

# Lean Startup

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**More startups fail from  
a lack of customers than from a  
failure of product development**



**But First a bit of history**

**It Started 100 Years Ago**



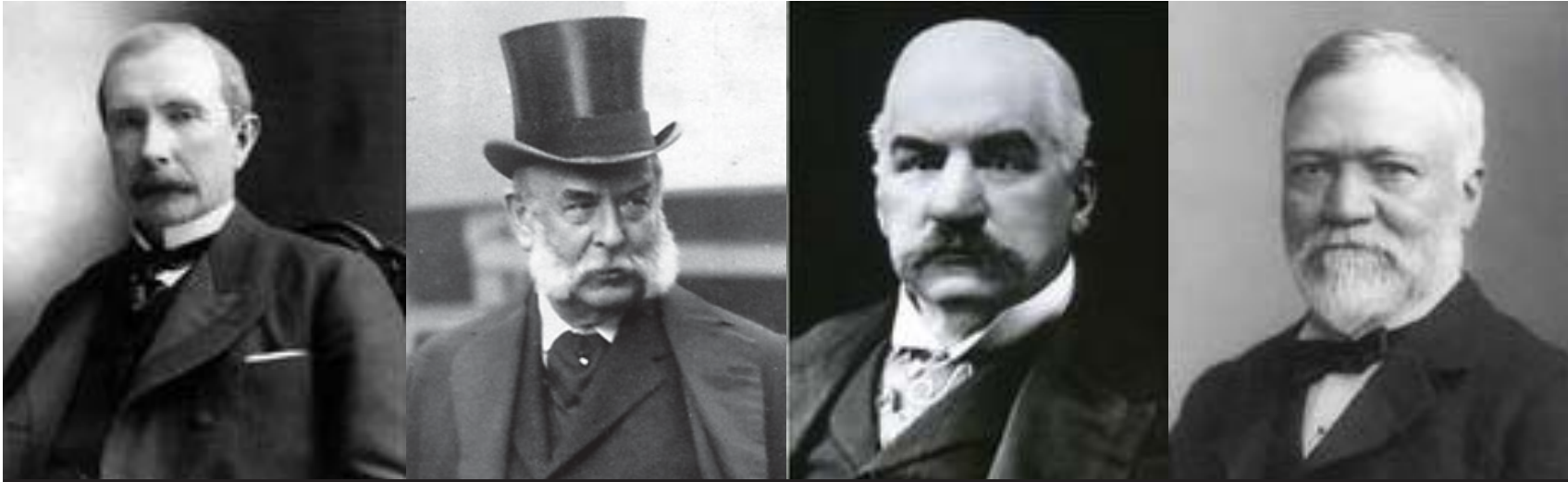


U.S. 1870's – 1920's Rapid Industrialization

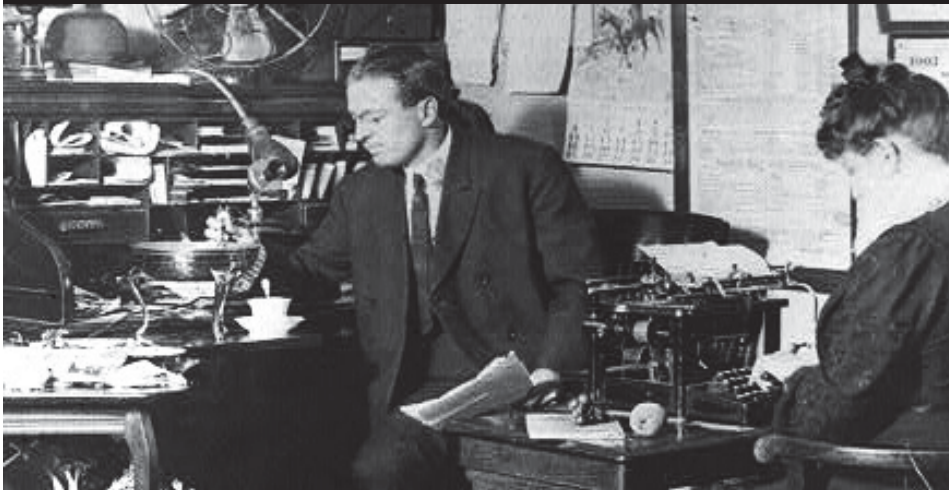
Railroads  
Steel  
Electricity  
Automobiles  
Consumer Goods







Ownership is separated from management





Ownership is separated from management  
Business needs *professional business administrators*





# The Master of Business Administration





# The Master of Business Administration 1908



# The Master of Business Administration (MBA)

## Business School Curriculum

- 
- Finance
  - Leadership
  - Org Behavior
  - Operations
  - Marketing
  - Strategy
  - Gov't & Law
  - Supply Chain
  - Ethics
  - Global Business
  - Accounting
  - Global Mgmt



# The Master of Business Administration (MBA)

## Business School Curriculum

### Execution of existing businesses

- Org Behavior
- Operations
- Marketing
- Strategy
- Ethics
- Global Business
- Accounting
- Global Mgmt



# **BUSINESS PLAN**

Prepared by:  
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# All I Need is the 5-Year Forecast

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
32	Balance Sheet										Year				
33										1999	2000	2001	2002	2003	
34	Assets														
35		Cash and cash equivalents*								\$4.27	\$6.38	\$7.62	\$8.83	\$7.00	
36		Accounts receivable*								\$20.58	\$24.39	\$28.77	\$34.11	\$32.00	
37		Inventories*								\$26.73	\$30.45	\$36.75	\$43.27	\$38.00	
38		Deferred income taxes*								\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
39		Total current assets								\$51.58	\$61.22	\$73.14	\$86.21	\$77.00	
40		Fixed assets													
41			Cost*							\$331.64	\$423.92	\$503.87	\$613.28	\$650.00	
42			Accumulated Depreciation*							\$98.72	\$105.89	\$112.40	\$122.26	\$115.00	
43			Net fixed assets							\$232.92	\$318.03	\$391.47	\$491.02	\$535.00	
44		Goodwill*								\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
45		Intangible assets*								\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
46		Other assets*								\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
47		Total assets								\$284.50	\$880.05	\$464.61	\$577.23	\$612.00	
48	Liabilities														
49		Accounts payable*								\$31.83	\$63.43	\$83.84	\$94.41	\$80.00	
50		Current debt*								\$30.86	\$43.83	\$64.85	\$79.49	\$0.00	
51		Total current liabilities								\$62.69	\$107.26	\$148.69	\$173.90	\$80.00	
52		Long-term debt*								\$40.00	\$46.92	\$53.41	\$73.57	\$214.54	
53		Other long-term liabilities*								\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
54		Total liabilities								\$102.69	\$154.18	\$202.10	\$247.47	\$294.54	
55	Shareholders' equity														
56		Common Stock and Additional Paid in Capital*								\$90.00	\$130.00	\$160.00	\$220.00	\$200.00	
57		Retained Earnings*								\$91.81	\$96.67	\$102.51	\$109.76	\$117.46	
58		Total Shareholders' Equity								\$181.81	\$226.67	\$262.51	\$329.76	\$317.46	
59		Total liabilities and shareholders' Equity								\$284.50	\$880.05	\$464.61	\$577.23	\$612.00	

Everyone has a plan  
until they get punched in the face  
*Mike Tyson*



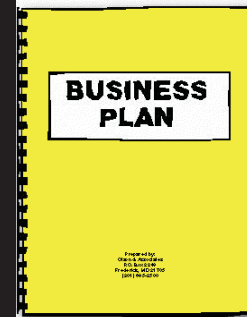
# No plan survives first contact with the enemy

*Field Marshall Helmuth von Moltke*



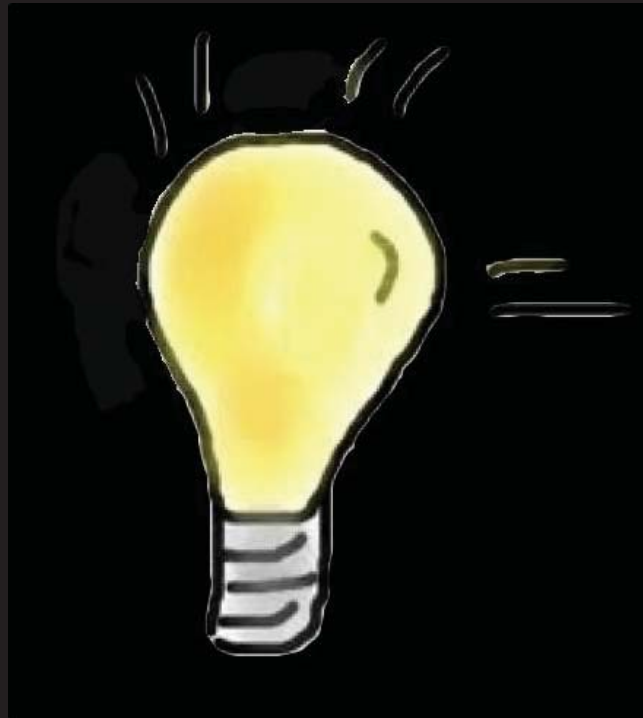
# Is this all there is?

EXECUTION



		Year				
		1999	2000	2001	2002	2003
11	Balance Sheet					
12	Assets					
13	Cash and cash equivalents*	54.27	54.38	53.62	54.89	53.94
14	Accounts receivable*	226.75	224.79	228.37	234.21	232.89
15	Inventory*	226.75	238.48	236.75	242.27	238.96
16	Deferred income taxes*	58.00	58.00	58.00	58.00	58.00
17	Total current assets	565.77	581.65	576.74	589.37	583.79
18	Fixed assets					
19	Land	1711.44	1423.92	1363.87	1413.28	1450.00
20	Accumulated Depreciation*	179.72	1,095.09	1,012.40	1,022.26	1,015.90
21	Net fixed assets	1,531.72	1,328.83	1,351.47	1,391.02	1,434.10
22	Goodwill*	58.00	58.00	58.00	58.00	58.00
23	Intangible assets*	58.00	58.00	58.00	58.00	58.00
24	Other assets*	58.00	58.00	58.00	58.00	58.00
25	Total assets	3,284.90	3,080.45	3,046.48	3,107.23	3,062.89
26	Liabilities					
27	Accounts payable*	131.83	143.43	143.84	154.41	140.00
28	Current debt*	158.00	142.93	144.45	179.89	150.00
29	Total current liabilities	289.83	286.36	288.29	334.30	290.00
30	Long-term debt*	58.00	58.00	58.00	58.00	58.00
31	Other long-term liabilities*	58.00	58.00	58.00	58.00	58.00
32	Total liabilities	405.83	402.29	404.29	450.30	406.00
33	Shareholders' equity					
34	Common Stock and Additional Paid-in Capital*	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
35	Retained Earnings*	1,181.12	1,047.47	1,042.19	1,049.79	1,117.44
36	Total shareholders' equity	2,181.12	2,047.47	2,042.19	2,049.79	2,117.44
37	Total liabilities and shareholders' equity	3,284.90	3,080.45	3,046.48	3,107.23	3,062.89

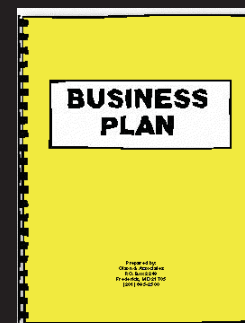




SEARCH

EXECUTION

?



Balance Sheet										
Year										
	1991	2000	2001	2002	2003					
<b>Assets</b>										
Cash and cash equivalents*	\$4.27	\$6.38	\$7.62	\$8.83	\$7.86					
Accounts receivable*	\$26.50	\$24.39	\$28.77	\$34.21	\$32.89					
Inventories*	\$26.75	\$38.85	\$74.75	\$62.27	\$58.86					
Deferred income taxes*	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00					
<b>Total current assets</b>	<b>\$57.52</b>	<b>\$69.62</b>	<b>\$110.14</b>	<b>\$95.31</b>	<b>\$93.61</b>					
Fixed assets										
Cost*	\$113.64	\$453.92	\$393.87	\$433.28	\$458.00					
Accumulated Depreciation*	\$19.72	\$395.69	\$322.46	\$322.26	\$325.00					
<b>Net fixed assets</b>	<b>\$232.92</b>	<b>\$218.83</b>	<b>\$71.41</b>	<b>\$491.02</b>	<b>\$133.00</b>					
Goodwill*	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00					
Intangible assets*	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00					
Other assets*	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00					
<b>Total assets</b>	<b>\$286.50</b>	<b>\$108.45</b>	<b>\$181.55</b>	<b>\$586.33</b>	<b>\$226.61</b>					
<b>Liabilities</b>										
Accounts payable*	\$31.81	\$63.40	\$83.84	\$94.41	\$80.88					
Current debt*	\$30.00	\$43.61	\$64.85	\$75.49	\$0.00					
<b>Total current liabilities</b>	<b>\$61.81</b>	<b>\$107.01</b>	<b>\$148.69</b>	<b>\$169.90</b>	<b>\$80.88</b>					
Long-term debt*	\$40.00	\$46.32	\$73.46	\$73.57	\$243.74					
Other long-term liabilities*	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00					
<b>Total liabilities</b>	<b>\$101.81</b>	<b>\$153.33</b>	<b>\$222.15</b>	<b>\$243.47</b>	<b>\$324.62</b>					
<b>Shareholders' equity</b>										
Common Stock and Additional Paid-in Capital*	\$90.00	\$130.00	\$100.00	\$220.00	\$200.00					
Retained Earnings*	\$196.50	\$258.45	\$281.55	\$341.93	\$126.61					
<b>Total Shareholders' Equity</b>	<b>\$286.50</b>	<b>\$388.45</b>	<b>\$381.55</b>	<b>\$561.93</b>	<b>\$326.61</b>					
<b>Total liabilities and shareholders' Equity</b>	<b>\$286.50</b>	<b>\$108.45</b>	<b>\$181.55</b>	<b>\$586.33</b>	<b>\$226.61</b>					

**It Resulted in Five Observations**



# Startups Are **Not** Smaller Versions of Large Companies



TEACHING POINT: SEE EG PAGE 3

**Startups Are Not Smaller  
Versions of Large Companies**

**Large Companies **Execute**  
Known Business Models**





**Startups Are Not Smaller  
Versions of Large Companies**

**Startups **Search** for  
Unknown Business Models**



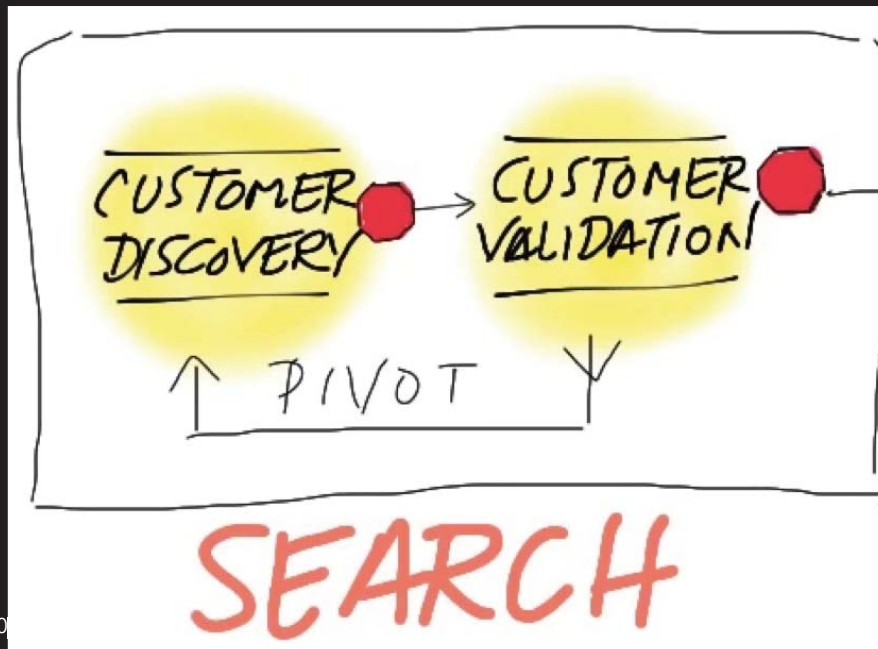
Startups Fail Because They  
Confuse *Search* with *Execute*



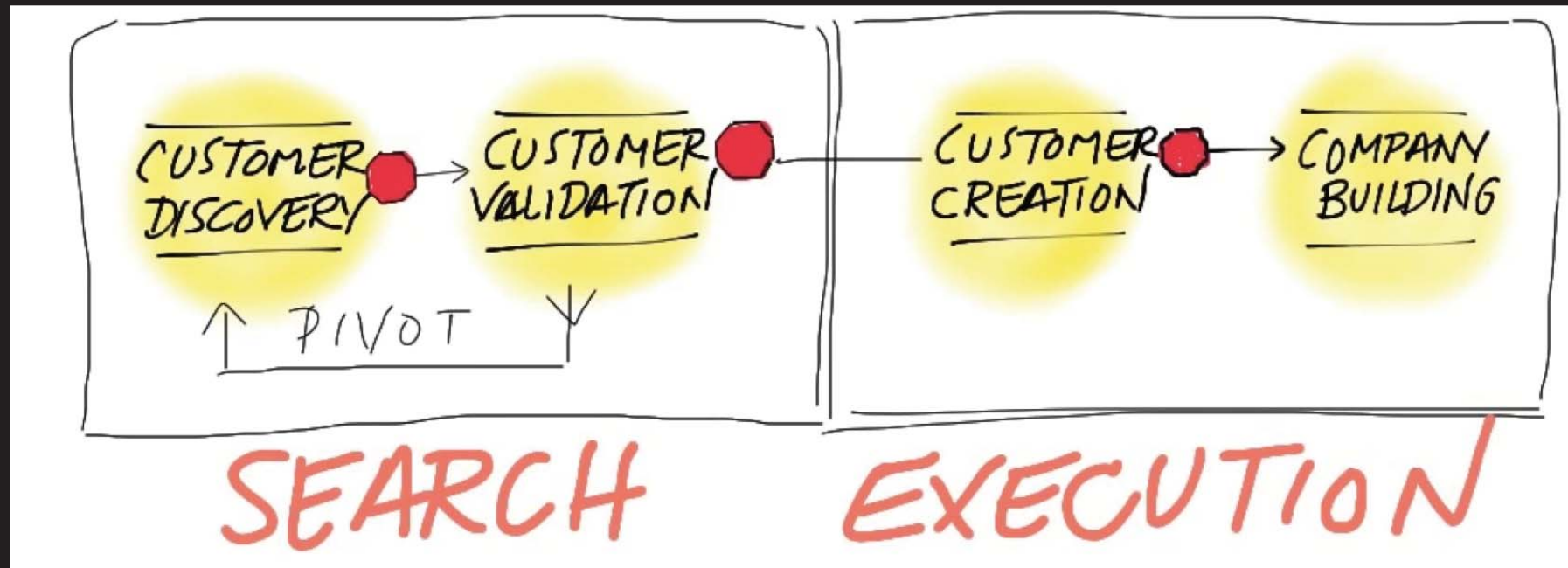
**Startups need their own tools,  
different from those used  
in existing companies**



# Customer Development



# Customer Development

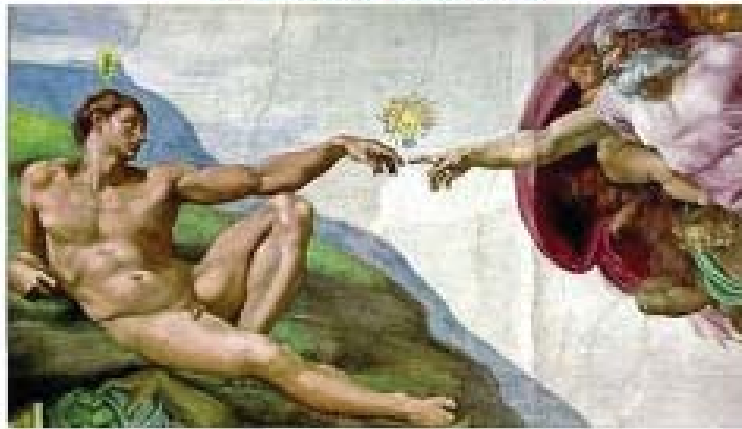




# Steve Blank wrote a “Book”

## **The Four Steps to the Epiphany**

*Successful Strategies for  
Products that Win*



**Steven Gary Blank**



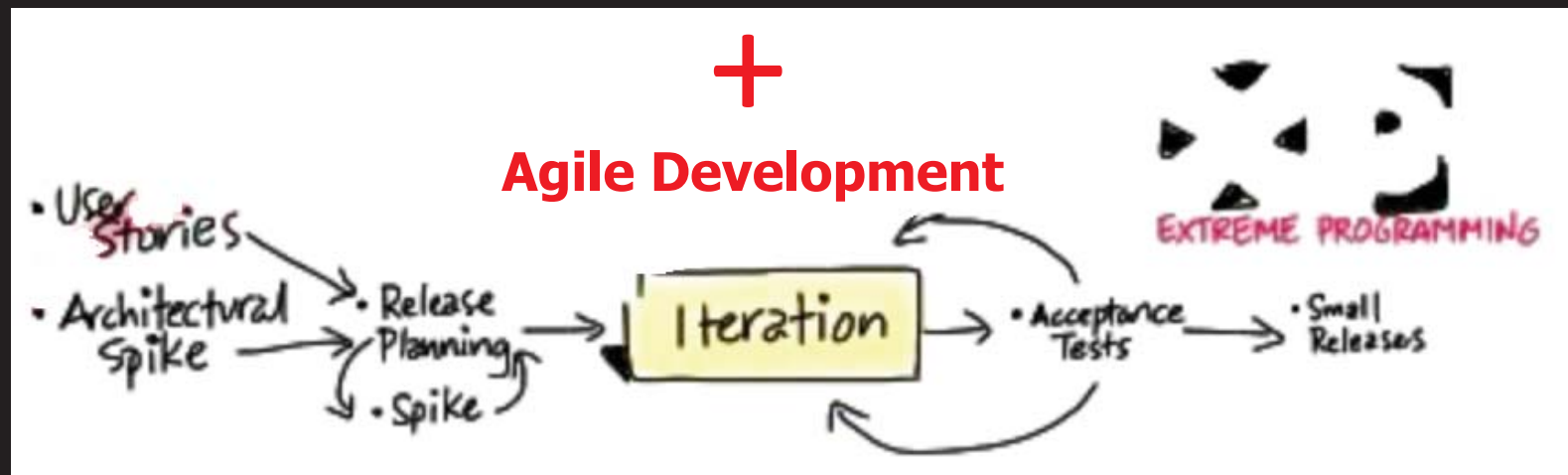
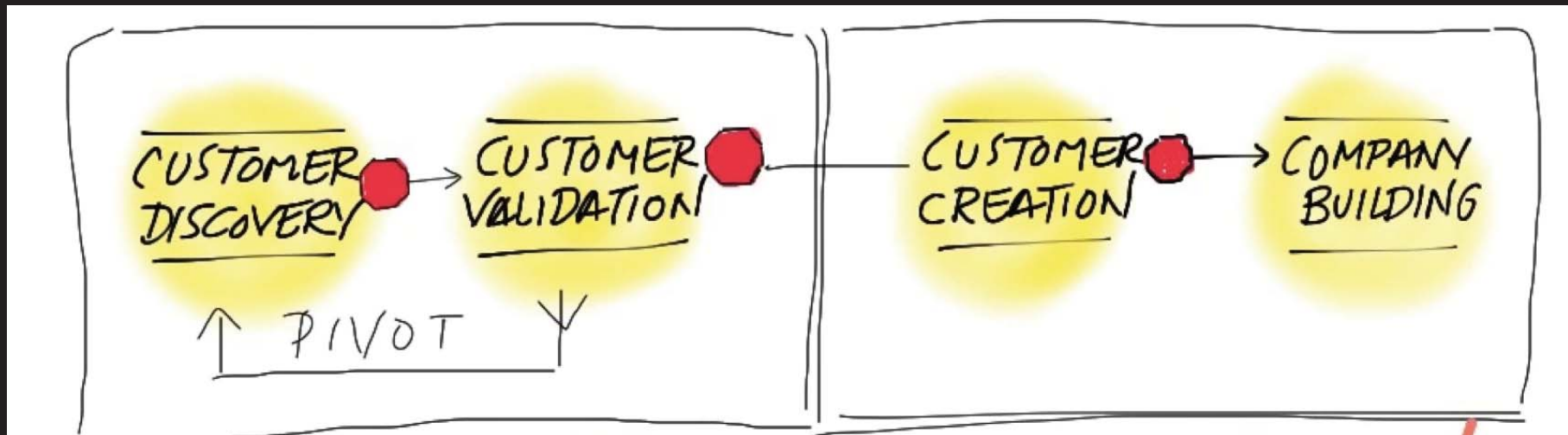


# Eric Ries Extends the Model

- Took my class at U.C. Berkeley
- Co-founded IMVU, I sat on his board
  - 1<sup>st</sup> implementation of Customer Development
  - Paired it with an Agile Development Model
- Called it the **Lean Startup**



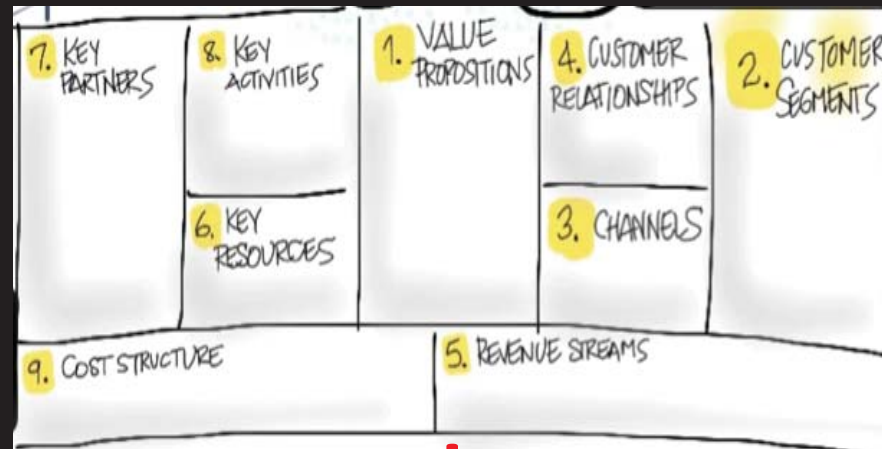
# Which Turned Into A Better Model



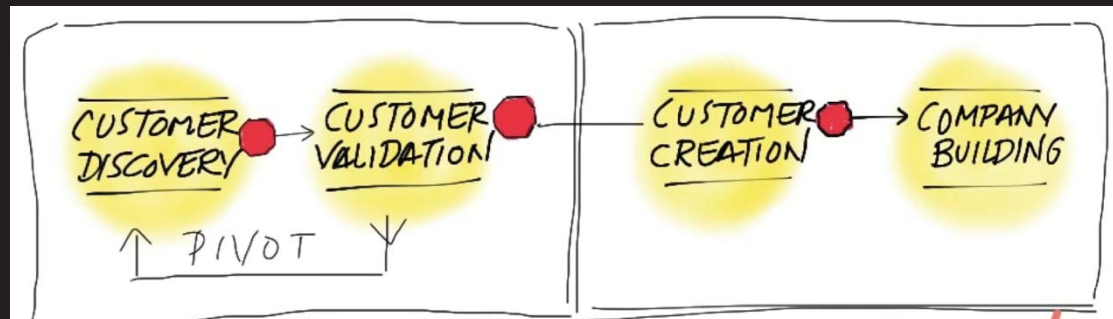


- Business Model Generation
- Defines what the “search” is about

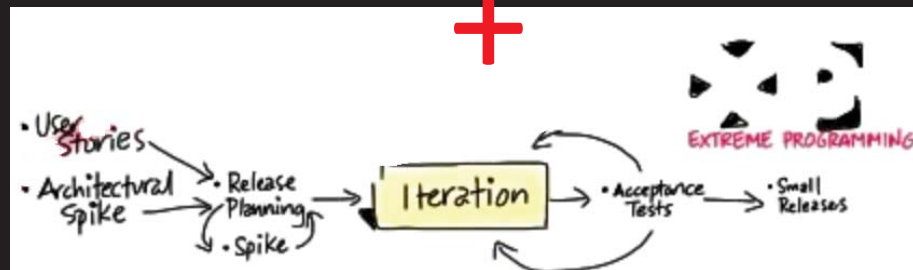
# Which Turned Into an **Even Better** Model



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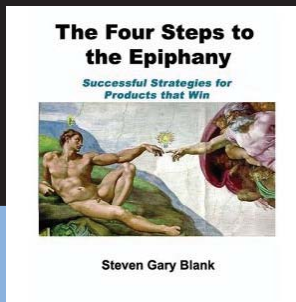


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# Lean Gets Theory



**Customer Development**

**2003**

**Blank**



**Business Model Canvas**

**2010**

**Osterwalder**



**Agile Engineering**

**2011**

**Ries**



**HBR Cover**

**2013**

**Blank**

Entrepreneurship is **Experiential**



**Let's Do it That Way**

**Let's Teach it That Way**



**What's A  
Startup?**





A **temporary** organization  
designed to search  
for a repeatable and  
scalable  
business model



A **temporary** organization  
designed **to search**  
for a repeatable and  
scalable  
business model



A **temporary** organization  
designed **to search**  
for a **repeatable and**  
**scalable**  
business model



A **temporary** organization  
designed **to search**  
for a **repeatable and**  
**scalable**  
**business model**



Startups Fail Because They  
Confuse *Search* with *Execution*



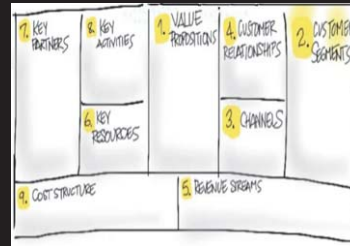


Product risk is not the biggest risk startups face; it's **market risk**. The risk that not enough people will buy and/or adopt.

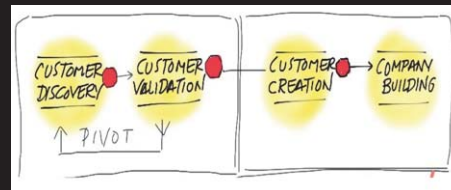
# **Taking you from an Idea to a Business**



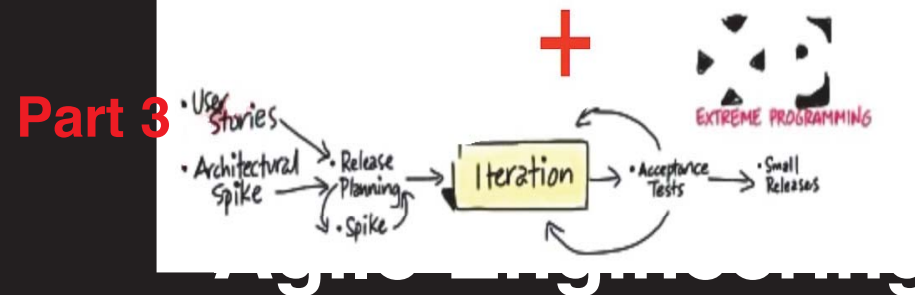
# Three Parts of Lean Startup



# Part 1



## Part 2



# 1. Frame Hypotheses










- Frame Hypotheses



# 1. Frame Hypotheses

- Frame Hypotheses

## Business Model Canvas

<b>Key Partners</b>  <b>Partners</b> <small>Who are our Key Partners? Who are our key suppliers? Which Key Resources are we dependent on? Which Key Activities do we need?</small>	<b>Key Activities</b>  <b>Activities</b> <small>What Key Activities do our Value Propositions require? Do Distribution Channels? Customer Relationships? Revenue Streams?</small>	<b>Value Propositions</b>  <b>Product / Service</b> <small>What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying?</small>	<b>Customer Relationships</b>  <b>Get/Keep/ Grow</b> <small>What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they helping deal with the rest of our business model? How costly are they?</small>	<b>Customer Segments</b>  <b>Customers</b> <small>For whom are we creating value? Who are our most important customers? What are their segments? How many are there?</small>
	<b>Key Resources</b>  <b>Resources</b> <small>What Key Resources do our Value Propositions require? Do Distribution Channels? Customer Relationships? Revenue Streams?</small>		<b>Channels</b>  <b>Channel</b> <small>Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How can we reach them better? Which ones work best? Which ones are most cost-efficient? How can we integrate them with customer routines?</small>	
<b>Cost Structure</b>  <b>Costs</b> <small>What are the most important costs inherent in our business model? Which Key Resources are most expensive? Which Key Activities are most expensive? Which Key Channels are most expensive? Are there economies of scale or experience? Are there cost synergies? Do we incur any fixed costs? Are there trade-off costs?</small>		<b>Revenue Streams</b>  <b>Revenue</b> <small>For what value are our customers really willing to pay? For what do they currently pay? How can this current payment method be improved? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?</small>		

[www.businessmodelgeneration.com](http://www.businessmodelgeneration.com)

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## Company/Project View : Business Model Canvas

ADAPTABILITY

External threats



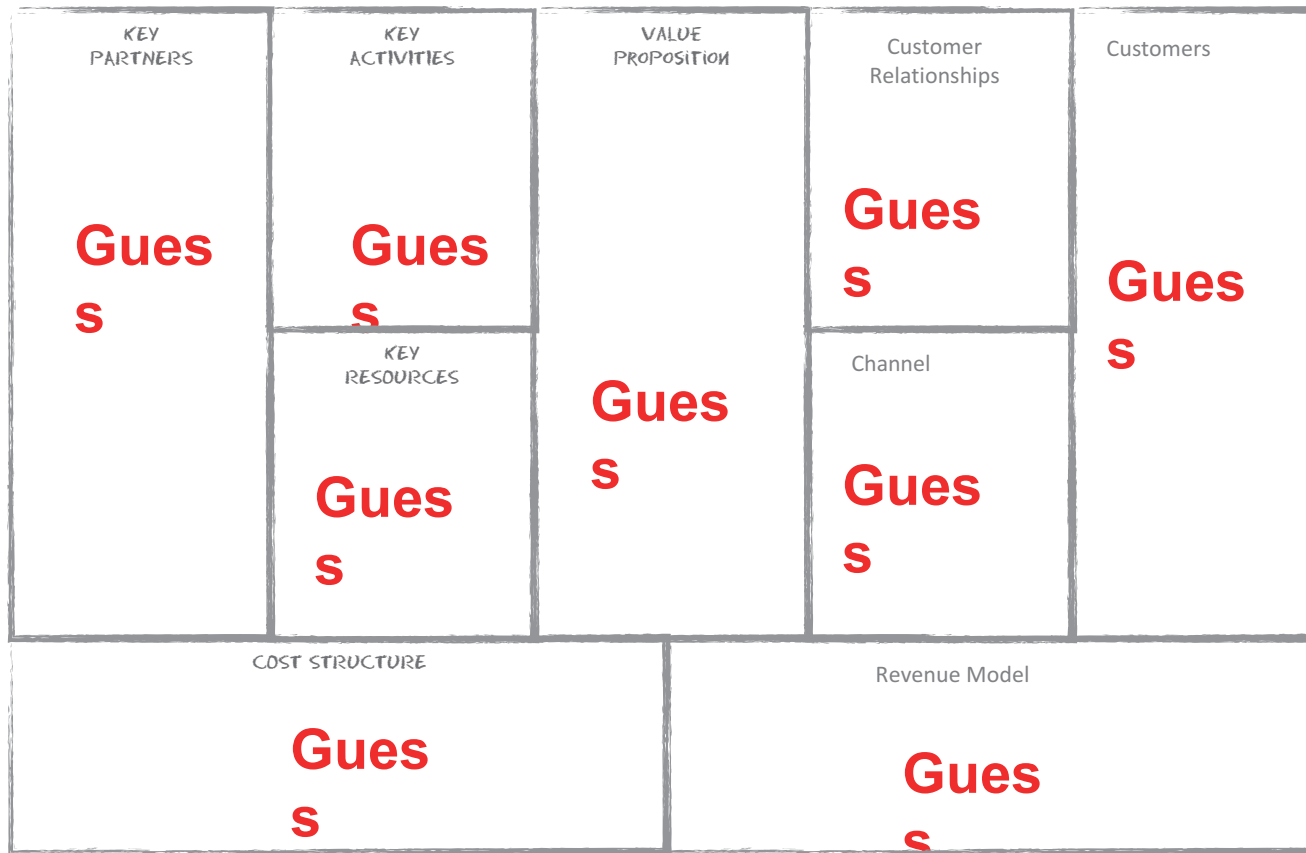
# Business Model Canvas

<b>Partners</b>  Who are our key partners? Suppliers?  What are we getting from them? Giving them?	<b>Activities</b>  What key activities do we need to be expert in?  <b>Resources</b>  What key resources do we need to own or acquire? Financial? Human?	<b>Value Proposition</b>  How are we solving each customers pains/gains?  How?  What product/service features match their needs?	<b>Customer Relationships</b>  how does the team get “Buy-In” from all the beneficiaries?  <b>Channel</b>  How will we deploy the product to widespread use? What constitutes a successful deployment?	<b>Customer Segments</b>  Who are our most important customers? Stakeholders?  What are their pains/gains?  What job do they want us to get done for them>
<b>Costs</b>  What is the Budget/Cost?			<b>Revenue Streams</b>  What is the revenue model? What are the pricing tactics?	

Source: Alexander Osterwalder- Business Model Generation

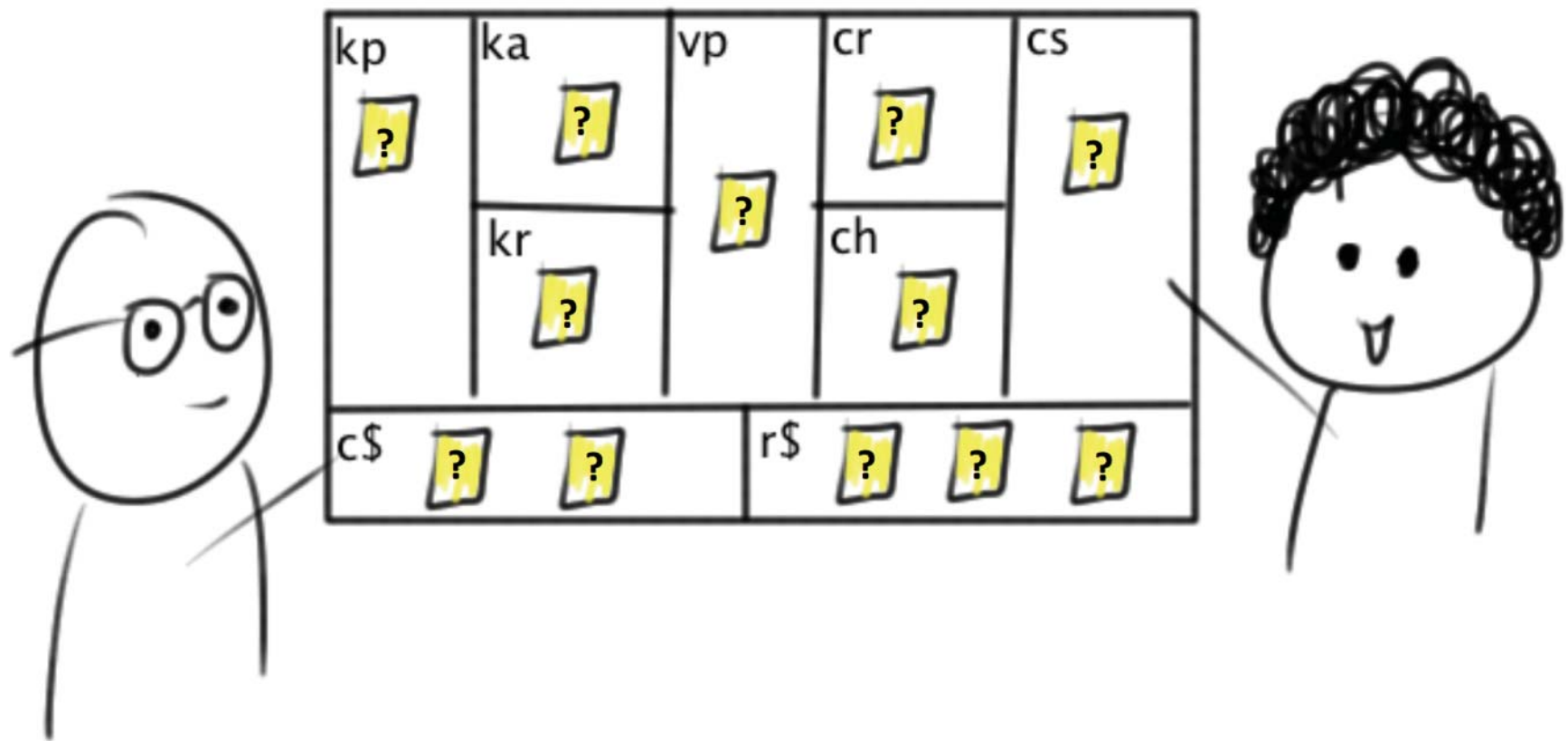


# 9 Guesses



Source: Alexander Osterwalder- Business Model Generation

*“I wonder how much of this is reality...”*



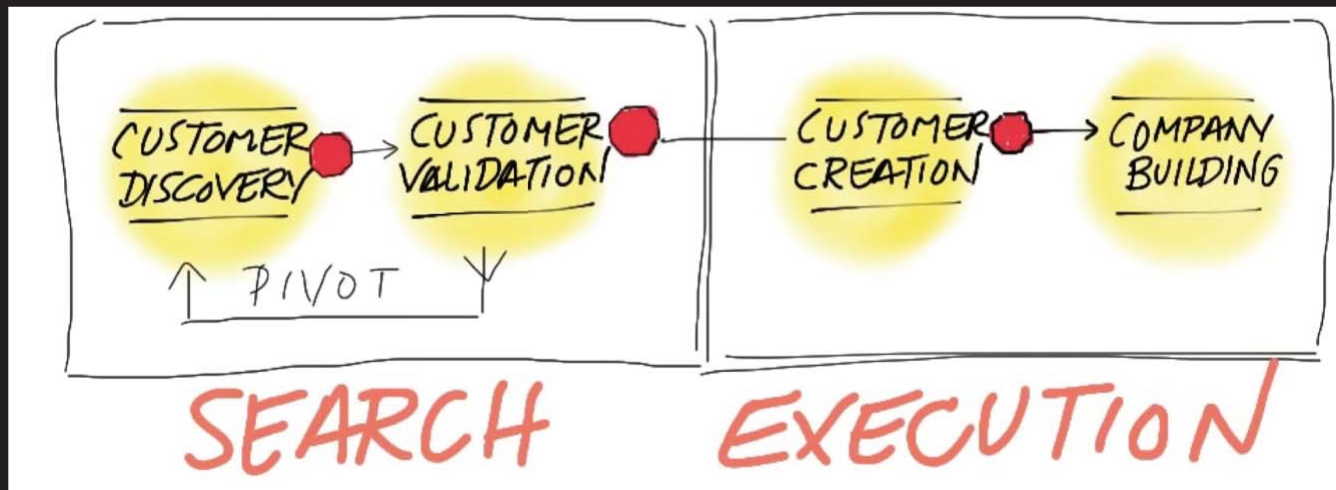
## 2. Test Hypotheses

- Frame Hypotheses → Business Model Canvas
- Test Hypotheses



## 2. Test Hypotheses

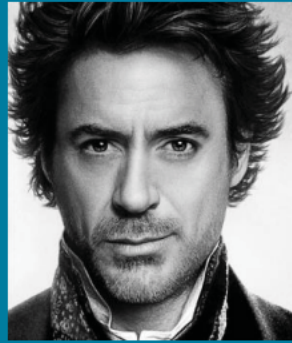
- Frame Hypotheses → Business Model  
Customer Development





**There Are No Facts Inside  
The Building, So Get the  
Heck Outside**



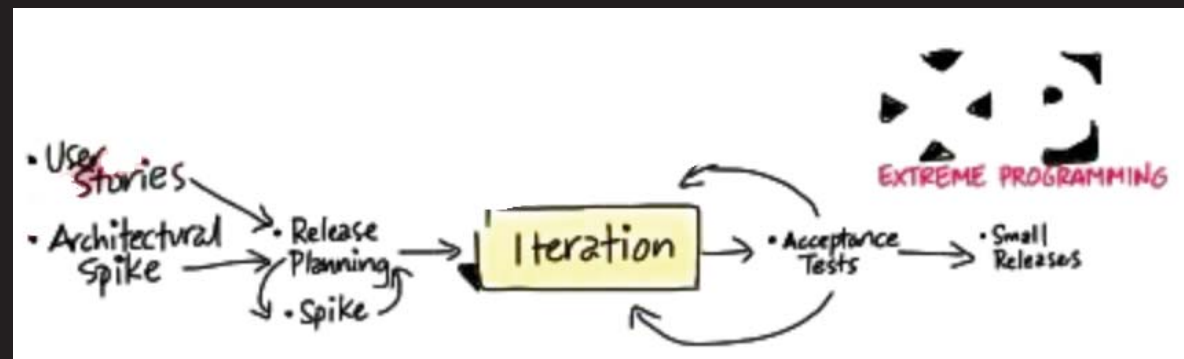


“It’s a big mistake to theorize before one has data because one begins to twist facts to suit theories instead of theories to suit facts.”

--Sherlock Holmes

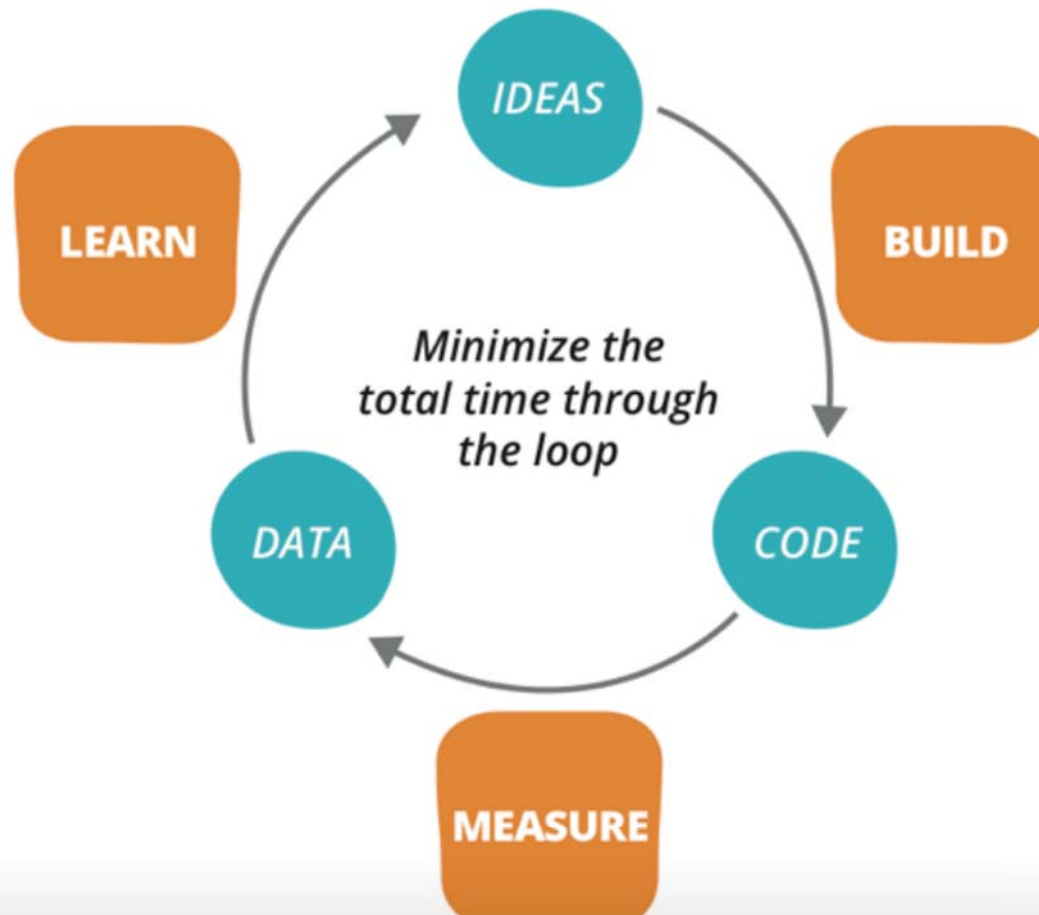
# 3. Build Incrementally & Iteratively

- Frame Hypotheses
  - Business Model
  - Customer Development
- Test Hypotheses
- Build the product incrementally & Iteratively
  - Rapid Prototype/MVP (Agile Engineering)



# build-measure-learn

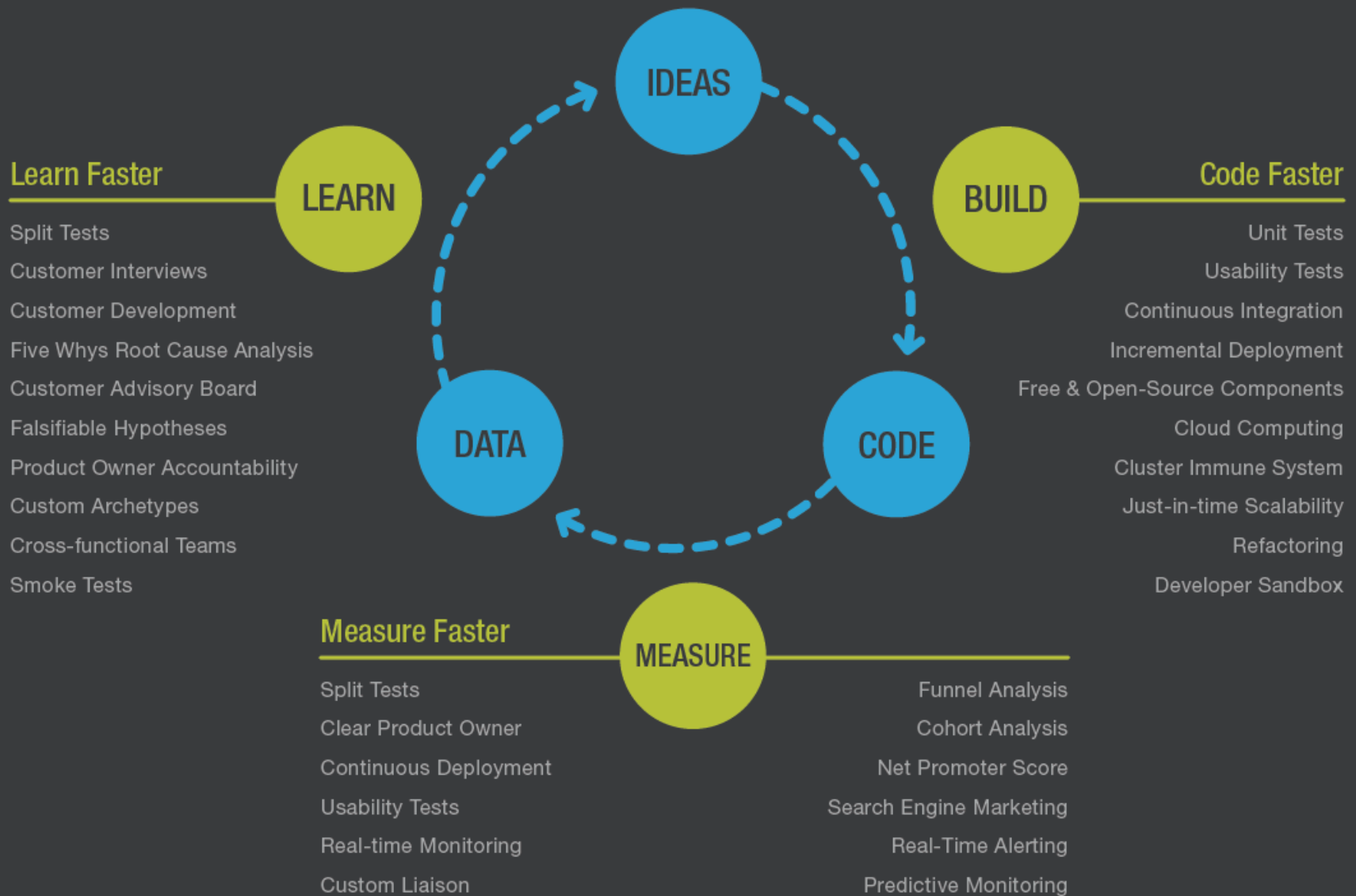
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# THE LEAN STARTUP

Created by Eric Ries - [startuplessonslearned.blogspot.com](http://startuplessonslearned.blogspot.com)

Designed by  **KISSmetrics**



# Lean Framework

- Business Model Canvas
  - Articulate initial Hypotheses
  - Weekly Progress Scorecard
- Customer Development
  - Test hypotheses in front of customers
  - Hypothesis > Experiment > Data > Insight
- Rapid Prototyping – Agile Engineering
  - Building a Series of Minimum Viable Products



# Experiential

- Getting out of the building
- Formal methodology for customer interaction
- Focus on Minimal Viable Products and Pivots
  - Getting out of the building is a big idea
  - It accelerates speed of translation





# Courses



# Lean LaunchPad, H4D, I-Corps,

Turning Researchers, Hackers, Hustlers and Designers  
into Entrepreneurs

# Common Elements

Team-based

Experiential

Immersive

Lean Methodology

Evidence-based

Flipped Classroom

Team Teaching



# Differences

Teams work on *their own* projects

Lean LaunchPad

Teams work on their own research

I-Corps

Teams work on *sponsors* projects

Hacking for Defense (H4D)



# Number of Variants

- Lean Launchpad
- I-Corps
- Hacking 4 Defense (H4D)
- Hacking 4 Diplomacy
- Hacking 4 Social Impact





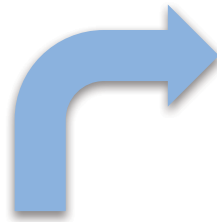
2011

1500+ teams



2012

1,000+ teams



~250,000 on-line students  
Udacity.com



2015



2015



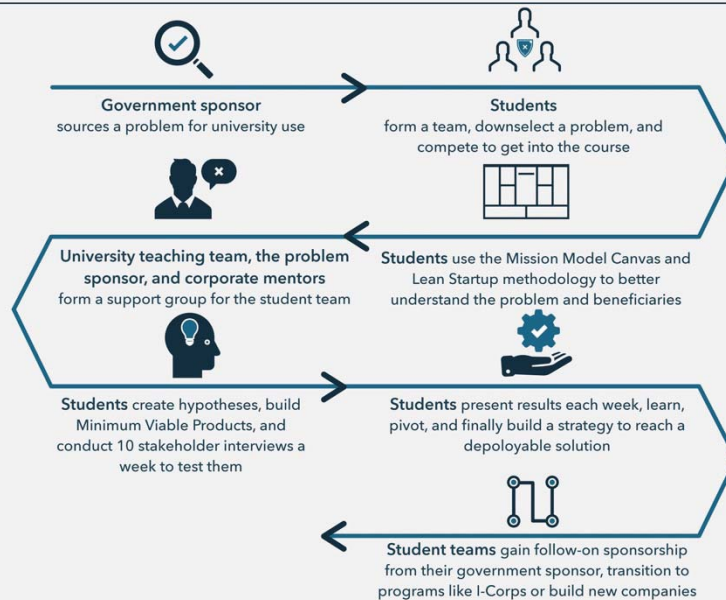
2016



# HACKING FOR DEFENSE | H4Di

## Overview

Hacking for Defense is a for-credit class that gives students the opportunity to build solutions for real-world problems from the Department of Defense and Intelligence Community that address the nation's emerging threats and security challenges.



## Partners & Sponsors



## Learn More

The H4Di community is growing daily. Please contact us at [contact@h4di.org](mailto:contact@h4di.org) or visit [h4di.org](http://h4di.org) if you would like to learn more.



# Adopted by the NSF

(National Science Foundation)



**550+ teams**, 1,700+ team members  
Taught by 50 NSF Sponsored Universities



# Thanks!

