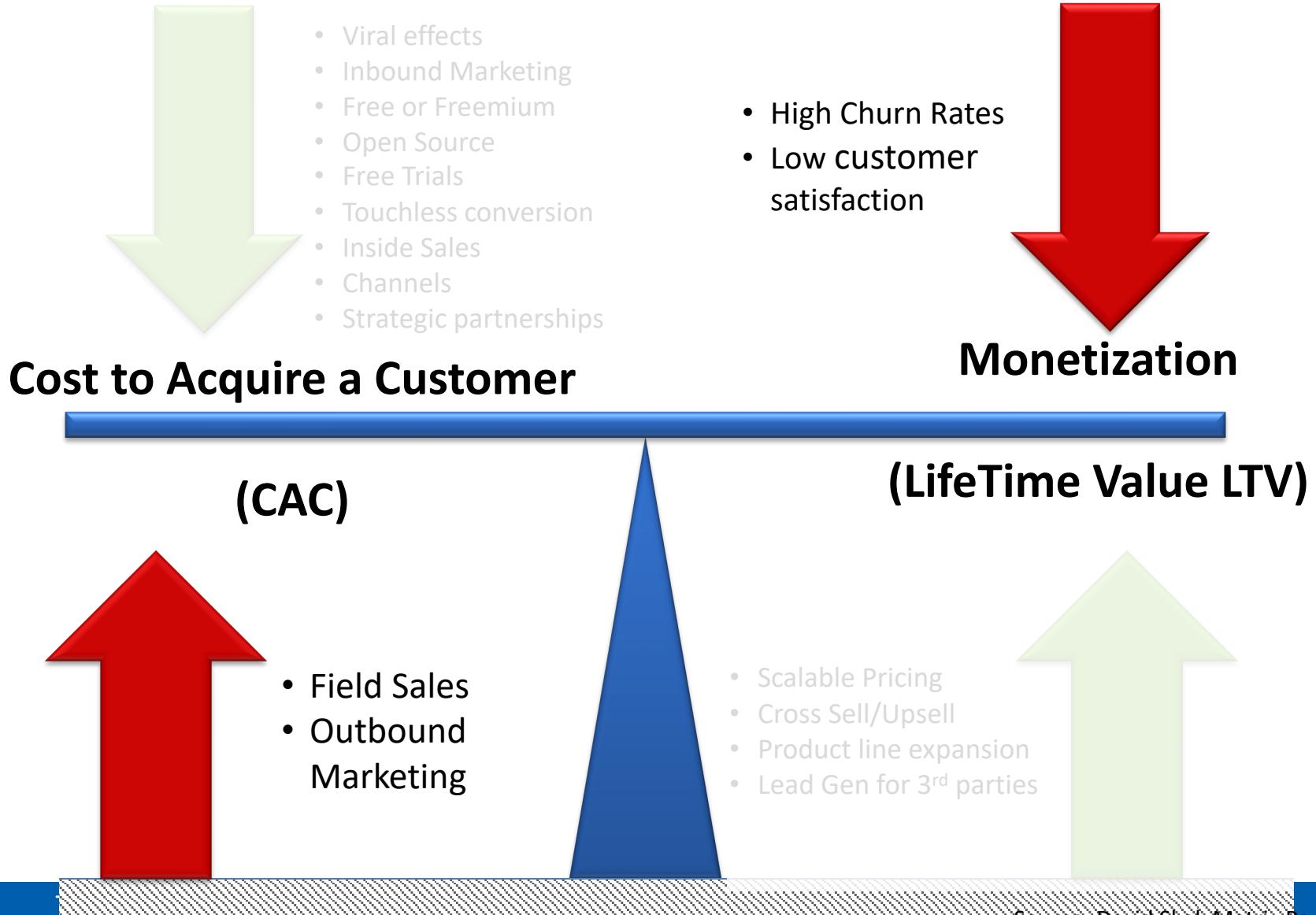
A well *balanced* business model



# The Balancing Act

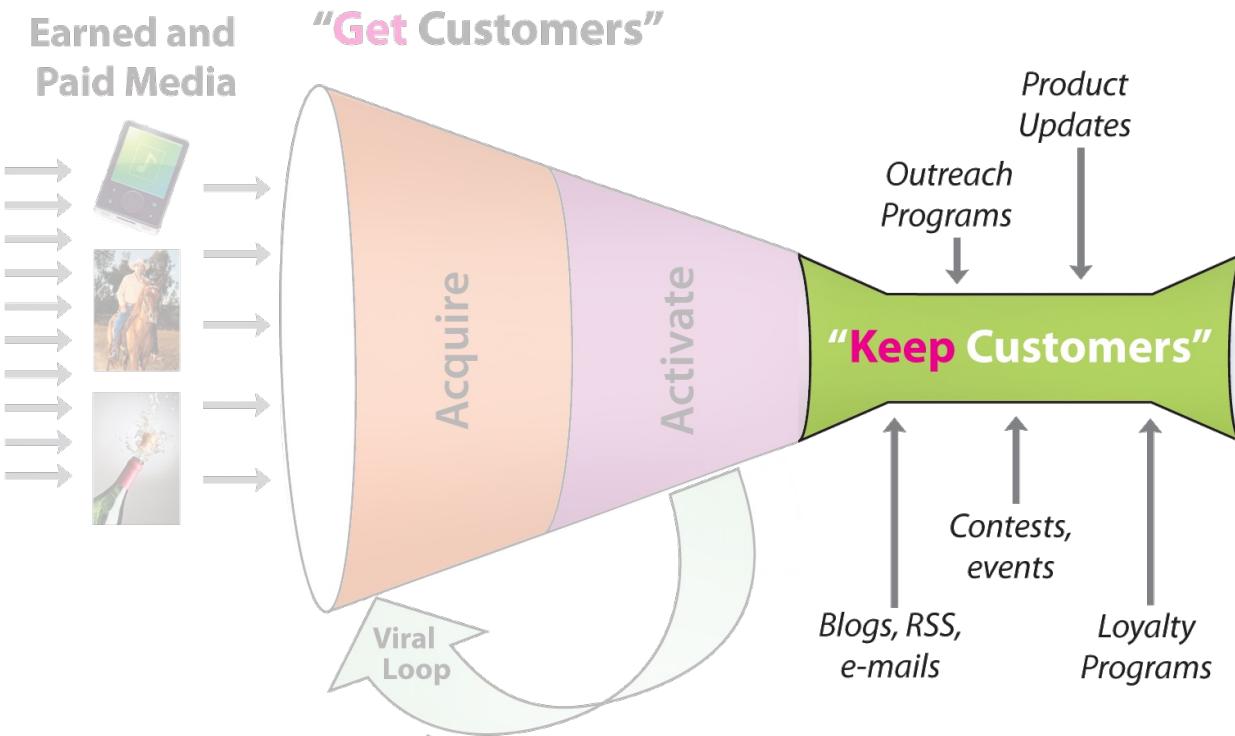


# The Balancing Act



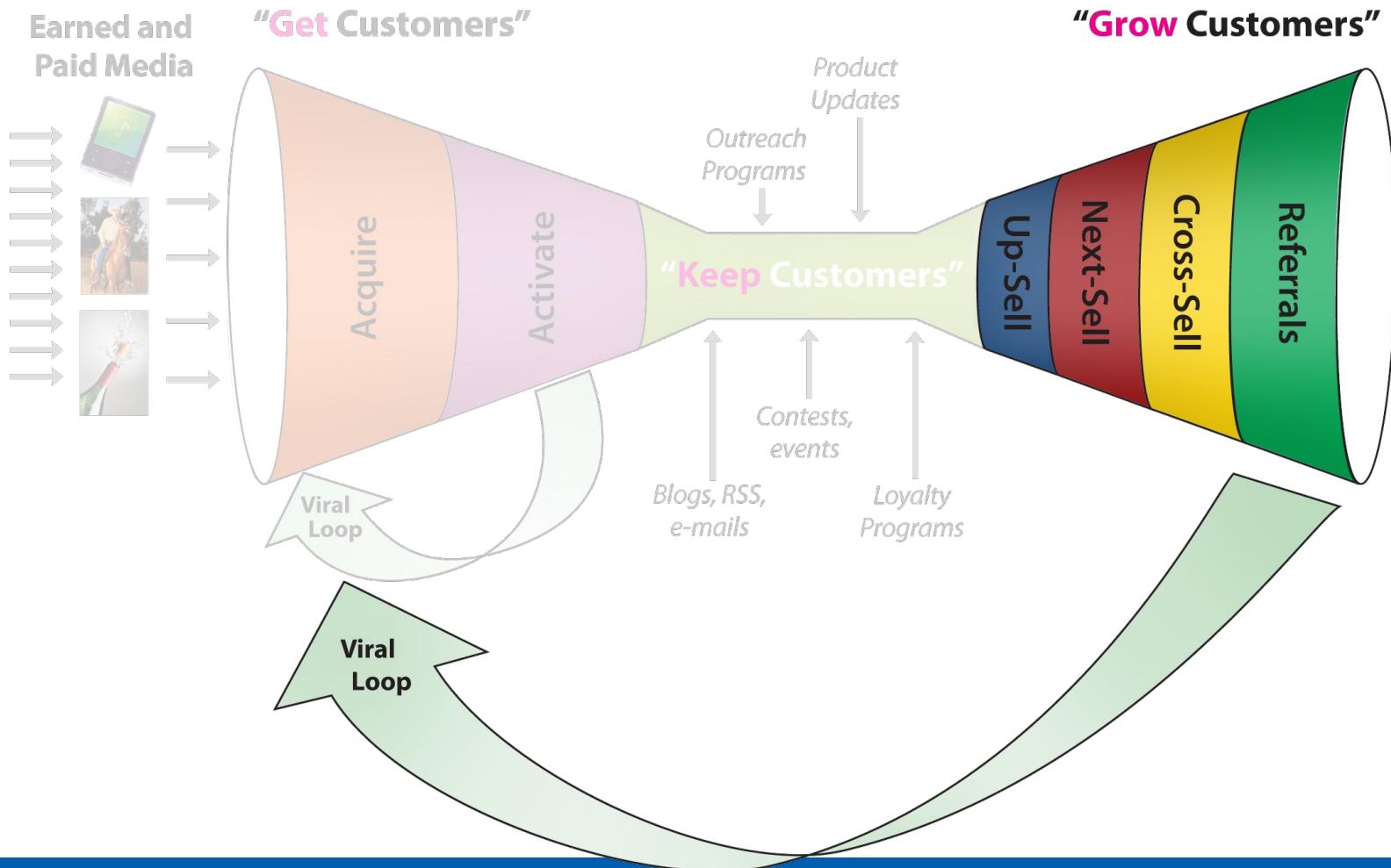
# Customer Relationships

## Web/Mobile Products—**Keep Customers**



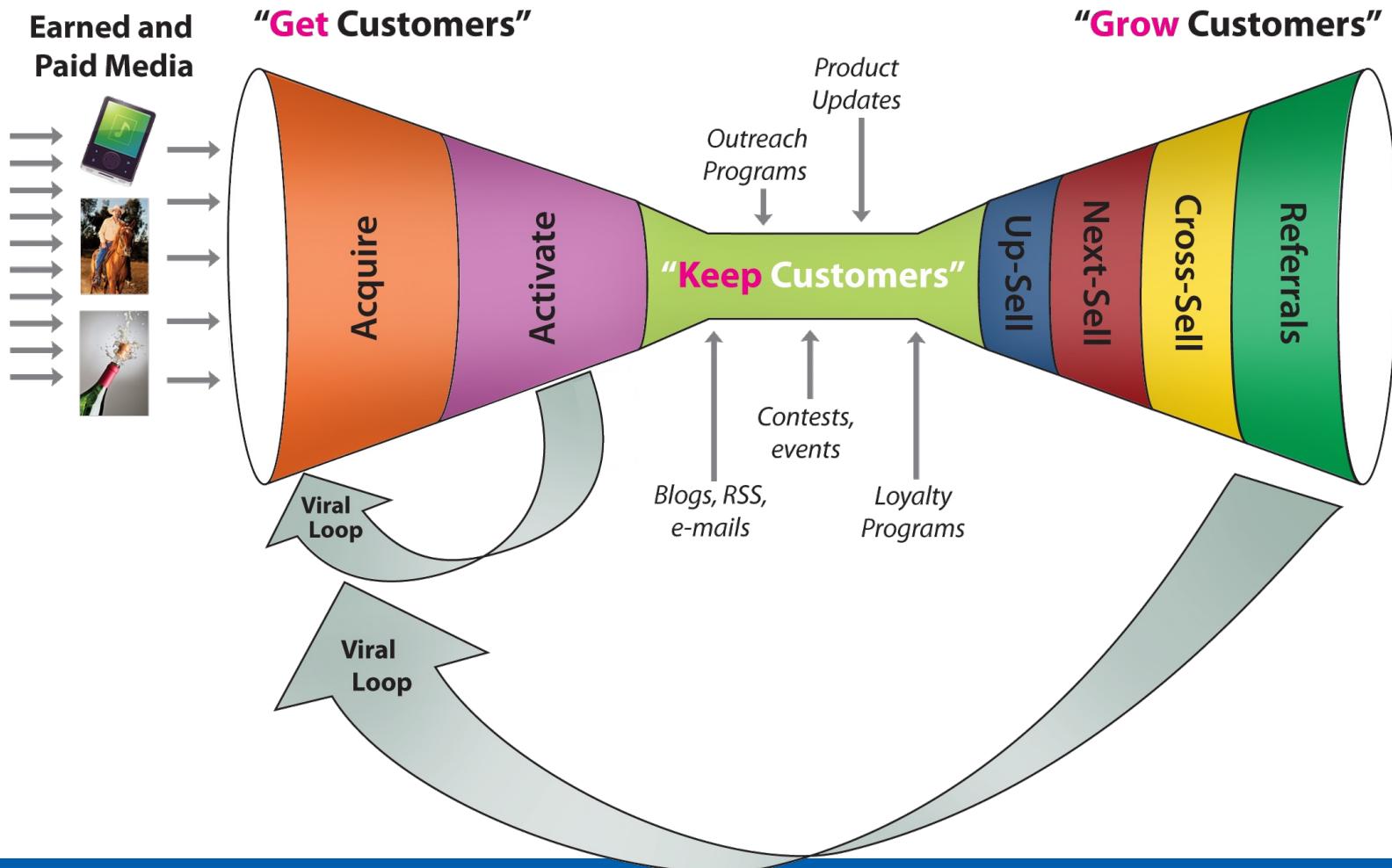
# Customer Relationships

## Web/Mobile Products— **Grow Customers**



# Customer Relationships

Web/Mobile Products **Get/Keep/Grow**



# Ag Robot Customer Relationships Example

# Demand generation plan and budget

*"You prove that it works and everything else is easy. Distribution is not that complicated in farming."* – Wyatt Duncan, Integrated Crop Pest Control

## SUNBELT EXPO 2010

### Word of mouth generation

- 2 systems for “Demo day events”
- 2 systems for customer demos
- 4 x 30K each = \$120,000

### World Ag Expo Booth

- 1 x 40x40 corner booth with demo
- Hold press event breakfast
- \$ 15 K (booth, banners, hotels)

### Magazine campaign

- 3 ads in 2 magazines
- Goal – get 2 articles on us
- 2 x \$ 10K + Ad agency = 30K

**Total \$165 K**



#### Sunbelt Expo Rates for 2010

Ad Sizes	B/W	2/C (Std)	4/C
Full Page	6,260	7,050	8,200
Full Spread	14,180	15,045	16,125
2/3 Page	3,950	4,860	6,000
1/2 Page	3,840	4,720	5,600
1/3 Page	2,030	3,050	4,050
1/4 Page	1,910	2,590	3,455
1/6 Page	1,100	1,650	2,200
Business Card	800	1,200	1,600
NEW! Exhibitor List Ad			395

All rates are gross.

#### GENERAL AG EXHIBIT SPACE PRICES

Outdoor General Ag Section	New and Renewing Exhibitors prior to May 31, 2010	New and Renewing Exhibitors after May 31, 2010
40' x 40'	\$1,115	\$1,150
40' x 40' Corner	\$1,475	\$1,520
40' x 40' Corner Median St.	\$1,630	\$1,680
40' x 60'	\$1,710	\$1,760

#### American Vegetable Grower™ 2011

##### Black & White National Rates

Frequency Discounts	1x	6x	12x	18x	24x	36x	48x
Full Page	\$4580	\$4395	\$4215	\$4025	\$3840	\$3755	\$3665
½ Page	3120	2985	2865	2745	2615	2555	2495
¼ Island	2655	2550	2440	2335	2235	2180	2125
½ Page	2430	2330	2235	2135	2040	1990	1920
¼ Page	1650	1580	1520	1450	1385	1350	1320
⅛ Page	875	835	800	760	730	715	705

# Housing App Customer Relationship Example

# We ran a Facebook ad to test actual willingness to pay for this service

Sponsored See All

**Pay rent online**  
rentlingo.com

Tired of writing checks by hand? Pay rent online easily and securely



RentLingo - One Stop Rental Se...  
www.rentlingo.com/property/#rentpayment

235 Linsen Apartment  
Bushwell Rd, CA94043  
3 Members

Monthly Rent: \$2000.00 per month

Roommates:	Amount:	Confirmed:
Joe Weiss	\$700.00	confirmed
Me	\$700.00	waiting confirm
Ben Anderson	\$600.00	waiting confirm

Payment Options

Please auto-debit on the  of every month until  12/01/12

Don't auto-debit, remind me to make payment on  28 of every

I'll remember to make my rent payment, please don't schedule :

Confirm

Email:   
Password:   
Sign In

## Make rent payment less painful

- Split rent payment amongst roommates
- Get automatic rent reminders and deductions
- Manage all utility bills in a single place

FREE! that's right, all that, for free

Sign Up ►

Trinity COMPANY HELP

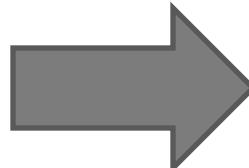
# To test willingness to pay we used three identical ads with three different landing pages

Sponsored [See All](#)

**Pay rent online**  
rentlingo.com



Tired of writing checks by hand? Pay rent online easily and securely



**FREE!**  
that's right, all that, for free

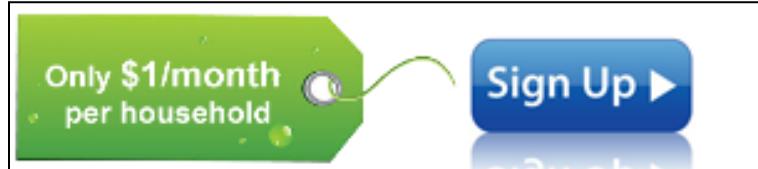
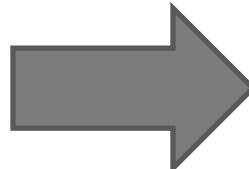
[Sign Up ▶](#)

Sponsored [See All](#)

**Pay rent online**  
rentlingo.com



Tired of writing checks by hand? Pay rent online easily and securely



Only \$1/month  
per household

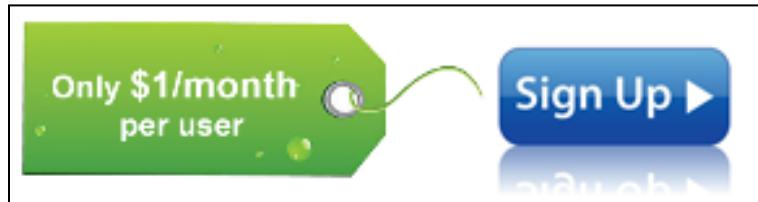
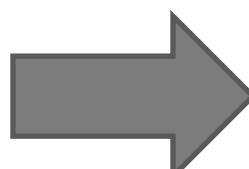
[Sign Up ▶](#)

Sponsored [See All](#)

**Pay rent online**  
rentlingo.com



Tired of writing checks by hand? Pay rent online easily and securely



Only \$1/month  
per user

[Sign Up ▶](#)

# To test willingness to pay we used three identical ads with three different landing pages

Ad	Sign-ups	Clicks	Ad spend
Free	0	23	\$25
\$1/household	0	25	\$25
\$1/user	0	24	\$25

- Unfortunately, test results only proved users did not trust our site for payments
  - Facebook traffic on this campaign was on our page for 4 seconds on average
- Outstanding question: can we win trust in other ways and then engage users to pay rent through us?

# Software Reference Tool Customer Relationships Example

# Example: AdWords Testing



citation manager

x Search

Instant is on ▾

Advanced search

About 10,400,000 results (0.19 seconds)

## Son of Citation Machine

Provides an interactive tool to help create reference citations for research papers. Includes various print and electronic resources.

Web Page - Book - Web Document - Online Journal Article

[citationmachine.net/](http://citationmachine.net/) - Cached - Similar

## Comparison of reference management software - Wikipedia, the free ...

Jump to [Citation styles](#): Reference Manager, Yes, Yes, Yes, Yes, various ? Referencer ? ... Sente, Yes, Yes, Yes, Yes, various, Sente format through GUI ...

General - Operating system support - Export file formats - Import file formats

[en.wikipedia.org/.../Comparison\\_of\\_reference\\_management\\_software](http://en.wikipedia.org/.../Comparison_of_reference_management_software) - Cached - Similar

## Reference management software - Wikipedia, the free encyclopedia

Ads

### Free Citation Manager

Peaya: A free way to search, organize and cite your papers  
[www.peaya.com](http://www.peaya.com)

[See your ad here »](#)



citation manager

x Search

Instant is on ▾

Advanced search

About 10,400,000 results (0.18 seconds)

## Everything

Images

Videos

News

Shopping

More

## Stanford, CA

Change location

## All results

Visited pages

Not yet visited

More search tools

## Son of Citation Machine

Provides an interactive tool to help create reference citations for research papers. Includes various print and electronic resources.

Web Page - Book - Web Document - Online Journal Article

[citationmachine.net/](http://citationmachine.net/) - Cached - Similar

## Comparison of reference management software - Wikipedia, the free ...

Jump to [Citation styles](#): Reference Manager, Yes, Yes, Yes, Yes, various ? Referencer ? ... Sente, Yes, Yes, Yes, Yes, various, Sente format through GUI ...

General - Operating system support - Export file formats - Import file formats

[en.wikipedia.org/.../Comparison\\_of\\_reference\\_management\\_software](http://en.wikipedia.org/.../Comparison_of_reference_management_software) - Cached - Similar

## Reference management software - Wikipedia, the free encyclopedia

Reference management software, citation management software or personal ...

[en.wikipedia.org/wiki/Reference\\_management\\_software](http://en.wikipedia.org/wiki/Reference_management_software) - Cached - Similar

[+ Show more results from wikipedia.org](#)

## Zotero | Home

- 2:48am  
Zotero is a powerful, easy-to-use research tool that helps you gather, organize, and analyze sources and then share the results of your research.

[www.zotero.org/](http://www.zotero.org/) - Cached - Similar

## EndNote - Bibliographies Made Easy

- Jan 25  
EndNote Home Page - Bibliographies Made Easy.

[www.endnote.com/](http://www.endnote.com/) - Cached - Similar

Ads

### Cite Like A Pro

Try a free citation management tool used at Harvard and Stanford  
[www.peaya.com](http://www.peaya.com)

[Related to reference manager:](#)

### Reference Manager

Low Prices on Reference manager!  
Free 2-Day Shipping w/Amazon Prime.  
[amazon.com](http://amazon.com) is rated ★★★★  
[amazon.com/software](http://amazon.com/software)

[See your ad here »](#)

Trin

# Example: AB Testing Results

## Website Optimizer: Experiment List

+ Create another experiment

<input type="checkbox"/>	Experiment	Status	Page Visitors	Conv.	Conv. Rate	Finish Time
	Peaya1	Running — collecting data <a href="#">Edit settings »</a>   <a href="#">View report »</a>	31	14	45.16%	N/A

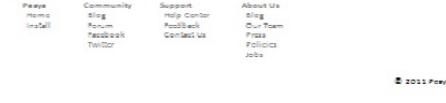
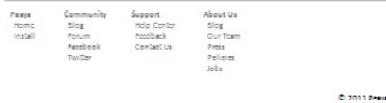
Show rows: 15    1 to 1 of 1



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0% conversion

42% conversion

75% conversion

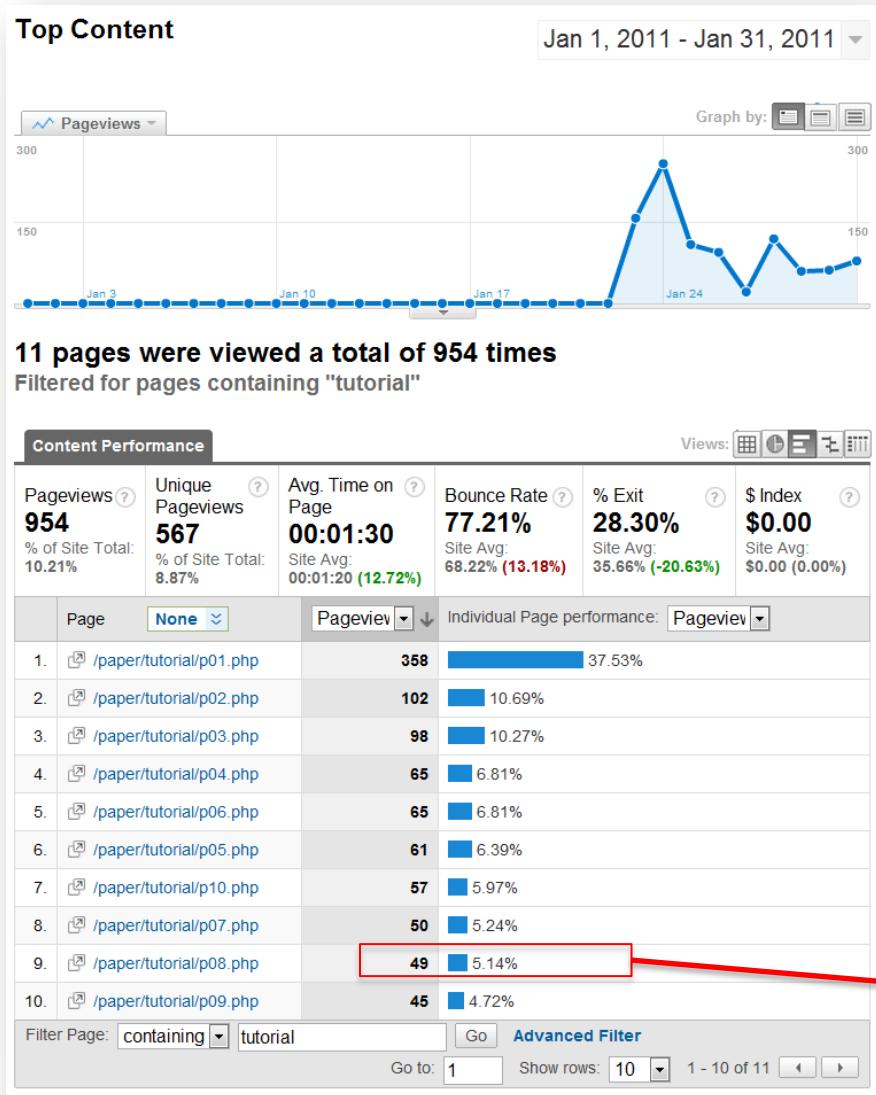
32% conversion

- Original Peaya website has 66% conversion rate
- Conversion defined as people clicking the download button on the landing page
-

# Example: Google & Facebook campaigns

- Keywords: free endnote, reference manager, pdf manager, Itunes for digital content, I tunes, manage pdf, organize paper, paper manager, citation manager, paper citation, cite pdfs
- 24 impressions, 2 clicks on google adwords
- Clicks on free endnote and organize paper
- No Facebook response
- 1 Post on ResearchGate drew 7 visitors

# Example: We're “a little” viral



**12% of sign-ups from referrals**

14 of 117 new registrations came from referrals by 3 people from Jan 1 to Feb 1.

Referral bonus promoted in tutorial

**Invite friends**

Connect with friends to see what they read TRY IT NOW

Click "Friends" and choose an invitation method

**BONUS:**  
When you refer a friend both your paper limits increase by 25.

Invite friends

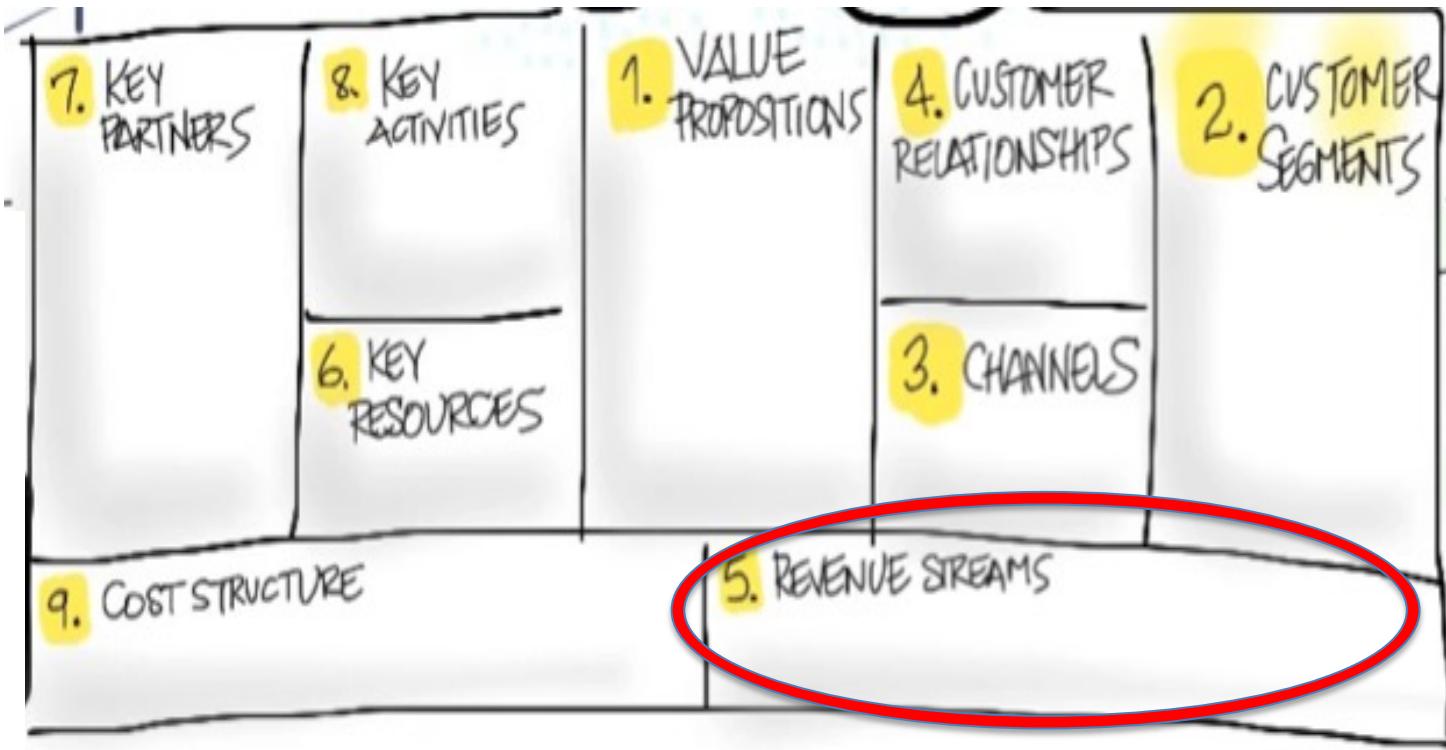
**Add** **Share** **Cite**

Search and Import	Share by email	Cite papers in Word
Type new reference	Share using web link	Requires Word 2003, 2007, or 2010 for Windows XP or higher
Add PDFs	Invite friends	
Add whole folder	Rate & Discuss	
Bulk Import		



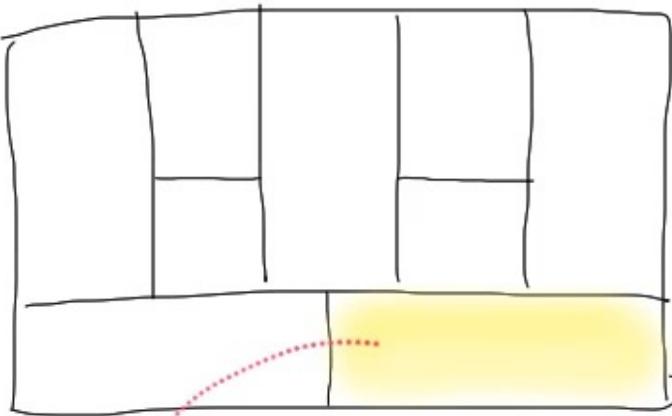
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# Revenue Streams



## Revenue Streams

How do you Make Money?



• What **VALUE** is the customer paying for?



## > 5. REVENUE MODEL



How does the company **MAKE MONEY** from each customer segment?



• **REVENUE MODELS** (i.e. direct sales) are the **STRATEGY**.



**PRICING** is the tactics.

# Common Mistakes

- A Revenue Stream is the *price* I charge customers
- I set the price of the product based on how much it costs me to make it
- My price has to be less than my competitors price

# The Two Key, but separate, Questions

**What's my Revenue Streams?**

**Within the revenue streams– how do I  
price the product?**

Revenue Stream =

the strategy the company uses to  
generate cash from each customer  
segment

# Pricing Model =

the tactics you use to set the price in  
each customer segment

# Revenue Stream

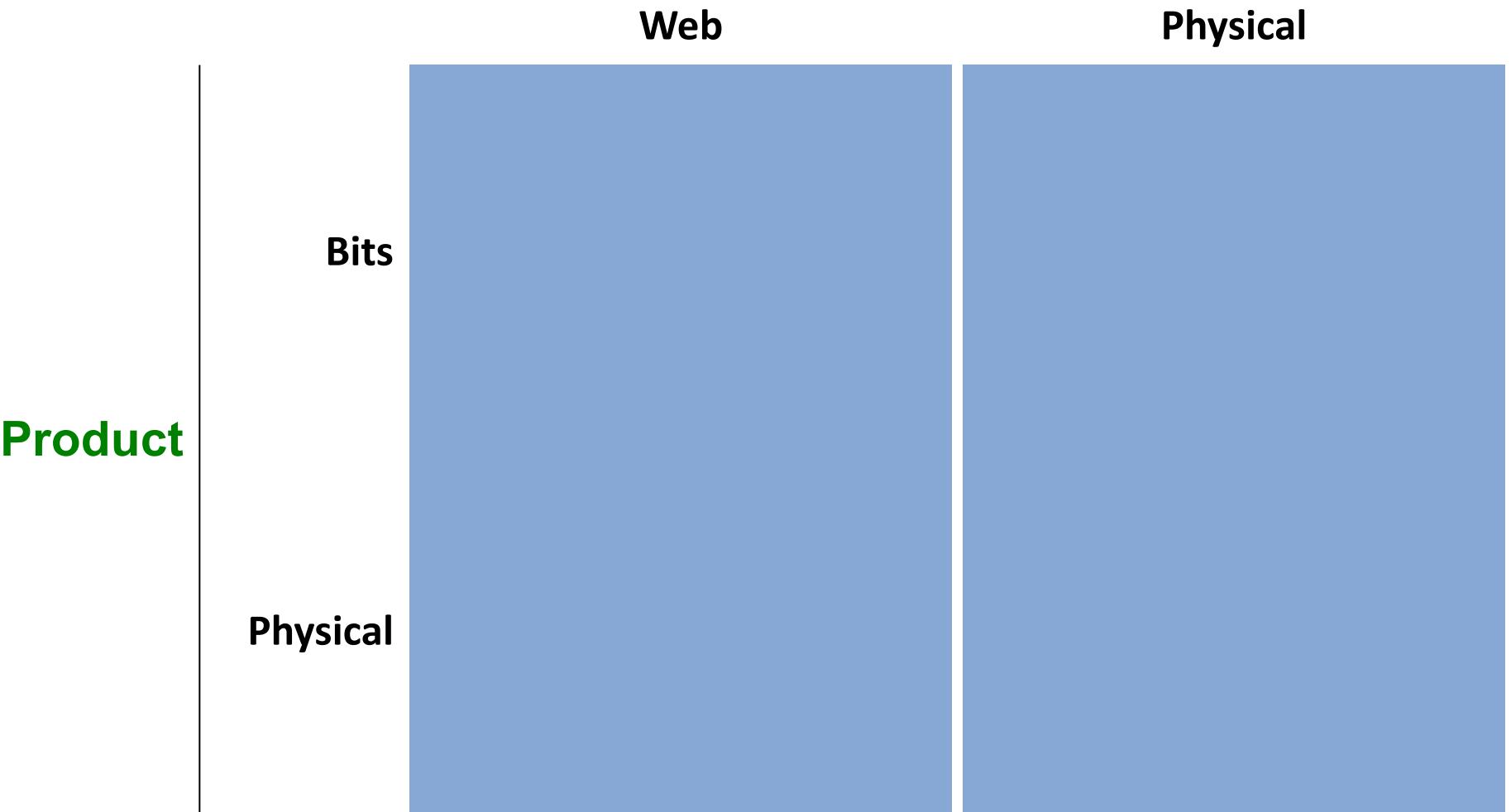
The strategy

What **value** are customers willing to pay for?

How do customers pay for products  
today?

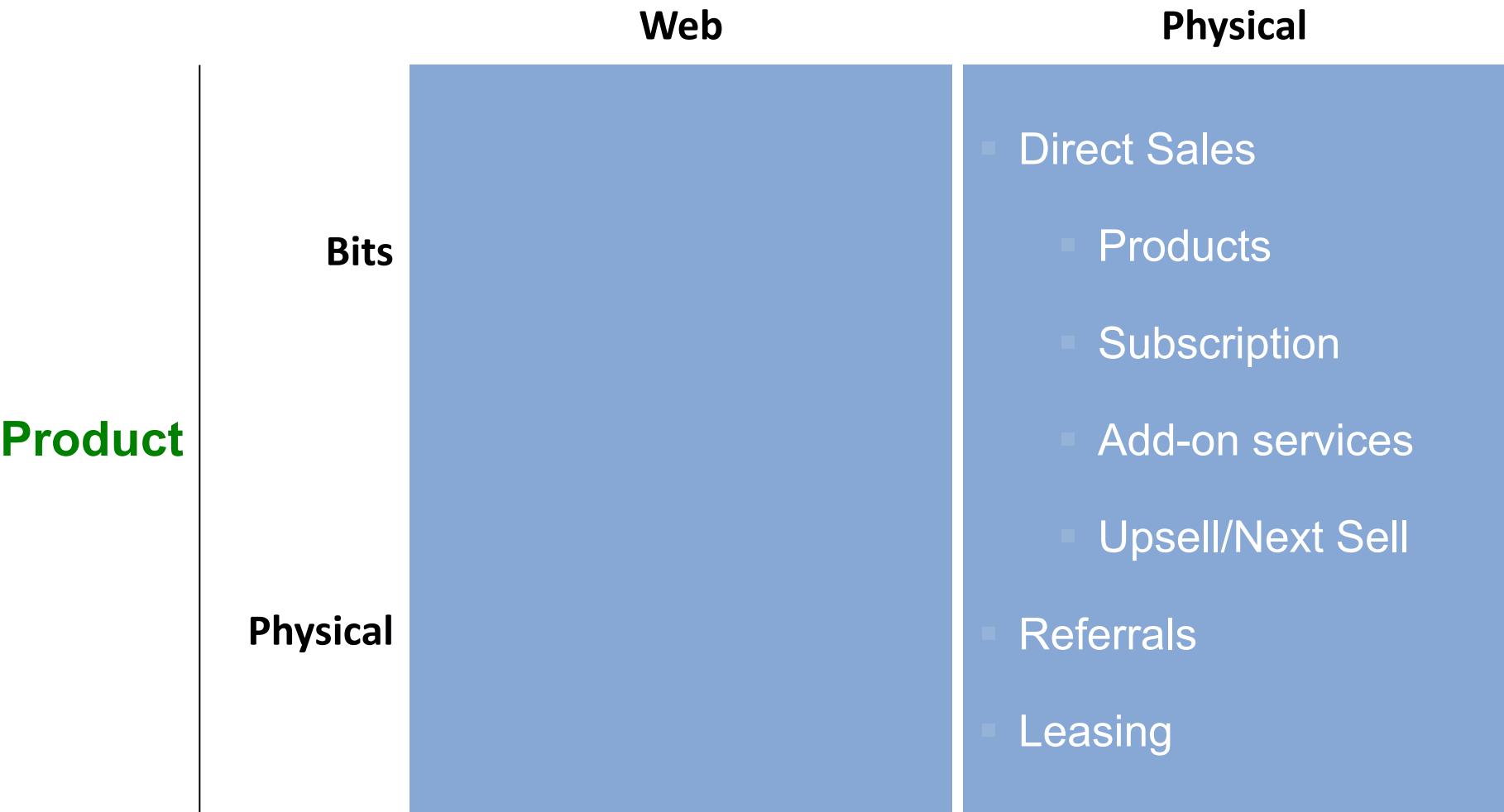
# Revenue Stream Choices

## Channel



# Revenue Stream Choices

## Channel



# Revenue Stream Choices

## Channel

	Web	Physical
Product	Bits	
	Physical	
	<ul style="list-style-type: none"><li>■ Direct Sales<ul style="list-style-type: none"><li>■ Products</li><li>■ License</li><li>■ Subscription</li><li>■ Upsell/Next Sell</li></ul></li><li>■ Ancillary Sales:<ul style="list-style-type: none"><li>• Referral revenue</li><li>• Affiliate revenue</li><li>• E-mail list rentals</li><li>• Back-end offers</li></ul></li></ul>	<ul style="list-style-type: none"><li>■ Direct Sales<ul style="list-style-type: none"><li>■ Products</li><li>■ Subscription</li><li>■ Add-on services</li><li>■ Upsell/Next Sell</li></ul></li><li>■ Referrals</li><li>■ Leasing</li></ul>

# Common categories of revenue models

# “Direct” revenue models

***Sales:*** Product, app, or service sales

***Subscriptions:*** SaaS, games, monthly subscription

***Freemium:*** use the product for free:  
upsell/conversion

***Pay-per-use:*** revenue on a “per use” basis

***Virtual goods:*** selling virtual goods

***Advertising sales:*** unique and/or large audience

# “Ancillary” revenue models

***Referral revenue:*** payment for referring traffic/customers to other web or mobile sites or products.

***Affiliate revenue:*** finder's fees/commissions from other sites for directing customers to make purchases at the affiliated site

***E-mail list rentals:*** rent your customer email lists to advertiser partners

***Back-end offers:*** add-on sales items from other companies as part of their registration or purchase confirmation processes, or “sell” their existing traffic to a company that strives to monetize it and share the resulting revenue

Each Revenue Stream may have different  
pricing tactics

# Pricing Model

the tactics

# Two Types of Pricing

**Fixed**  
Pricing

- Cost + markup
- Value priced (by customer segment or features)
- Volume priced

**Dynamic**  
Pricing

- Negotiation
- Yield Management
- Real-time market
- Auctions

# Common Startup Mistake

Lets Price on Cost

- Cost + markup
- Typically not a strategic way to price
- Driven by internal economics and not customer insight

# Common Startup Mistake

Lets Price on Cost

- Cost + markup
- Typically not a strategic way to price
- Driven by internal economics and not customer insight

Price on Value

- Based on buyer's perception of value (e.g. time saved, new efficiency created, etc.)
- Customers don't necessarily feel that they want to pay this way

# Single versus Multi-sided Markets

# Single/Multi-side Markets

**Single-sided markets care about revenues**

**Multi-sided markets may care about users first, revenues second**

- Often Web-based

# “Users First” Companies

If you say your business is advertising based:

How do you get to 10M monthly users?

How do you become one of the top 5 websites visited?

How much do the “payers” actually pay?

# “Revenue First” Companies

Time to doublings for monthly revenues

Key questions:

- When will I get to \$100k/month in revenues?
- When will I get to \$1M/month in revenues?
- What **assumptions** about my business am I making when I reach these milestones?

# **Key Revenue Model Questions**

**What are my customers paying for?**

**What capacity do my customers have to pay?**

**How will you package your product ?**

**How will you price the offerings?**

# How Many Will You Sell?

**What's the Market Size & estimate of Market Share?**

**How many can your channel sell?**

**How much will the channel cost?**

**How many customer activations?**

- Revenue? Churn/Attrition rate? customers/?

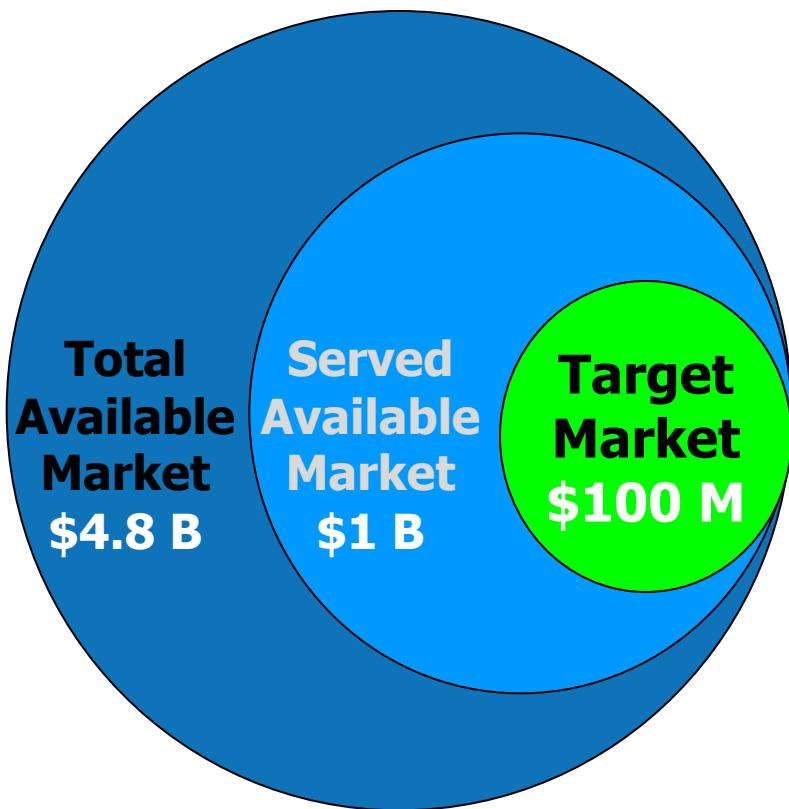
**How much will it cost to acquire a customer?**

- How many units will they buy from each of these efforts?

Top down: 10% of a million-person market=100,000 customers

Bottom up: 1,000 customers/month 1st year => 3,000/month 3rd year

# Target Market

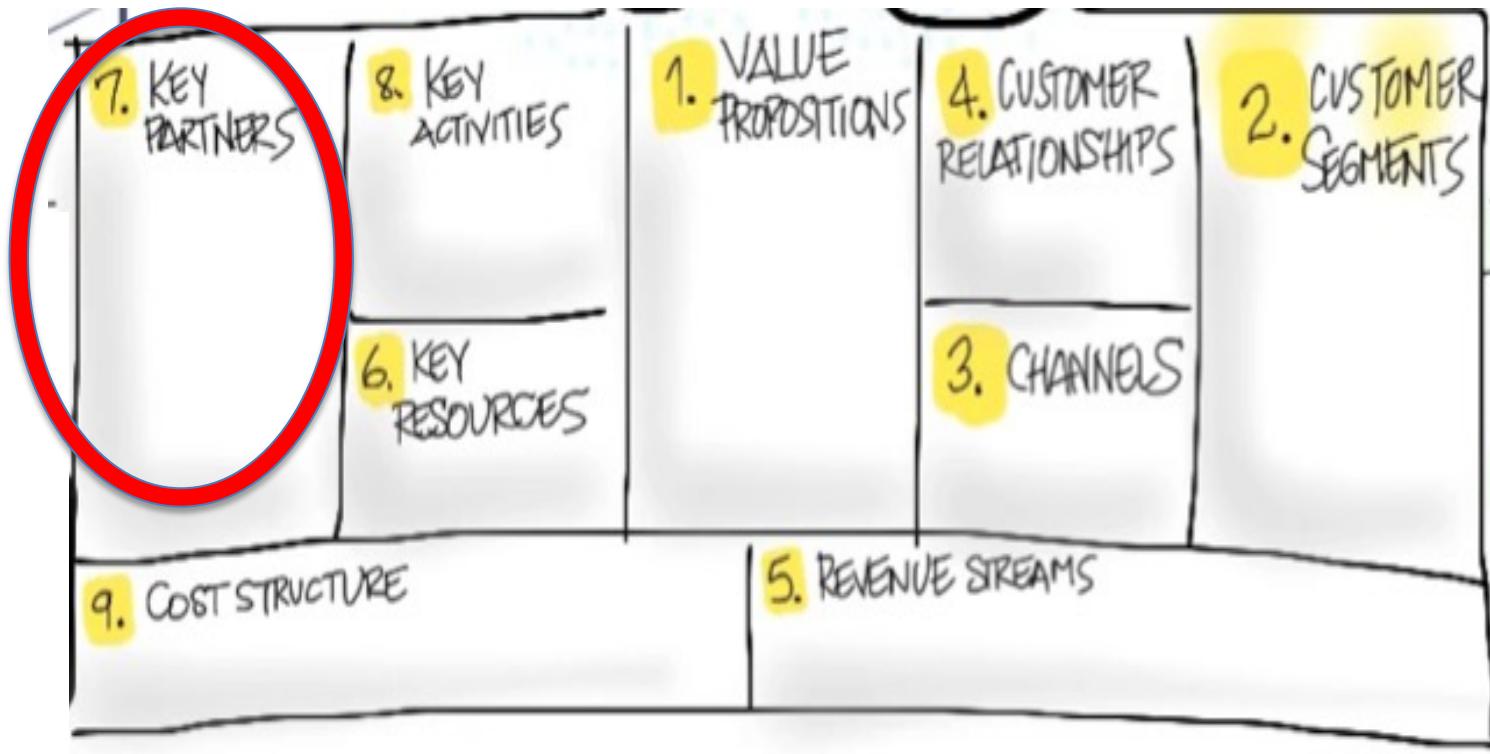


- Who am I going to sell to?
  - Airports
- How large is the market be (in \$'s)?
  - \$100 M
- How many units would that be?
  - 200 M units



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# Key Partners, Key Activities, Key Resources, Cost structure

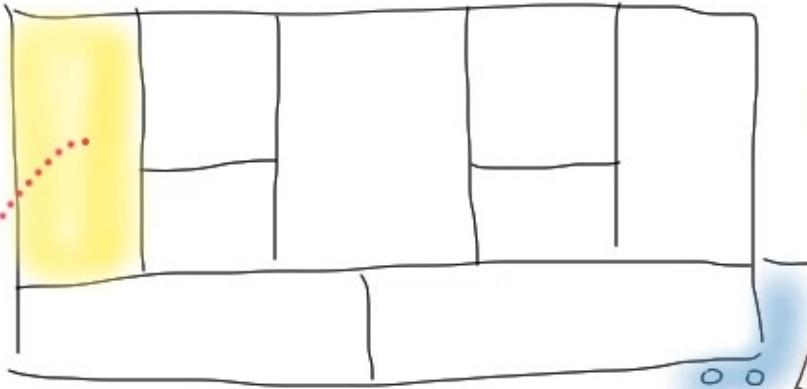


## Key Partners

Who are your Partners and Suppliers?

WHAT KEY RESOURCES  
are we acquiring from  
them?

What KEY ACTIVITIES do  
they perform?

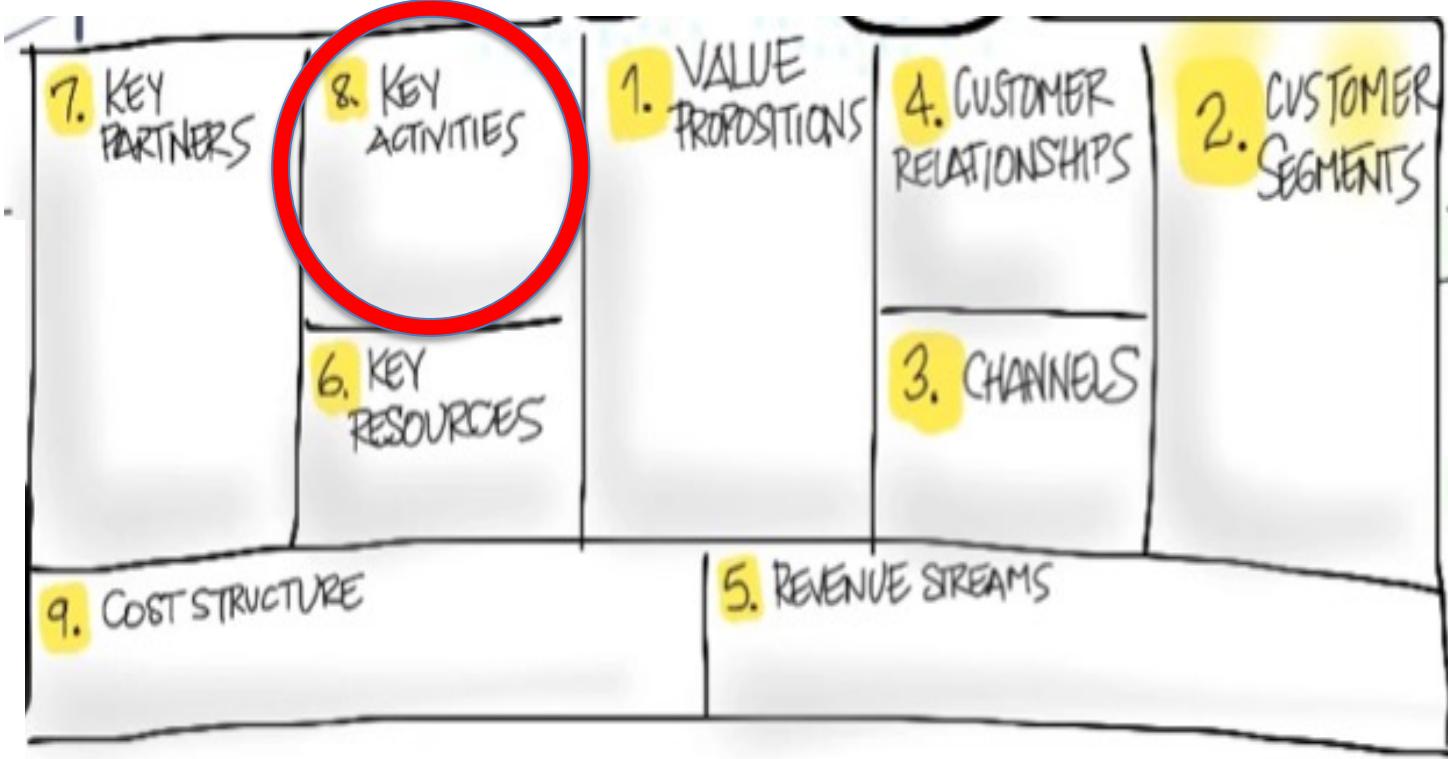


## 7. KEY PARTNERSHIPS

Who are the KEY  
**PARTNERS** and  
**SUPPLIERS** needed  
to make the business  
model WORK?

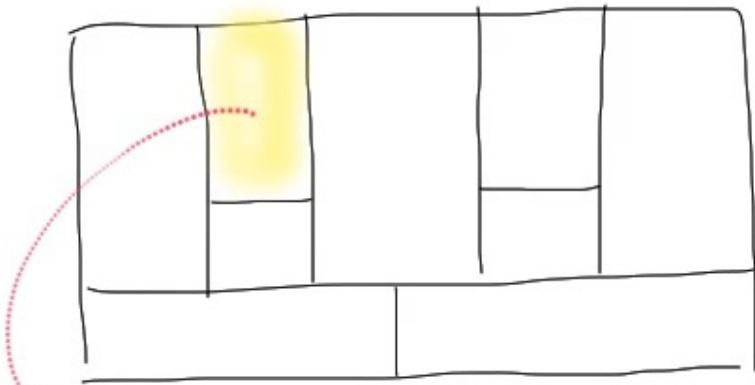
• JOINT VENTURES





## Key Activities

**What's Most Important for the Business?**



## 8. KEY ACTIVITIES

What are the **MOST IMPORTANT THINGS** the company must DO to make the business model WORK?

● PRODUCTION



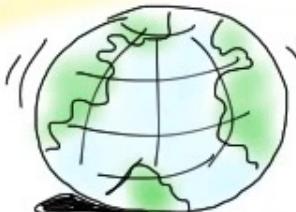
● PROBLEM SOLVING

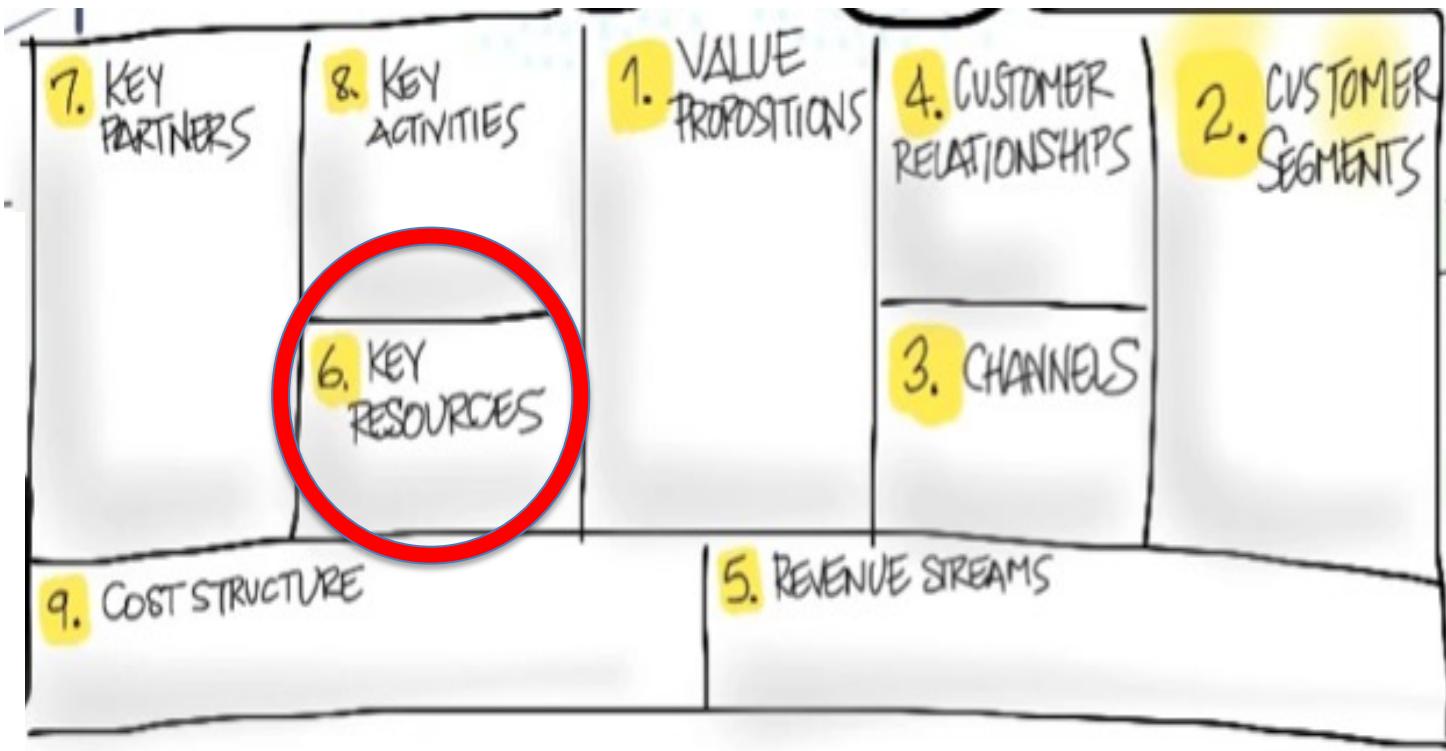
● CONSULTING  
● ENGINEERING

WE CAN  
SOLVE  
THIS!



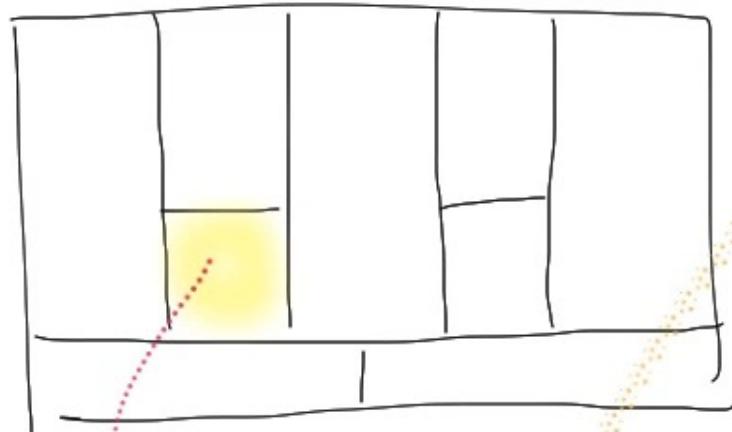
SUPPLY CHAIN MANAGEMENT





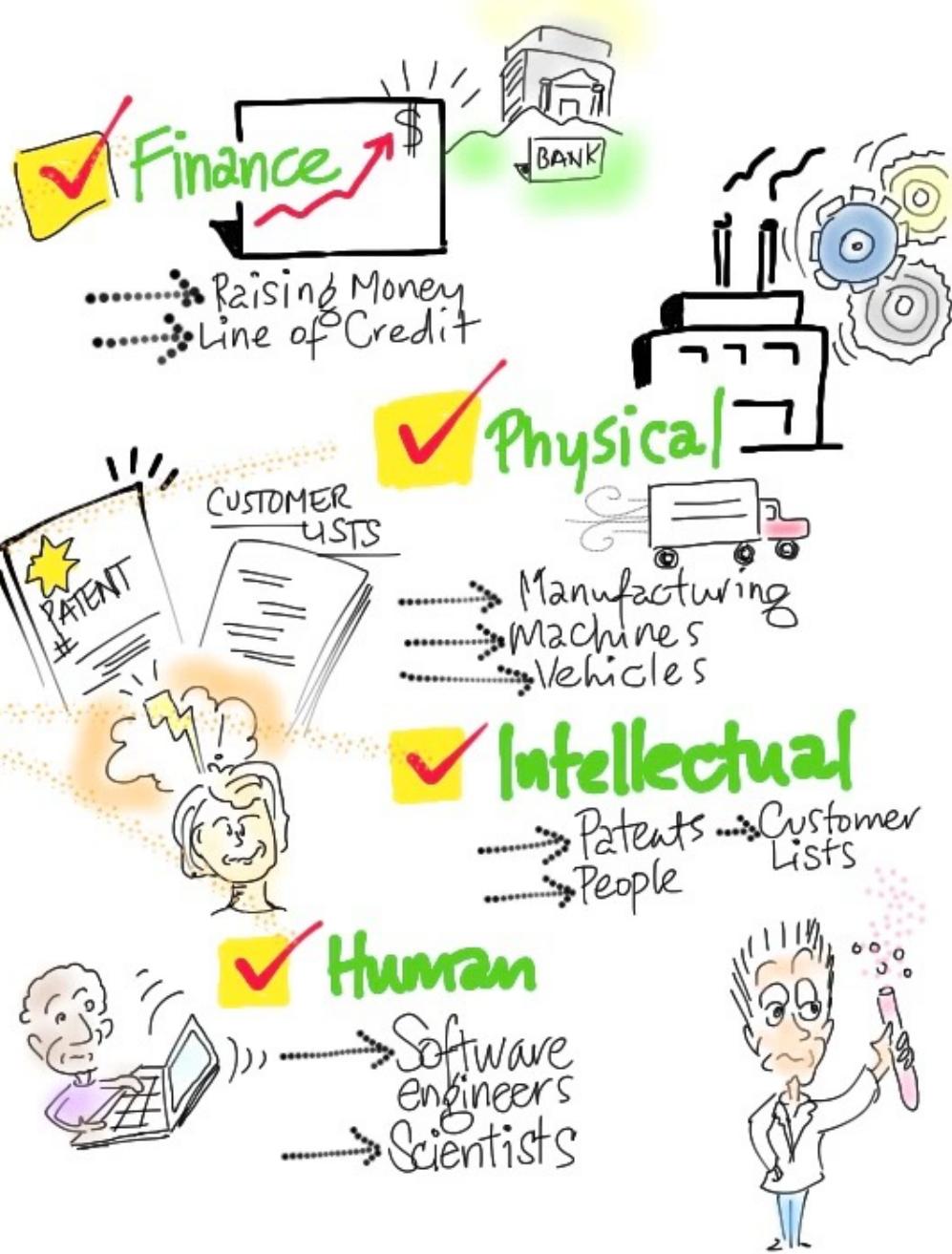
## Key Resources

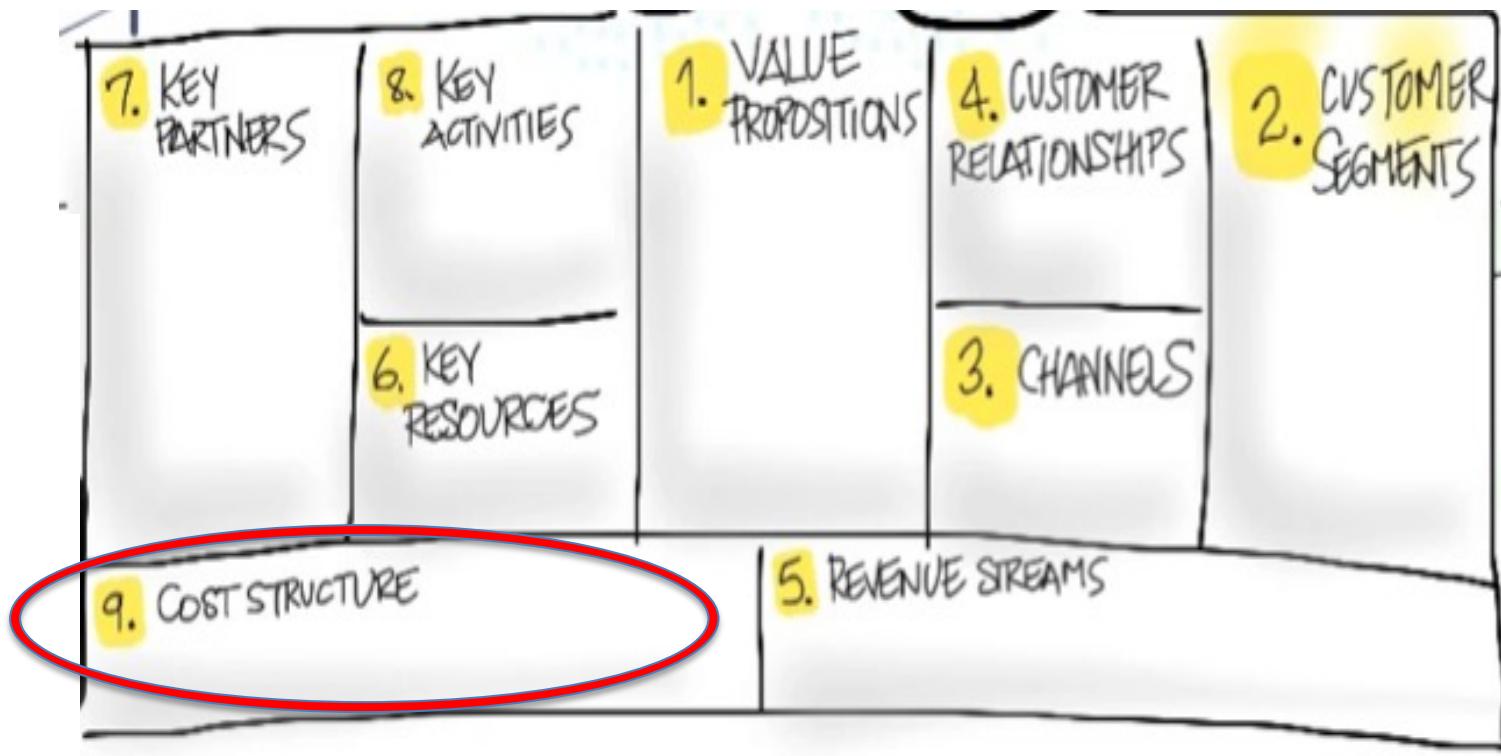
**What's Are Your Most Important Assets?**



## b. KEY RESOURCES

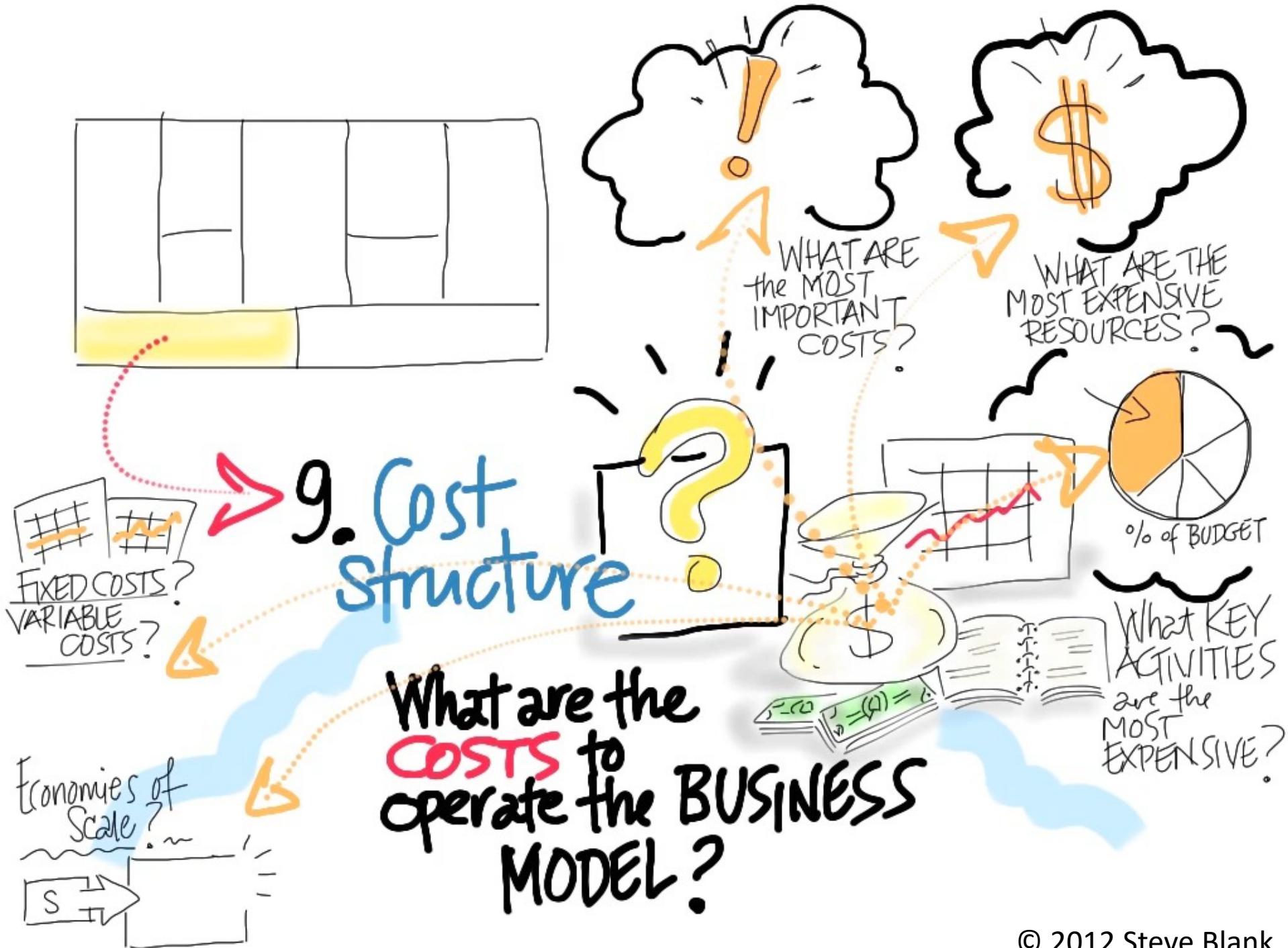
What are the **MOST  
IMPORTANT ASSETS**  
required to make the  
business model WORK?





# Cost Structure

What are the Costs and Expenses



7. KEY PARTNERS

8. KEY ACTIVITIES

1. VALUE PROPOSITIONS

4. CUSTOMER RELATIONSHIPS

2. CUSTOMER SEGMENTS

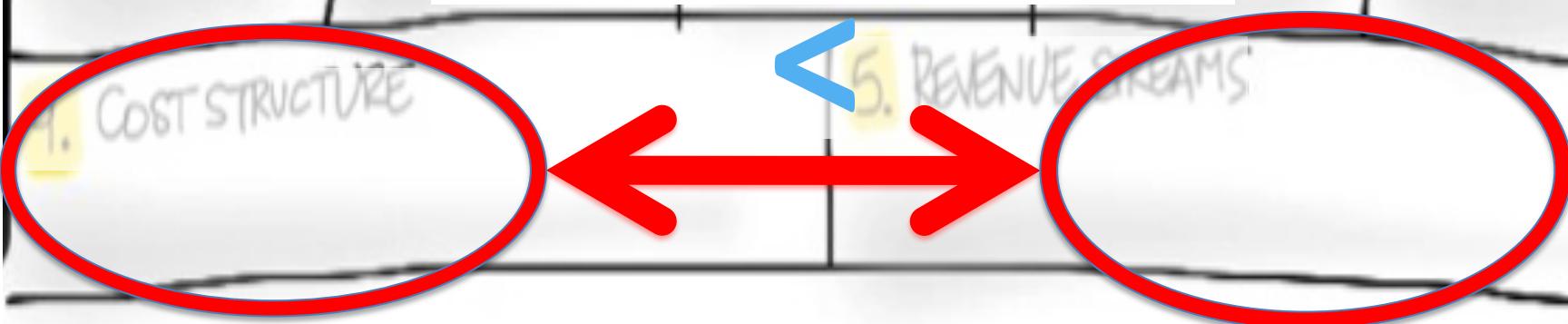
6. KEY RESOURCES

3. CHANNELS

## How You Make Money

4. COST STRUCTURE

5. REVENUE STREAMS





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# Ethics in Technology Innovation and the Ethics Canvas

Dave Lewis, dave.lewis@scss.tcd.ie

Thanks to: Wessel Reijers, Arturo Calvo, Killian Levacher

# Why Should Tech Innovators be Concerned with Ethics?

- Because new technologies have a profound impact on the way we live, on the relationships we have, on the societal & political processes we engage in.

- For tech innovators?

- First: because it is good for the image of your business (instrumental goal)
- Second: because it actually improves the service you provide! (substantive goal)
- Third: because it is the *good* thing to do, it contributes to your idea of a better society and being a good person (normative goal)



# Technology Ethics in Context

## Technology Ethics

TRL 1 > TRL 2 > TRL 3 > TRL 4 > TRL 5 > TRL 6 > TRL 7 > TRL 8 > TRL 9

Basic Research

Technology Concept

Applied Research

Laboratory Prototype

Real-world Prototype

Real-world Prototype System

Real-world Product Demo

First Commercial Product

Full-scale Commercial Product

Academia

Industry

## Research Ethics

Ethics for publication, e.g.  
Neurips

GDPR

AI Regulation

Technology Ethics concerns how technology impact society – impact from basic research to market deployment

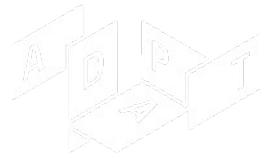
Research Ethics specifically addresses how research can be conducted without harming human participants

Data protection applies at all stages of technology R&D

AI and Data bring a new initiatives on ICT R&D ethics

# Software Malfeasance: Example





# Unintended Impacts - Example: Gender in Google Translate

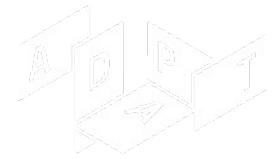
- Some languages, like Turkish, don't have gender specific pronouns
- Google translate has to guess the gender when translating in English
- Statements allocating gender to role reveal gender bias
- What is the source of this?
- Is it a problem?

Sample Google Translate output:

he is a soldier  
she's a teacher  
he is a doctor  
she is a nurse

<https://qz.com/1141122/google-translates-gender-bias-pairs-he-with-hardworking-and-she-with-lazy-and-other-examples/>

# Power of Big Data: Example: Cambridge Analytica



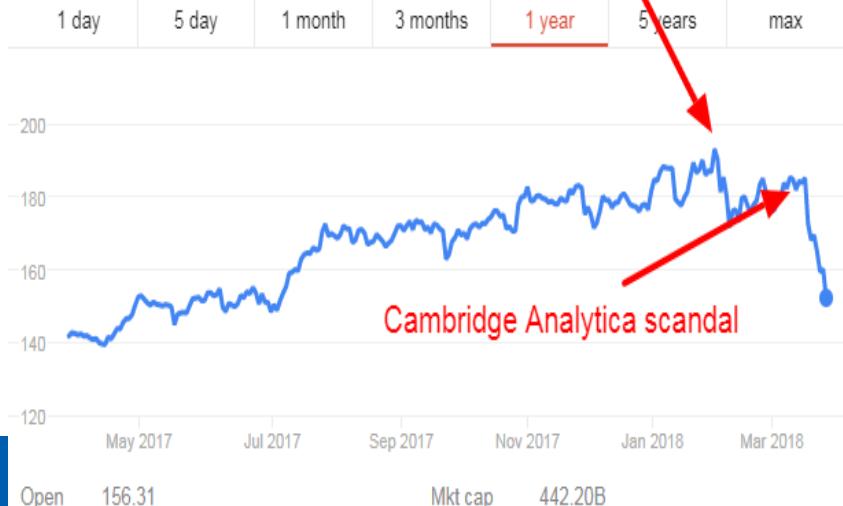
- Academic research into Psychographics (U. Cambridge) revealed the link between psychological profiles and Facebook profiles
- Correlated major psychological types to elements in the social graph: Openness, Conscientiousness, Extroversion, Agreeableness and Neuroticism
- Cambridge Analytica applied psychographics to help target political ads in 2016 US elections....

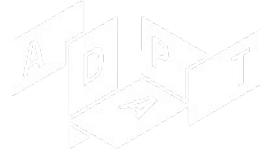
<https://www.theguardian.com/news/2018/mar/17/data-war-whistleblower-christopher-wylie-facebook-nix-bannon-trump>



Facebook, Inc. Common Stock  
NASDAQ: FB - Mar 28, 6:15 AM EDT

152.22 USD **↓7.84 (4.90%)** Facebook's share price peak  
After-hours: 151.38 **↑0.55%**

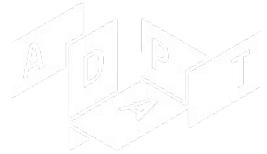




# Algorithmic Power on Behaviour & Worldview

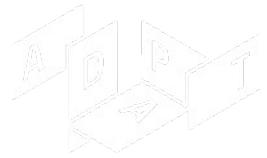
- “Race to the Bottom ... of the Brain Stem”  
Tristian Harris
- 70% of YouTube views are based on algorithmic recommendations
- Business model maximises video views to maximise ad views
- Outrage/fear/anger the most reliable reactions that drive us to keep watching
- -> Recommender algorithm inevitably drive us to content that builds outrage to keep us watching
  - Evidence to US Congress: <https://www.youtube.com/watch?v=WQMuxNiYoz4>
  - Agenda: <https://humanetech.com/wp-content/uploads/2019/06/Technology-is-Downgrading-Humanity-Let's-Reverse-That-Trend-Now-1.pdf>





# AI & Data is Mainstreaming Technology Ethics

- Companies harvest and utilise personal data on a **massive scale**
- Growing concerns about the **collection, linking, use and leakage** of personal data from **mobile devices, bio-sensors, cameras, GPS trackers and social media.**
- Machine Learning deliver new levels of **insights and predictions** about an individual's behaviour and also feeds increasingly **personalised AI-driven interactive digital experiences - Ads to Alexa**
- Individuals and groups **struggle to understand** the impact of personal information processing
- Companies, especially SMEs, often lack the knowledge and expertise needed to address these **complex legal and ethical issues.**

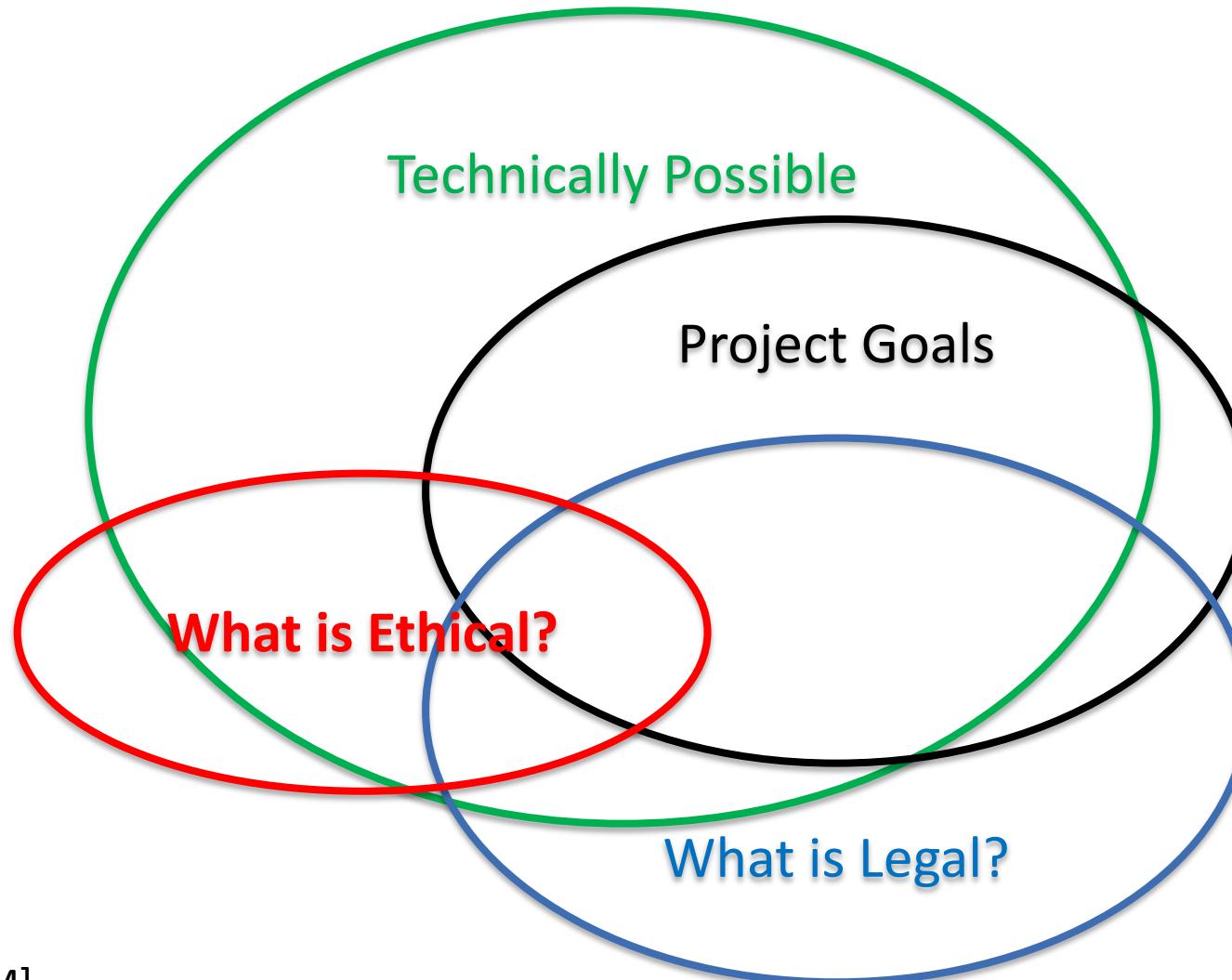


# Example of Risks: Algorithmic selection of digital content

- Manipulation of individuals or groups,
- Diminishing variety that creates biased views and distortion of reality,
- Constraints on communication and freedom of expression,
- Threats to privacy and data protection rights,
- Social discrimination,
- Violation of intellectual property rights,
- Impact on the human brain and cognitive capacity and
- Algorithmic power over human behavior and development.

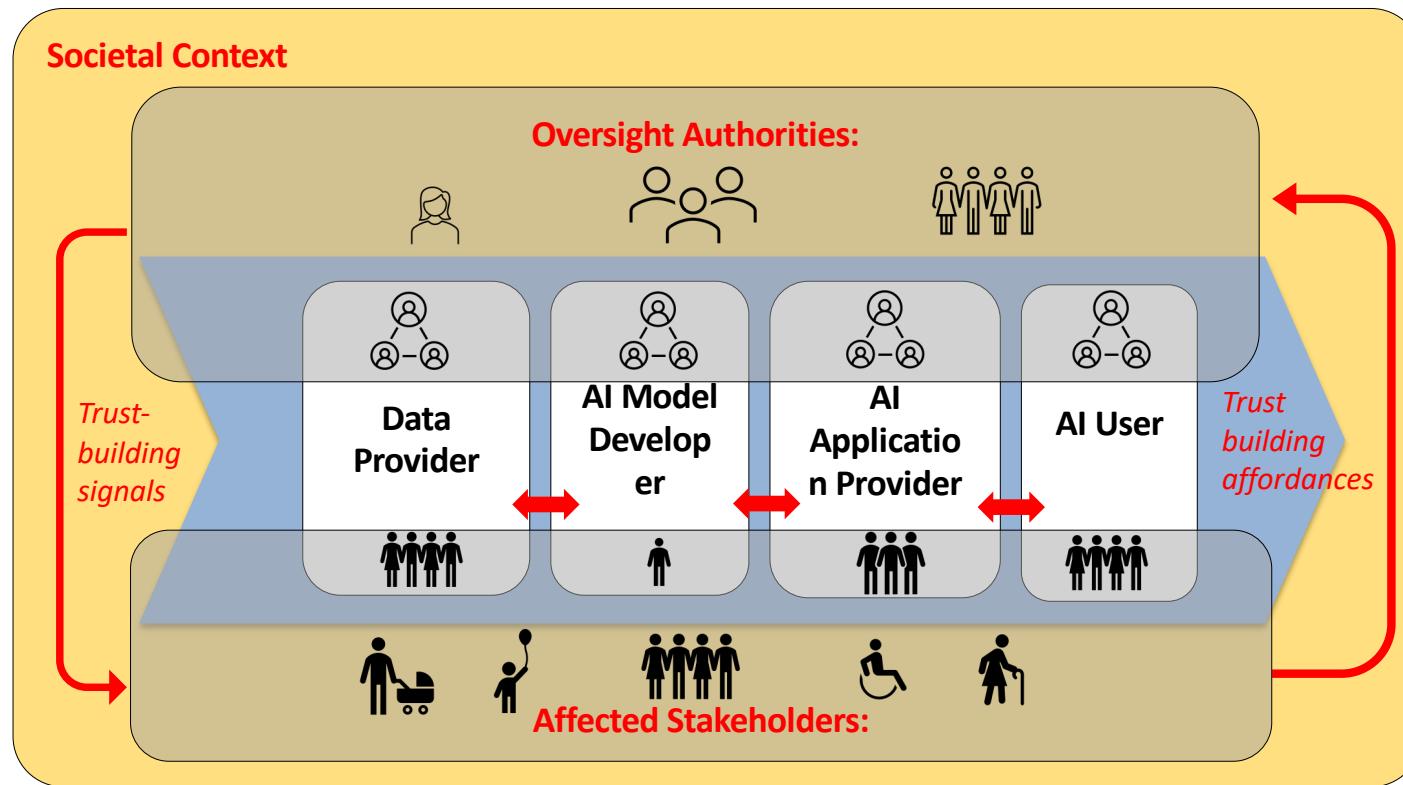
Latzer, M., Hollnbuchner, K., Just, N., & Saurwein, F. (2016). The economics of algorithmic selection on the Internet. *Handbook on the Economics of the Internet*, (October 2014), pp 395–425. Retrieved from <https://doi.org/10.4337/9780857939852.00028>

# Ethics in a Technology Development Project



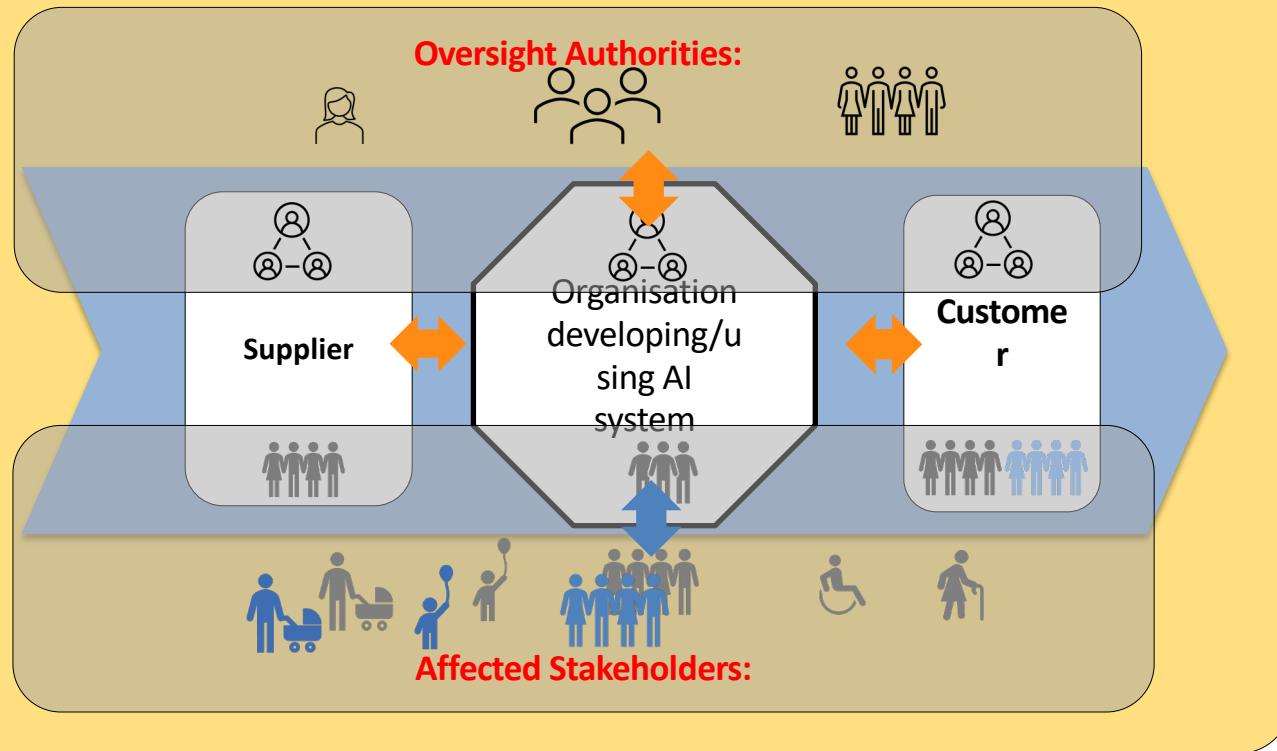
[IBM]

# Scoping Context: Trustworthy AI and Data Governance – Co Regulation



# Bridging fundamental rights, ethics and management systems

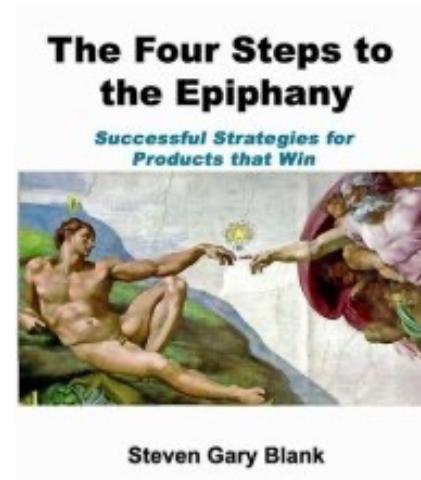
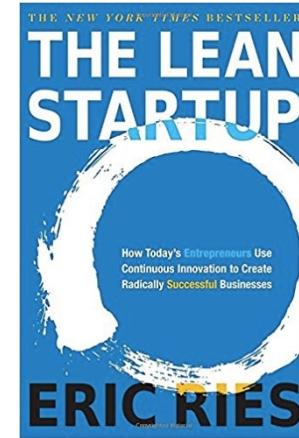
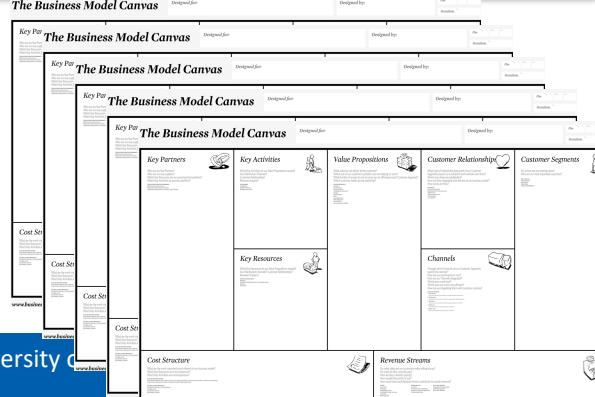
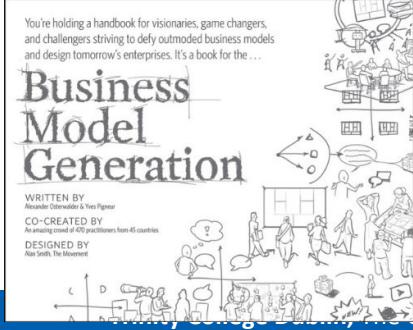
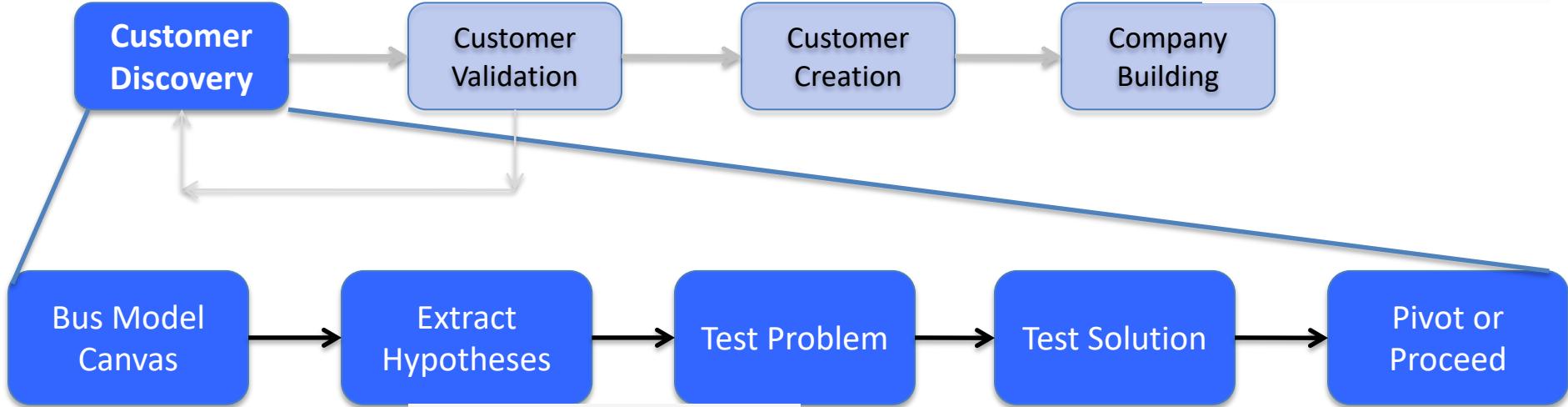
## Societal Context



- Labour Practices (workers)
- The Environment (future generations)
- Fair Operating Procedures (suppliers, customers, regulators)
- Consumer Issues (consumers)
- Community Involvement and Development (local communities)
- Human Rights (everyone)

# Data Hungry Innovation - "Silicon Valley" Methods

## The Customer Development Process



Steven Gary Blank

How to make ethics part of the process?

# Practicing Ethics in Responsible R&I

- Levels of practising ethics on responsible R&I (Brey, 2000):
  - *Disclosure*: exploration and identification of ethical impacts
  - *Theoretical*: frameworks to evaluate the impacts
  - *Application*: moral deliberation to overcome negative impacts
- *Disclosure level* neglected in current methodologies
- Need to:
  - Keep pace with **volume and speed** of innovation
  - **Accessible** to non-ethicist
    - R&I teams have an important perspective
    - R&I teams position to implement pivot to mitigate negative impact
  - Enabling a **collaborative** process



# Ethics Canvas: Lightweight approach

- Ethic Canvas is a methodology for identifying, evaluating and resolving ethical impacts during R&I stages:
  - Formation of knowledge and concepts
  - Design of the technology
  - Prototyping and testing
  - Integration of R&I outcomes into society
- Foster ethically informed technology design by engaging R&I teams with the ethical impacts
- Collaborative brainstorming tool with two aims:
  - Help innovators identify, discuss and articulate possible ethical impacts
  - Bring about *pivots* in the design



<https://ethicscanvas.org>

# Considerations on Ethical Impacts of Technology

- Changes in individual behaviour
- Relationships between individuals
- Relationships between collective actors
- Relationships *between* individuals and collectives
- Impact in the public sphere, on worldviews
- Impact of technology failure
- Impacts on the environment and production processes

# Ethics Canvas

Project Title:

Date:

Ethics Canvas v1.8 - ethicscanvas.org © ADAPT Centre &amp; Trinity College Dublin &amp; Dublin City University, 2017.

Individuals affected	Behaviour	What can we do?	Worldviews	Groups affected
Who use your product or service? Who are affected by its use? Are they men/women, of different ages, etc.?	How might people's behaviour change because of your product or service? Their habits, time-schedules, choice of activities, etc.?	What are the most important ethical impacts you found? How can you address these by changing your design, organisation, or by proposing broader changes?	How might people's worldviews be affected by your product or service? Their ideas about consumption, religion, work, etc.?	Which groups are involved in the design, production, distribution and use of your product or service? Which groups might be affected by it? Are these work-related organisation, interest groups, etc.?
 1	 3		 5	
	Relations  How might relations between people and groups change because of your product or service? Between friends, family-members, co-workers, etc.?		Group Conflicts  How might group conflict arise or be affected by your product or service? Could it discriminate between people, put them out of work, etc.?	
 1	 4	 9	 6	 2
Product or Service Failure  What are potential negative impact of your product or service failing to operate or to be used as intended? What happens with technical errors, security failures, etc.?		Problematic Use of Resources  What are potential negative impacts of the consumption of resources relating to your project? What happens with its use of energy, personal data, etc.?		
 7		 8		

# Stage 1: Identify the Relevant Stakeholders

Who might be affected by application—  
be inclusive

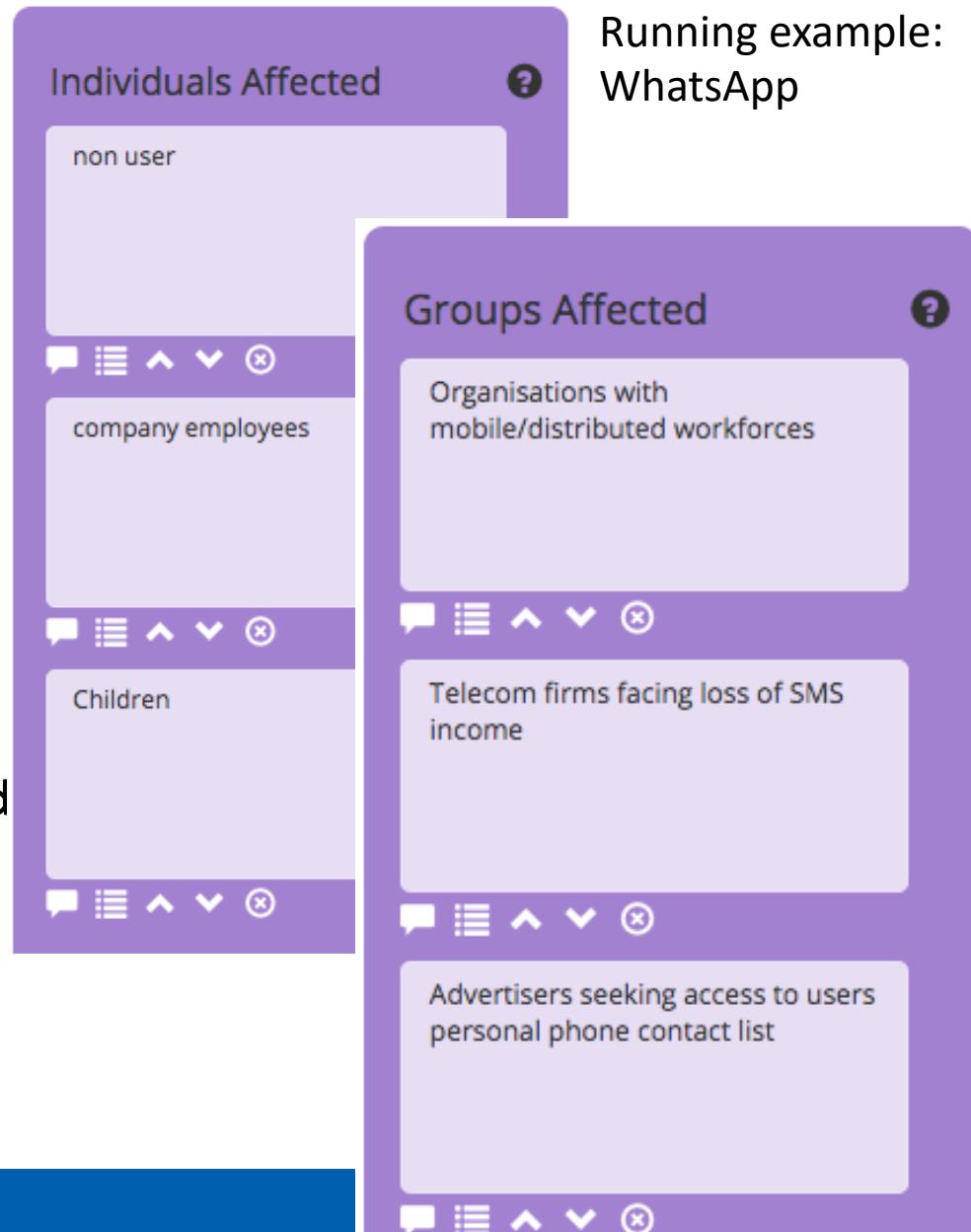
**Individuals:** Who use your product or service? Who are affected by its use?

*e.g. are they of different genders, of different ages, etc.?*

**Groups:** Which groups are involved in the design, production, distribution and use of your product or service?

**Which groups might be affected by it?**

*e.g. are these work-related organisation, interest groups, etc.?*



# Stage 2: Identifying Ethical Impacts

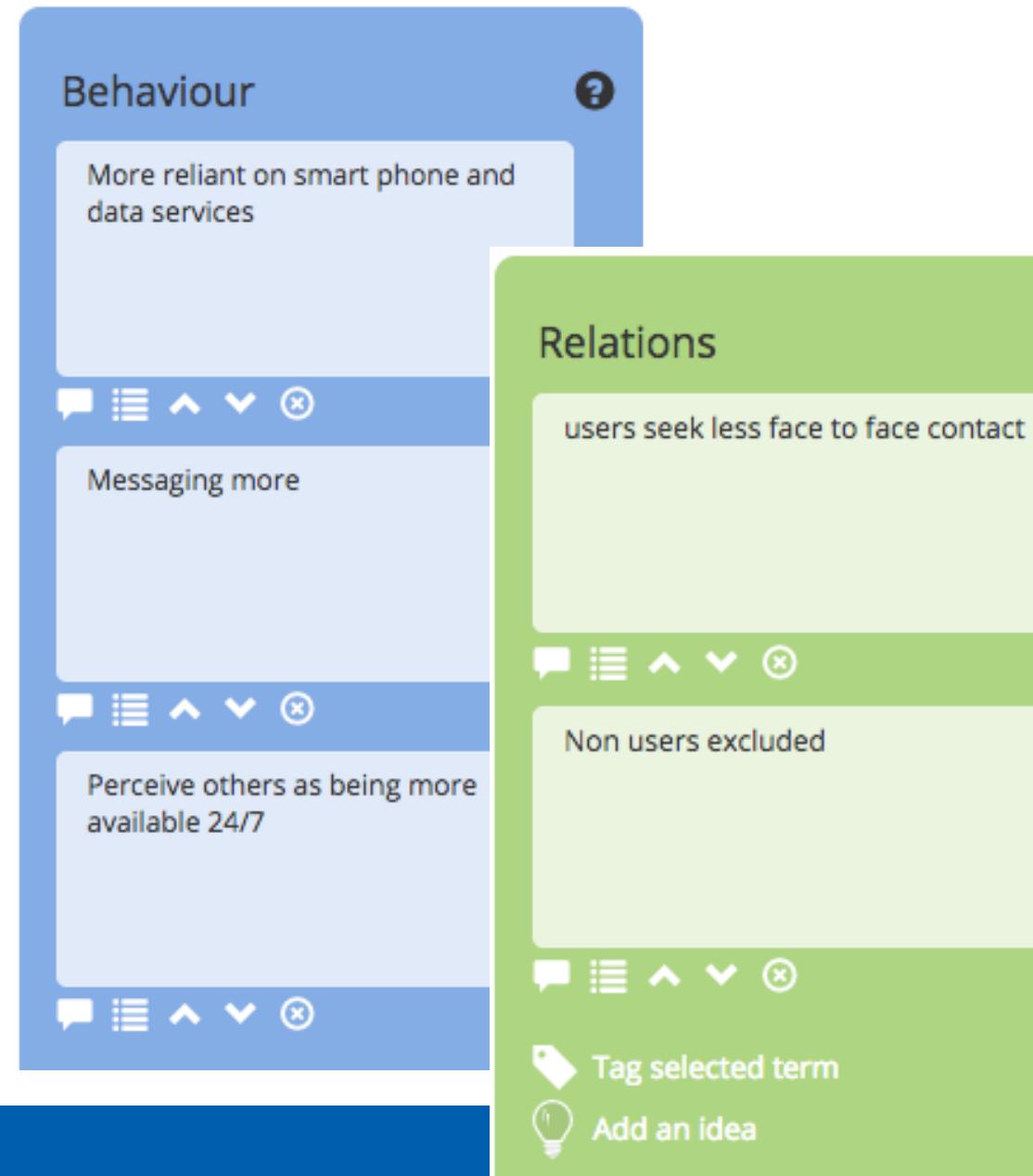
First, 'micro' impacts are captured by the canvas, i.e. on everyday lives of people using and living with the application

**Behaviour:** How might people's behaviour change because of your product or service?

*e.g. habits, time-schedules, choice of activities, etc.?*

**Relations:** How might relations between people and groups change?

*e.g. between friends, family members, co-workers, etc.?*



## Stage 2: Identifying

Next 'macro' impacts need to be considered.

These surpass individual's impacts - pertain to collective, social structures instead, e.g. related to political structures or cultural value-systems.

How might people's Worldviews be affected by your product or service? e.g. *their ideas about consumption, religion, work, etc.?*

Social conflicts: How might Group Conflict arise or be affected? e.g. *discriminate between people, put them out of work, etc.?*

Worldviews

personal phone contacts no longer regarded as private

concerns with loss of location privacy

Group Conflicts

New channel for cyberbullying

conflict between employees and employers messages outside work hours

Tag selected

Add an idea

# Stage 2: Identifying Ethical Impacts

Aspects that *indirectly* impact our lives..

Potential negative impact of your product or service failure? e.g. what happens with technical errors, security failures, etc.?

Potential negative impacts of the consumption of resources relating to your project? e.g. what happens with its use of energy, personal data, etc.?

## Product or Service Failure

loss of critical communication channel if service fails



breach of phone contact list data privacy

## Problematic Use of Resources

loss of control over phone contact list



individual attention diverted from social surrounding to smartphone

# Stage 3: How to Address Ethical Impacts

**What are the most important ethical impacts you found?**

**How can you address these by pivoting your design, organisation, or by proposing broader changes?**

What can we do?

transparency and control over sharing and use of phone contact list



Tag selected term



Add an idea

Individuals Affected: -	Behaviour: -	What can we do?: -	Worldviews: -	Groups affected: -
Product or Service Failure: -	Relations: -		Group Conflicts: -	

<b>Individuals Affected:</b> Consumer of food -	<b>Behaviour:</b> - Less time preparing meals  Easier to live singly/independently  More consumption of ready meals	<b>What can we do?:</b> Find other reasons to eat together as a family  Microwave fresh rather than processing meals  Switch to air fryer	<b>Worldviews:</b> - More individualistic outlooks - Devaluing food preparation and cooking skills	<b>Groups affected:</b> Cooked food vendors – less business  Fresh food vendors: more value in pre-processed food as convenience attractive to consumers
	<b>Relations:</b> Less family interaction at meal times -		<b>Group Conflicts:</b> ?	

**Product or Service Failure:**

Only way of warming food

Microwave unit leaks

**Problematic Use of Resources:**

More processed food and packaging

<p><b>Individuals Affected:</b></p> <ul style="list-style-type: none"> <li>- Everyone accessing youtube</li> <li>Children</li> <li>Content posters</li> </ul>	<p><b>Behaviour:</b></p> <ul style="list-style-type: none"> <li>- More screen time due to recommendations</li> <li>Access to violent or disturbing content</li> <li>Access to age inappropriate content</li> <li>Open to false messages/information</li> <li>Open for harmful body images</li> </ul>	<p><b>What can we do?:</b></p> <ul style="list-style-type: none"> <li>- Green energy for data centres and networks</li> <li>- Screen time reporting and rationing</li> <li>- Better screen on inappropriate content</li> </ul>	<p><b>Worldviews:</b></p> <ul style="list-style-type: none"> <li>- Increase in belief in conspiracy theories</li> <li>- increase in extremist and polarized views</li> </ul>	<p><b>Groups affected:</b></p> <ul style="list-style-type: none"> <li>- News providers</li> <li>- Advertisers</li> <li>- Content providers</li> <li>- youTubers</li> <li>- Content moderators</li> </ul>
	<p><b>Relations:</b></p> <ul style="list-style-type: none"> <li>- Less consuming video as a group</li> <li>Less consuming same video as social contacts, less common experience to share</li> </ul>		<p><b>Group Conflicts:</b></p> <ul style="list-style-type: none"> <li>- fakenews and distortion of facts impact civic and democratic processes</li> <li>Employer harms on content moderators</li> <li>Displacement of local news sources</li> </ul>	

**Product or Service Failure:**

- Loss of advertising opportunities
- Loss of video for promoting services or providing information, e.g. how-tos

**Problematic Use of Resources:**

- Data center power consumption

# The Ethics Canvas

- Canvas current version: 1.8

- Web version:

<https://ethicscanvas.org>

- License: Creative Commons Attribution Non-Commercial 3.0 Unported



- User Manual available at:
- <https://www.ethicscanvas.org/download/handbook.pdf>

# Conclusions

- As tech becomes more powerful and ubiquitous, risks of individual and societal impact and harm grows
- Tech Ethics becoming a priority for governments and companies, e.g. for AI, Big Data, Robotics, IoT etc
- Modern innovation techniques feeding AI and Big Data applications need appropriate forms of ethical consideration – agile, accessible
- Ethic Canvas is a simple tool to help innovation teams reflect on ethical issues across application design iterations





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**Thank You**