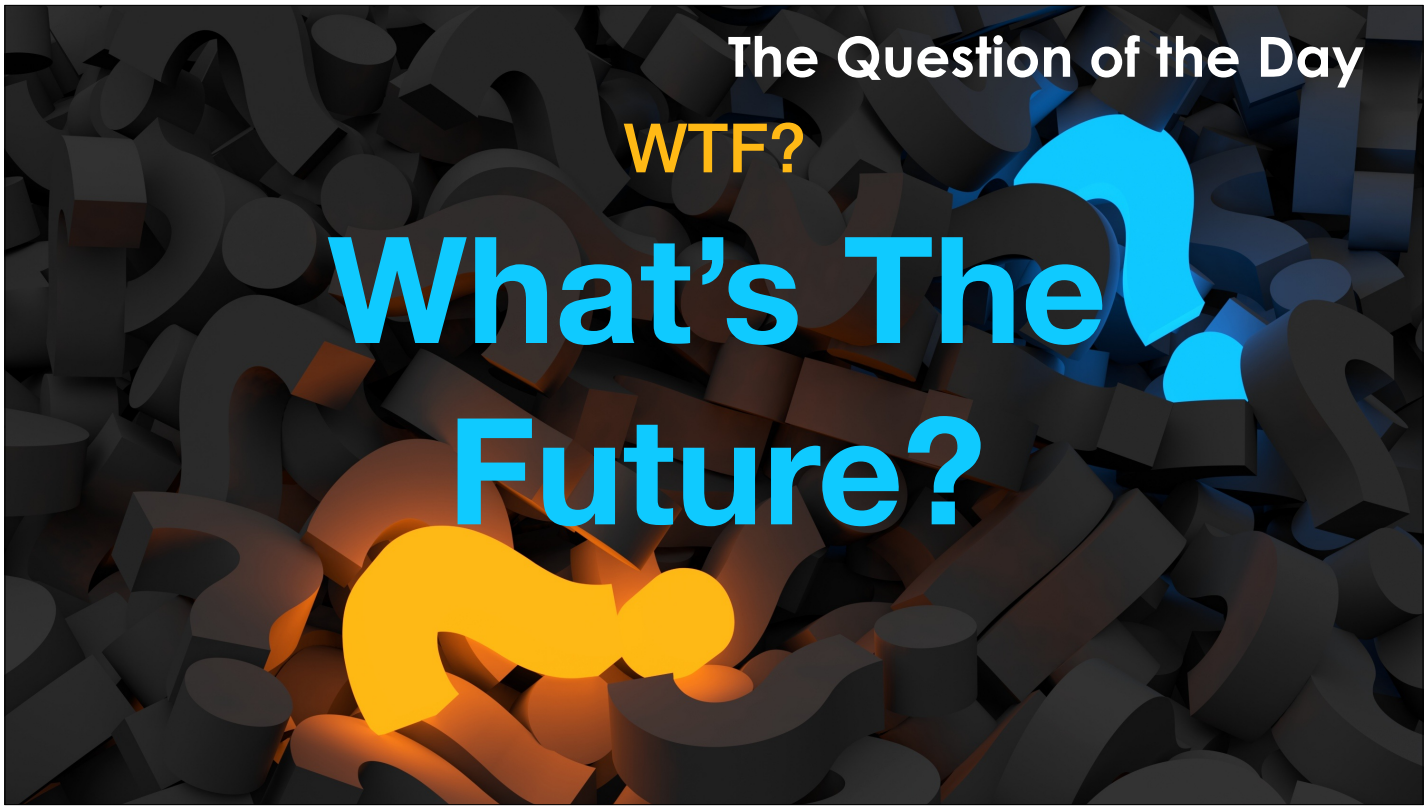


1

2


The Pace of Change is Quickening

3


30 linear steps
vs
30 exponential steps

4

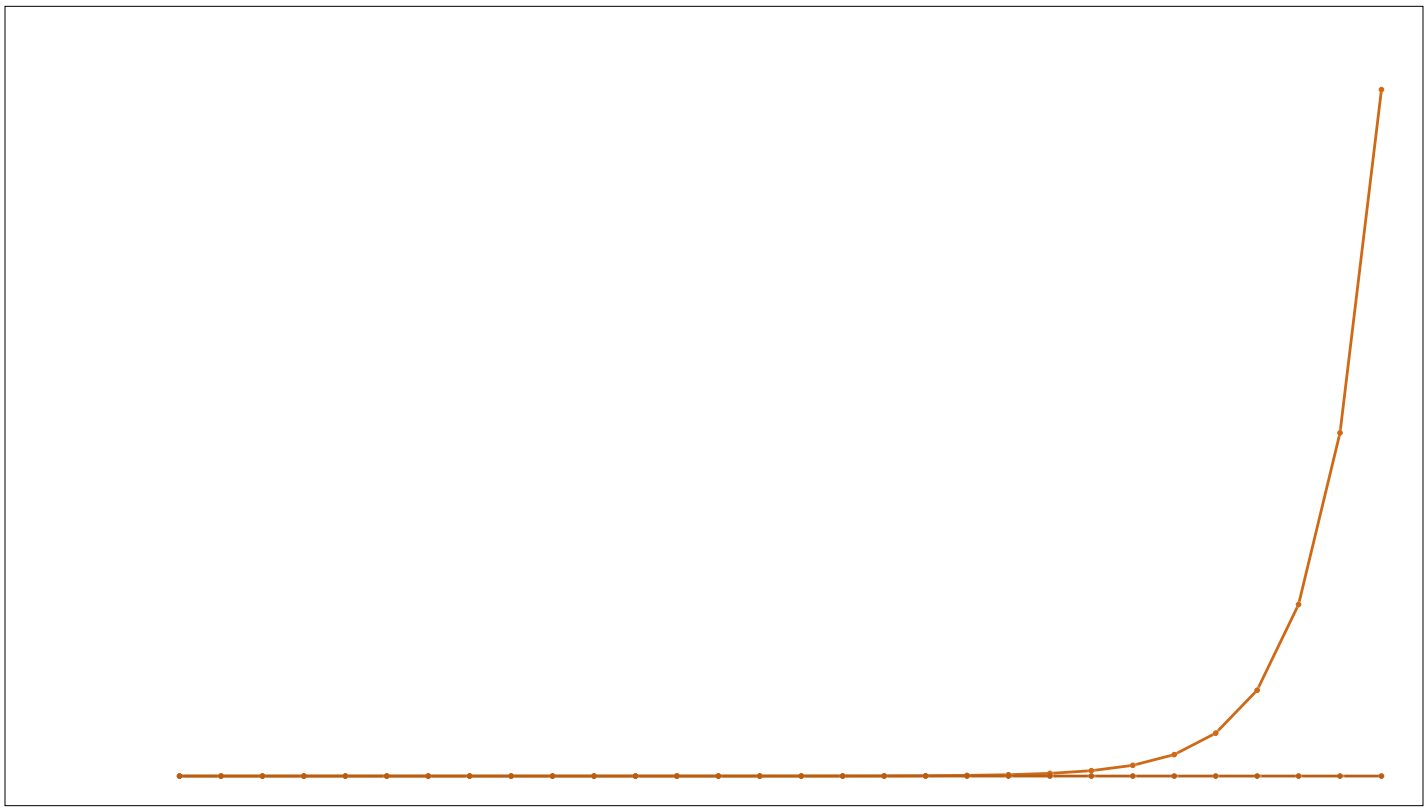
Step	Distance 30 Linear Steps	Distance 30 Exponential Steps
1	1	1
2	2	2
3	3	4
4	4	8
5	5	16
6	6	32
7	7	64
8	8	128
9	9	256
10	10	512
11	11	1024
12	12	2048
13	13	4096
14	14	8192
15	15	16384
16	16	32768
17	17	65536
18	18	131072
19	19	262144
20	20	524288
21	21	1048576
22	22	2097152
23	23	4194304
24	24	8388608
25	25	16777216
26	26	33554432
27	27	67108864
28	28	134217728
29	29	268435456
30	30	536870912

30 Meters

vs

536870912 Meters
(333596 Miles)
(536870 KM)

or 13 times
around the earth



Drivers of Exponential Growth

Drivers of Exponential Growth

Processors and **Moore's Law**

Gordon Earle **Moore** (born January 3, 1929) is an American businessman and co-founder and Chairman Emeritus of Intel Corporation and the author of Moore's law.

-from wikipedia

Drivers of Exponential Growth

Processors and **Moore's Law**

"Moore's law" is the observation that, over the history of computing hardware, the number of transistors in a dense integrated circuit **doubles** approximately every **two** years.

Although this trend has continued for more than half a century, "Moore's law" should be considered an observation or conjecture and **not** a **physical** or natural **law**. Sources in 2005 expected it to continue until at least 2015 or 2020.

-from wikipedia

Step	Distance 30 Linear Steps	Distance 30 Exponential Steps
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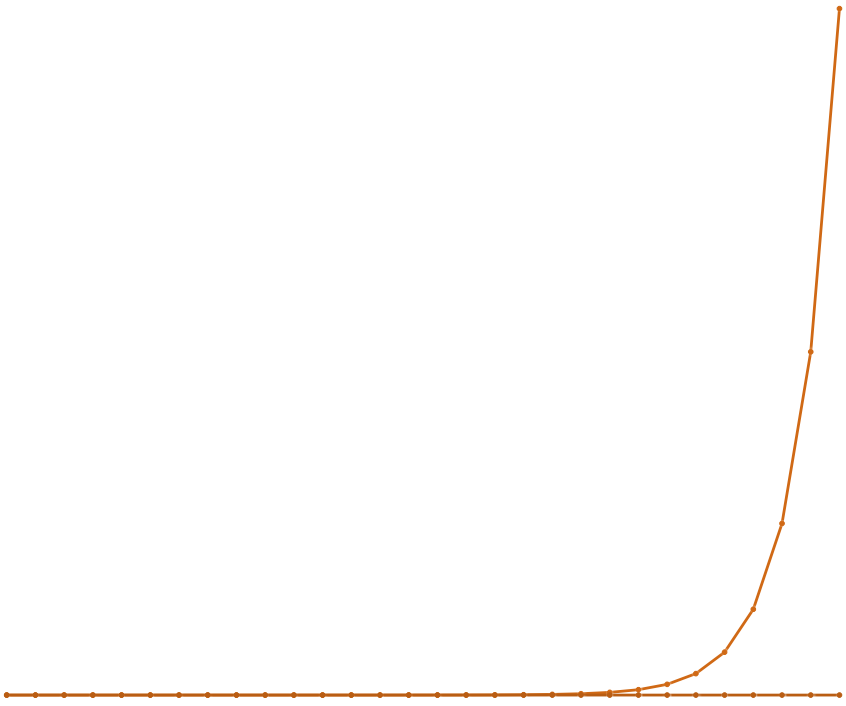

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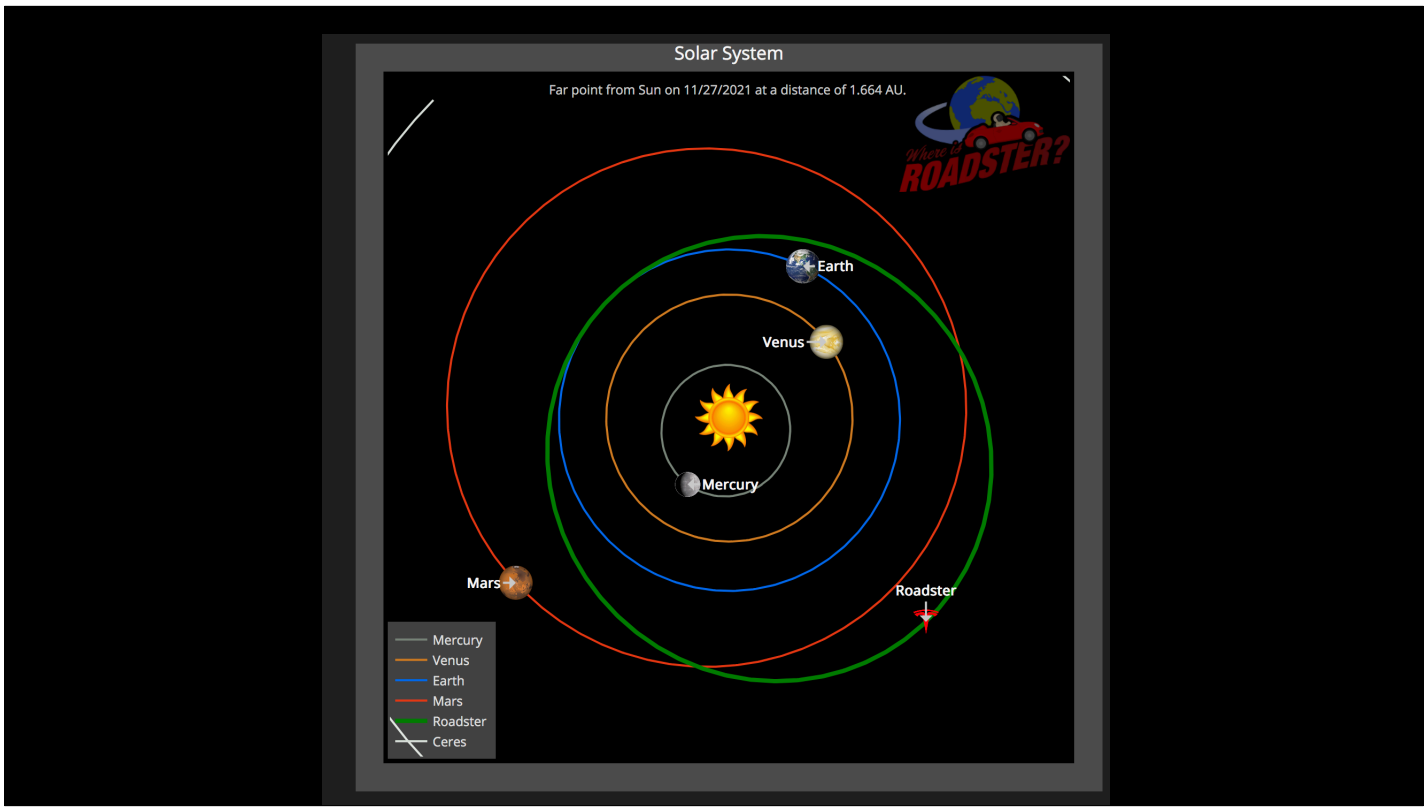
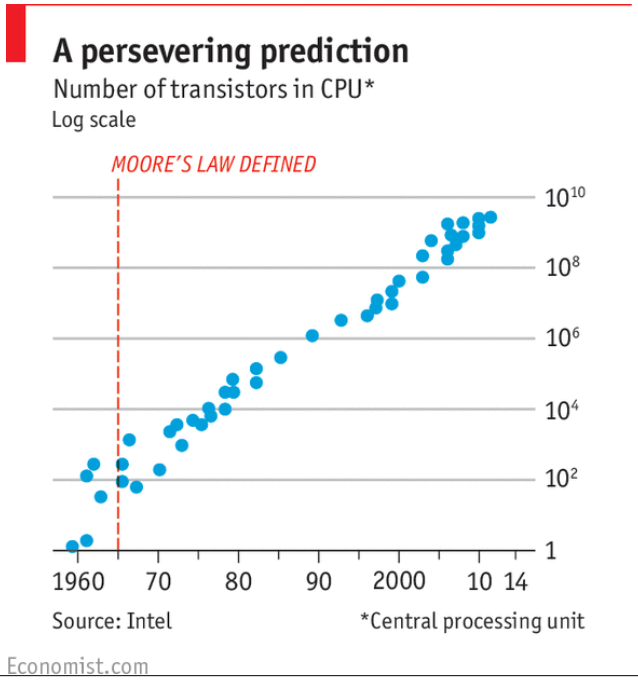
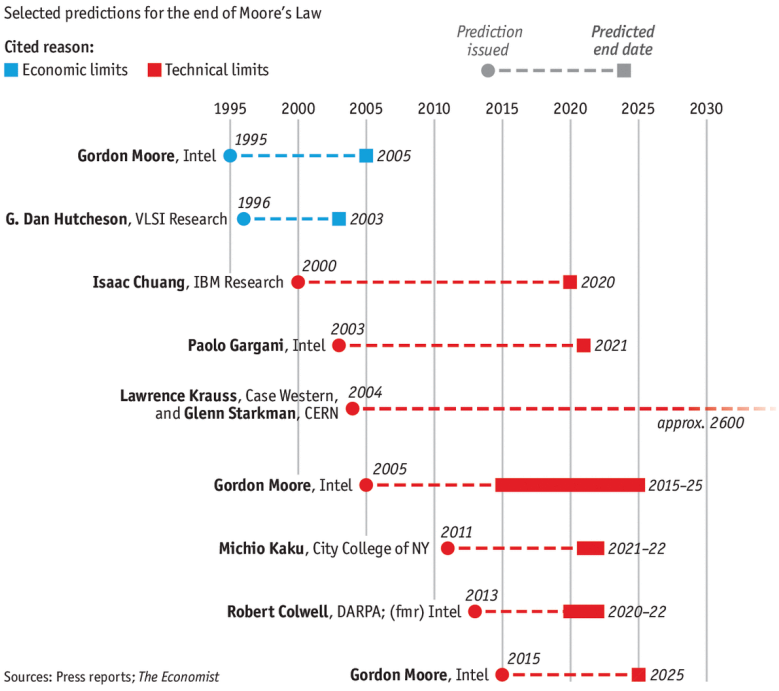

Solar System
Far point from Sun on 11/27/2021 at a distance of 1.664 AU.
Where is ROADSTER?
Earth
Venus
Mercury
Mars
Roadster
Mercury
Venus
Earth
Mars
Roadster
Ceres

14

Drivers of Exponential Growth



Drivers of Exponential Growth



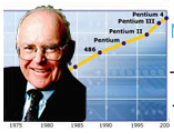
Drivers of Exponential Growth

Moore's Law is dead, says Gordon Moore

Legendary chip man reviews the past, present and future.

By Manek Dubash | Apr 13, 2010

Share



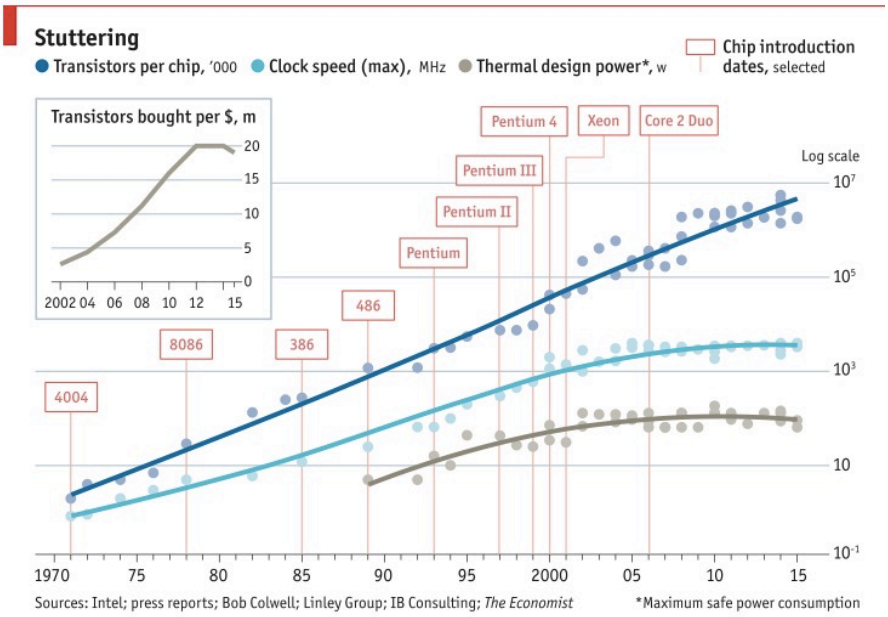
Moore's Law is dead, according to Gordon Moore, its inventor.

The extrapolation of a trend that was becoming clear even as long ago as 1965, and has been the pulse of the IT industry ever since will eventually end, said Moore, who is now retired from Intel.

Forty years after the publication of his law, which states that transistor density on integrated circuits doubles about every two years, Moore said this morning: "It can't continue forever. The nature of exponentials is that you push them out and eventually disaster happens.

"In terms of size [of transistor] you can see that we're approaching the size of atoms which is a fundamental barrier, but it'll be two or three generations before we get that far - but that's as far out as we've ever been able to see. We have another 10 to 20 years before we reach a fundamental limit. By then they'll be able to make bigger chips and have transistor budgets in the billions."

Drivers of Exponential Growth



Far-out ways to extend Moore's Law

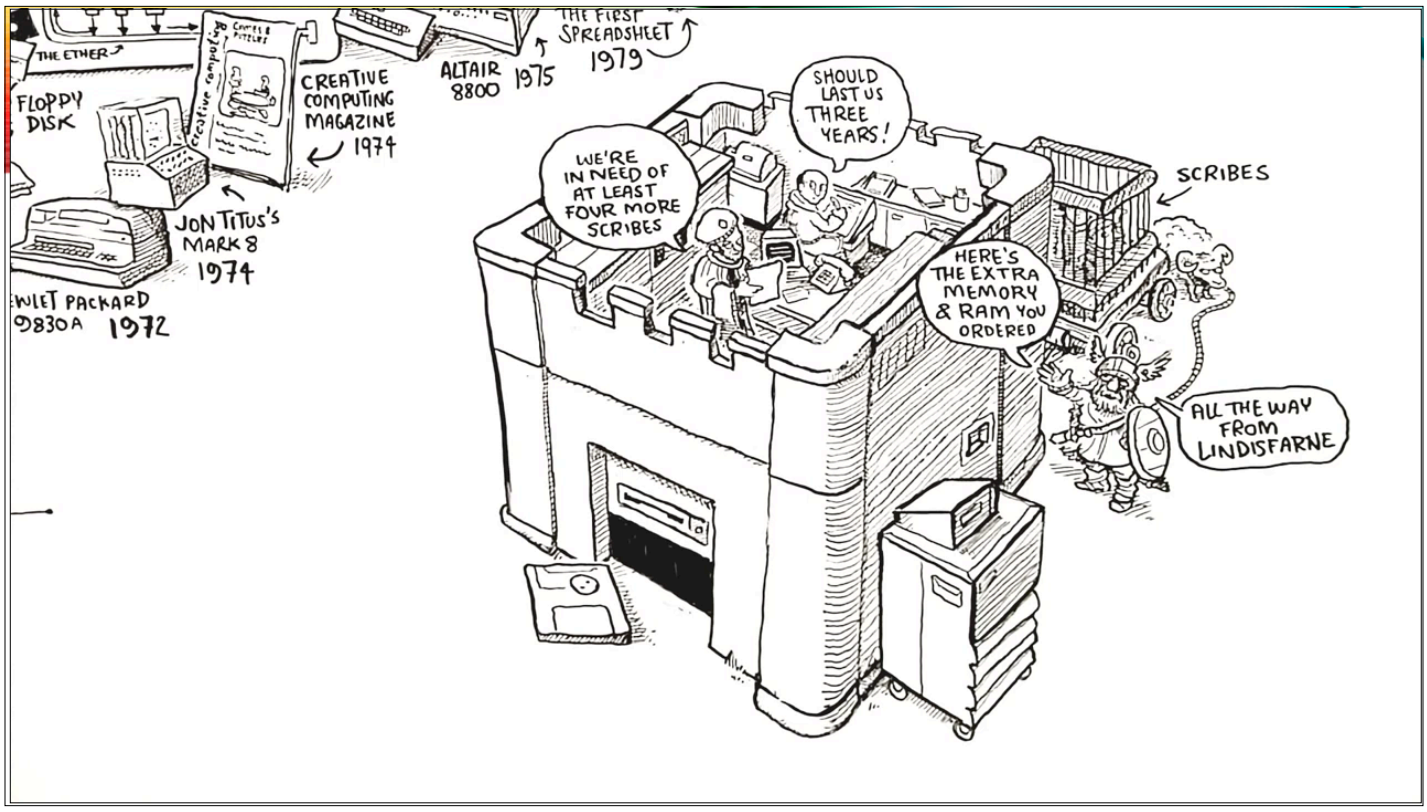
- **Quantum** computing
- **Molecular** computing
- **3D** chip design

Why tech will continue its exponential growth (for at least a little bit) regardless of Moore's Law

FPGAs

- A **field**-programmable **gate array** (FPGA) is an integrated circuit designed to be configured by a customer or a designer after manufacturing – hence "field-programmable".
  —wikipedia

The practice of using a network of remote servers **hosted** on the **Internet** to store, manage, and process data, rather than a **local server** or a personal computer. —wikipedia



- Processing Power as a **Utility** ! Not just about **storage.**
- These platforms hide the **complexity** and details of the underlying **infrastructure** from users and applications by providing very simple graphical interface or API (Applications Programming Interface).
- **Agile** architecture.
- Cloud services are reliable, relatively cheap.

Dramatically **Lowers Barriers to Entry**

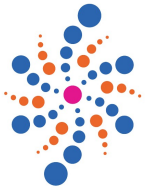
27

Models to help us understand what is happening

28

The Six Ds of Exponential Growth

The Six Ds of Exponential Growth



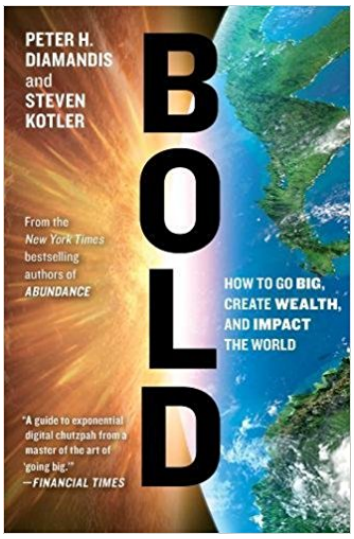
Singularity
UNIVERSITY

The Six Ds of Exponential Growth

Singularity UNIVERSITY

SU is think tank that offers educational programs and a business incubator focusing on scientific progress and "exponential" technologies. It was founded in 2008 by Peter Diamandis and Ray Kurzweil at the NASA Research Park in California -Wikipedia

The Six Ds of Exponential Growth



The Six Ds of Exponential Growth

"The Six Ds are a chain reaction of technological progression, a road map of rapid development that always leads to enormous upheaval and opportunity."
–Peter Diamandis and Steven Kotler, Bold

Digitalization

"A technology becomes **exponential** once it becomes **digitalized**. It becomes represented in ones and zeroes. Once that happens, it becomes an information-based technology and it hops on an **exponential** growth curve."—Steven Kotler

Digitalization

"A technology becomes exponential once it becomes digitalized. It becomes represented in ones and zeroes. Once that happens, it becomes an information-based technology and it hops on an exponential growth curve."—Steven Kotler

Examples

Digitalization

"A technology becomes exponential once it becomes digitalized. It becomes represented in ones and zeroes. Once that happens, it becomes an information-based technology and it hops on an exponential growth curve."—Steven Kotler

Examples
Digital Camera

Digitalization

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Examples
Digital Camera
Digital Music

Digitalization

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Examples
Digital Camera
Digital Music
Digital Movies

Digitalization

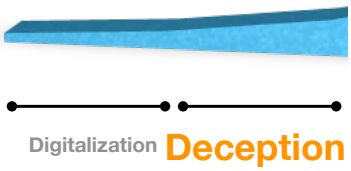
"A technology becomes exponential once it becomes digitalized. It becomes represented in ones and zeroes. Once that happens, it becomes an information-based technology and it hops on an exponential growth curve."—Steven Kotler

Examples
Digital Camera
Digital Music
Digital Movies
Digital Money ?

Digitalization

Digitalization **Deception**

"..It takes a while for [these technologies] to get up to speed.. And there's all this hype in the beginning and they fall into this **deceptive** period and people kind of **dismiss** them."—Steven Kotler



Digitalization **Deception**


Deception
30 linear steps
vs
30 exponential steps

43


Deception

44

Deception

Step	Distance 30 Linear Steps	Distance 30 Exponential Steps
1	1	1
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30 Meters

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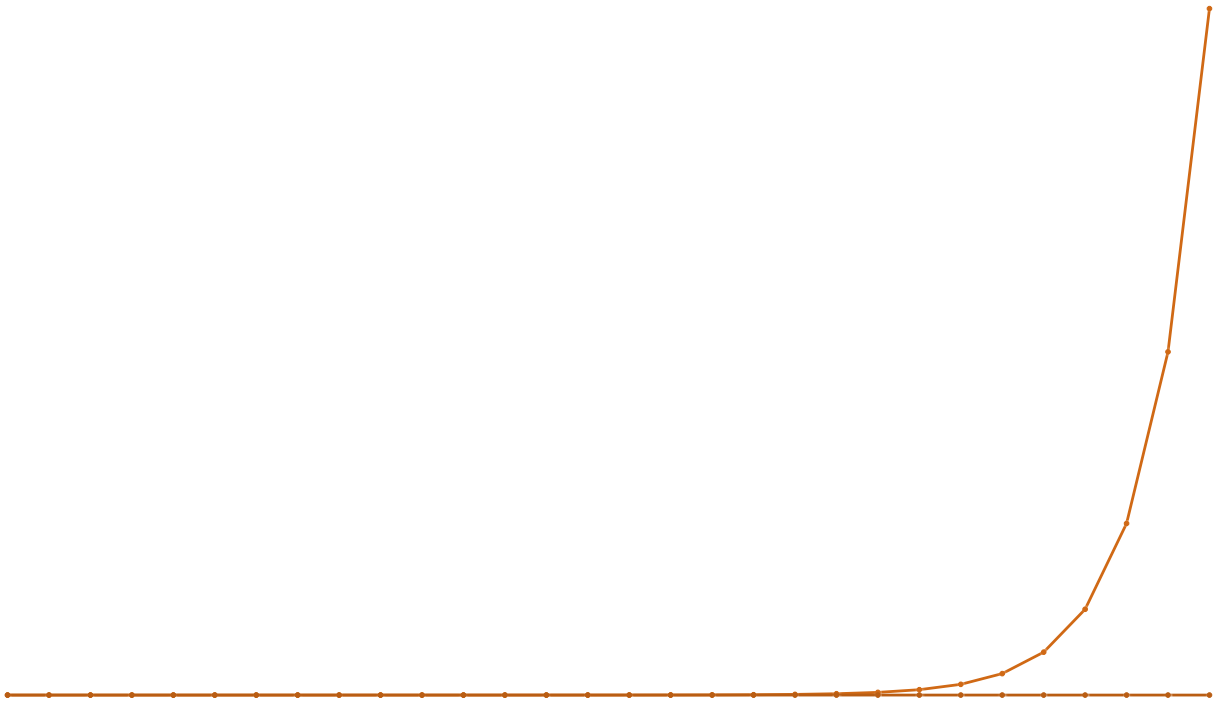
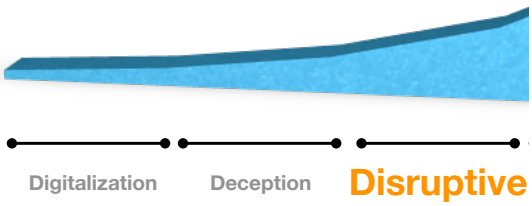
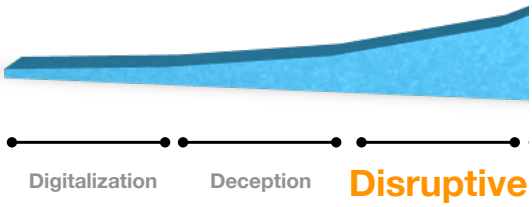
Deception





47

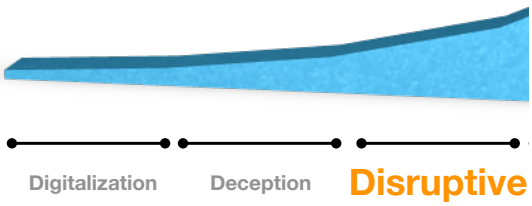
"The technologies then play a role in **subverting** established industries. "—Steven Kotler



48

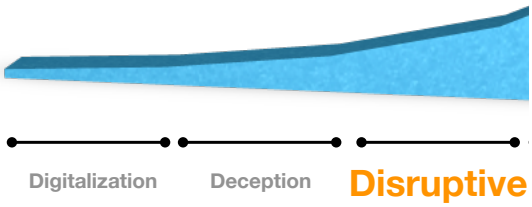
"The technologies then play a role in subverting established industries. "—Steven Kotler

Examples



"The technologies then play a role in subverting established industries. "—Steven Kotler

Examples
Uber disrupting the taxicab industry.



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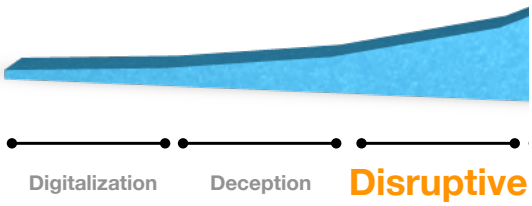
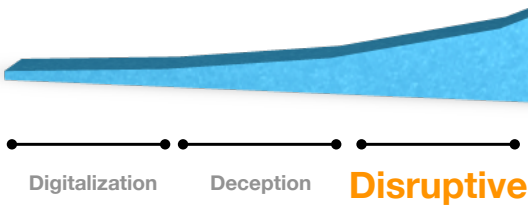
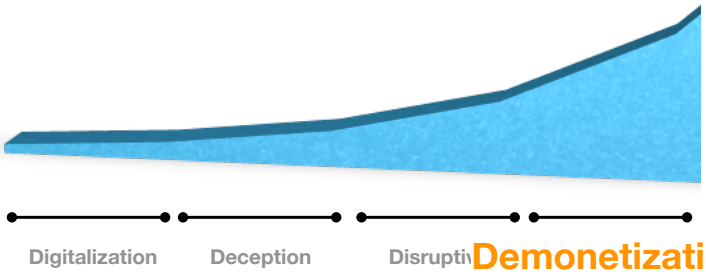
Examples
Uber disrupting the taxicab industry.
Netflix disrupting the movie rental industry.



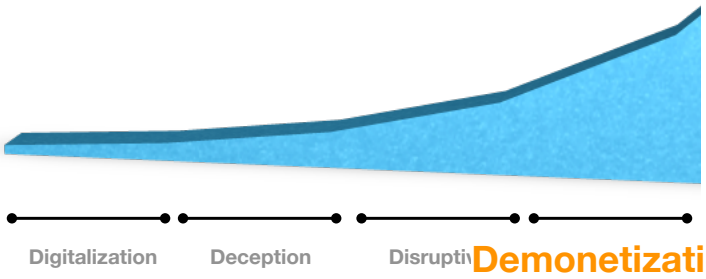
"The technologies then play a role in subverting established industries. "—Steven Kotler

Examples
Uber disrupting the taxicab industry.
Netflix disrupting the movie rental industry.
HD Camera phones and Instagram disrupting Kodak.

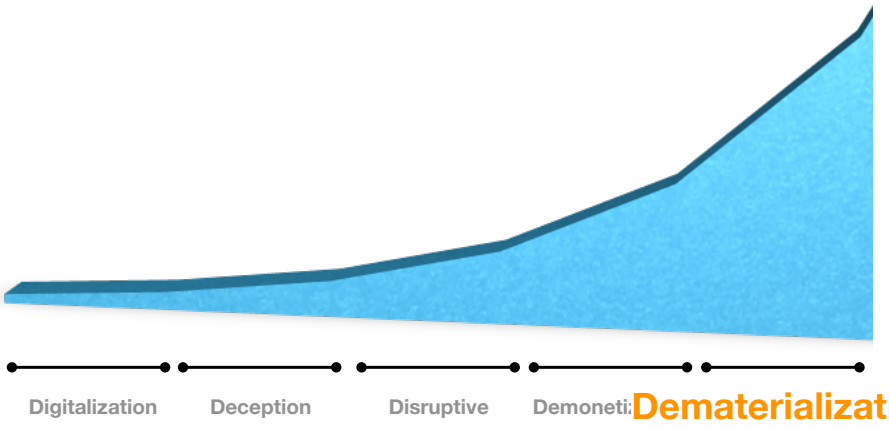




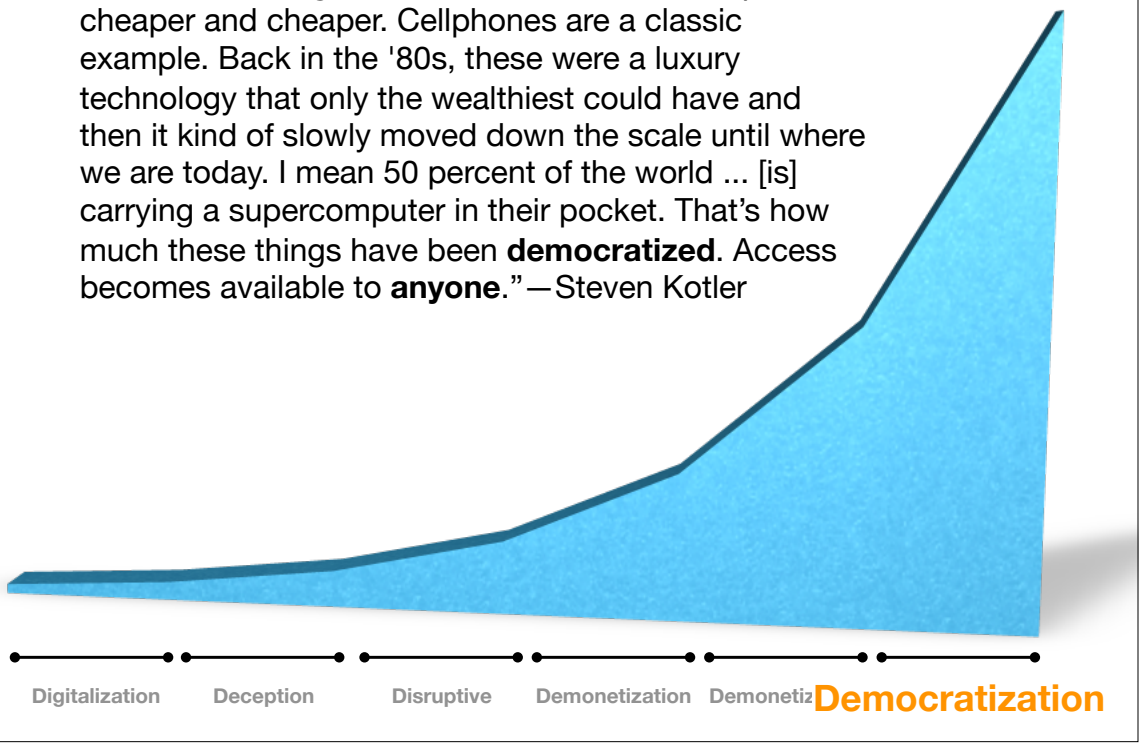
"For example, once you could store digital images on a camera, film was totally **demonetized**. And suddenly nobody was buying roll film anymore. … So the **money** comes out of the equation."—Steven Kotler



"Think about all the 1980s or '90s technology that now come free with your cellphone.. You have your GPS locator, your encyclopedia, your radio and record player, your camera, video recorder, on and on and on, right. … the technology itself is **disappearing**. Nobody's going out and buying cameras anymore because it comes on your smartphone"—Steven Kotler



"These technologies themselves become cheaper and cheaper and cheaper. Cellphones are a classic example. Back in the '80s, these were a luxury technology that only the wealthiest could have and then it kind of slowly moved down the scale until where we are today. I mean 50 percent of the world ... [is] carrying a supercomputer in their pocket. That's how much these things have been **democratized**. Access becomes available to **anyone**."—Steven Kotler



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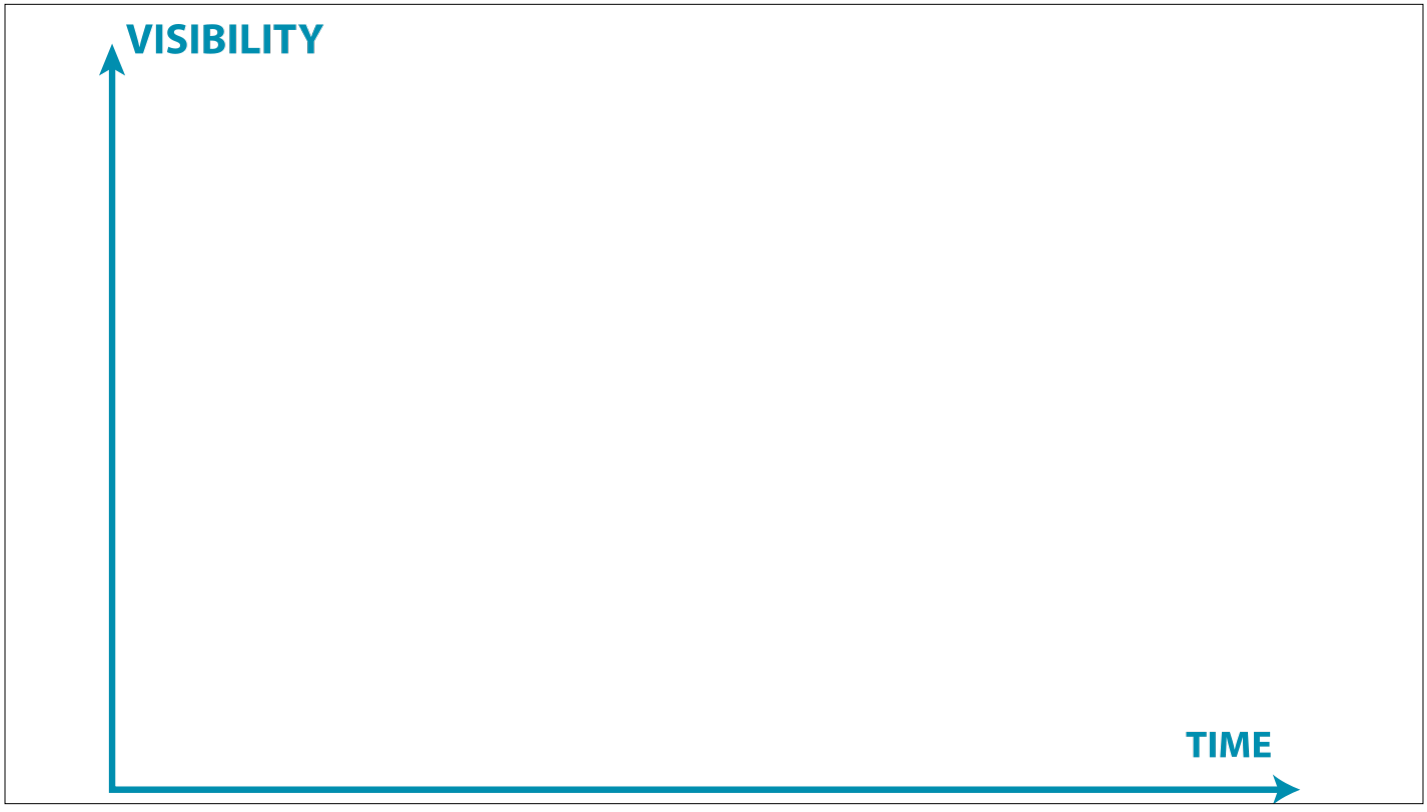
Hype-Cycle

57



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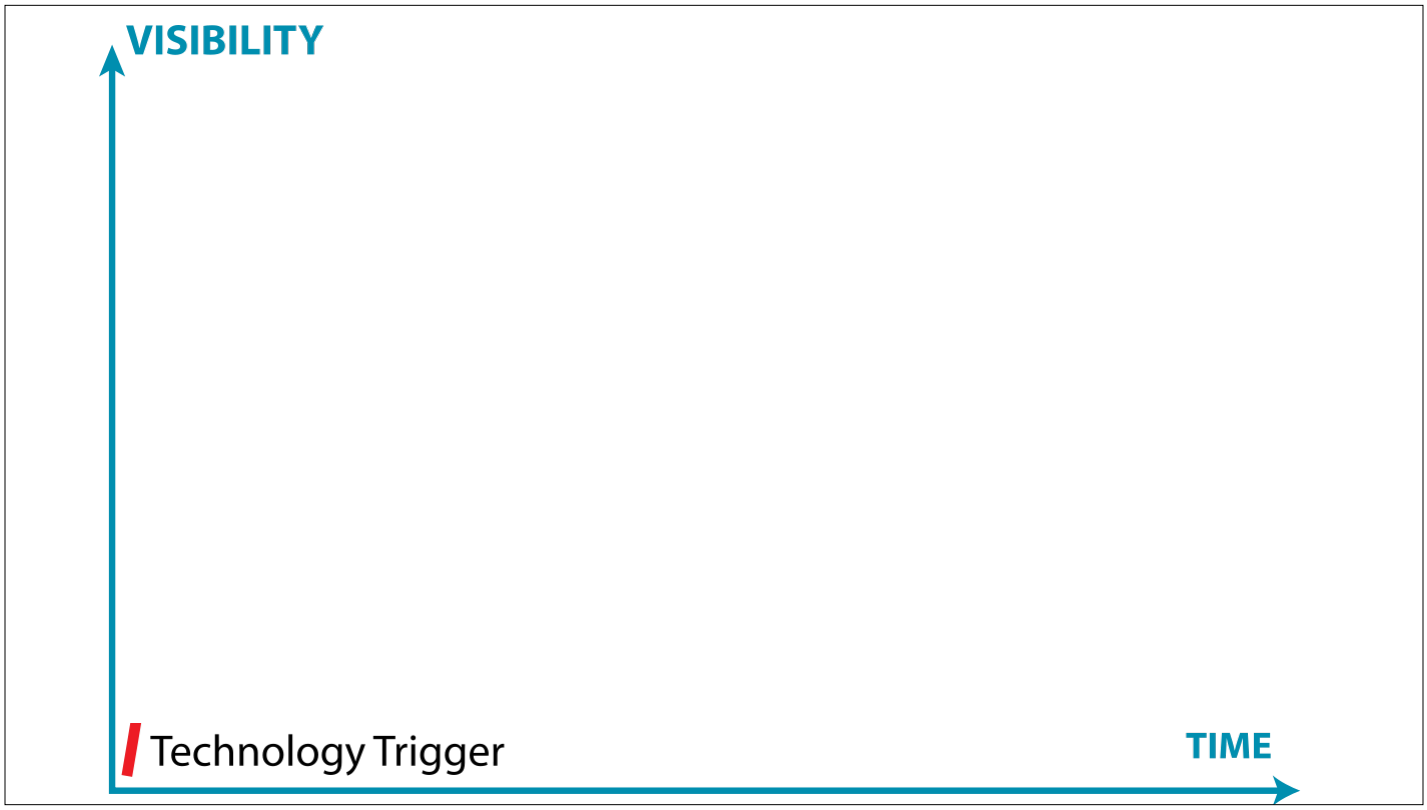
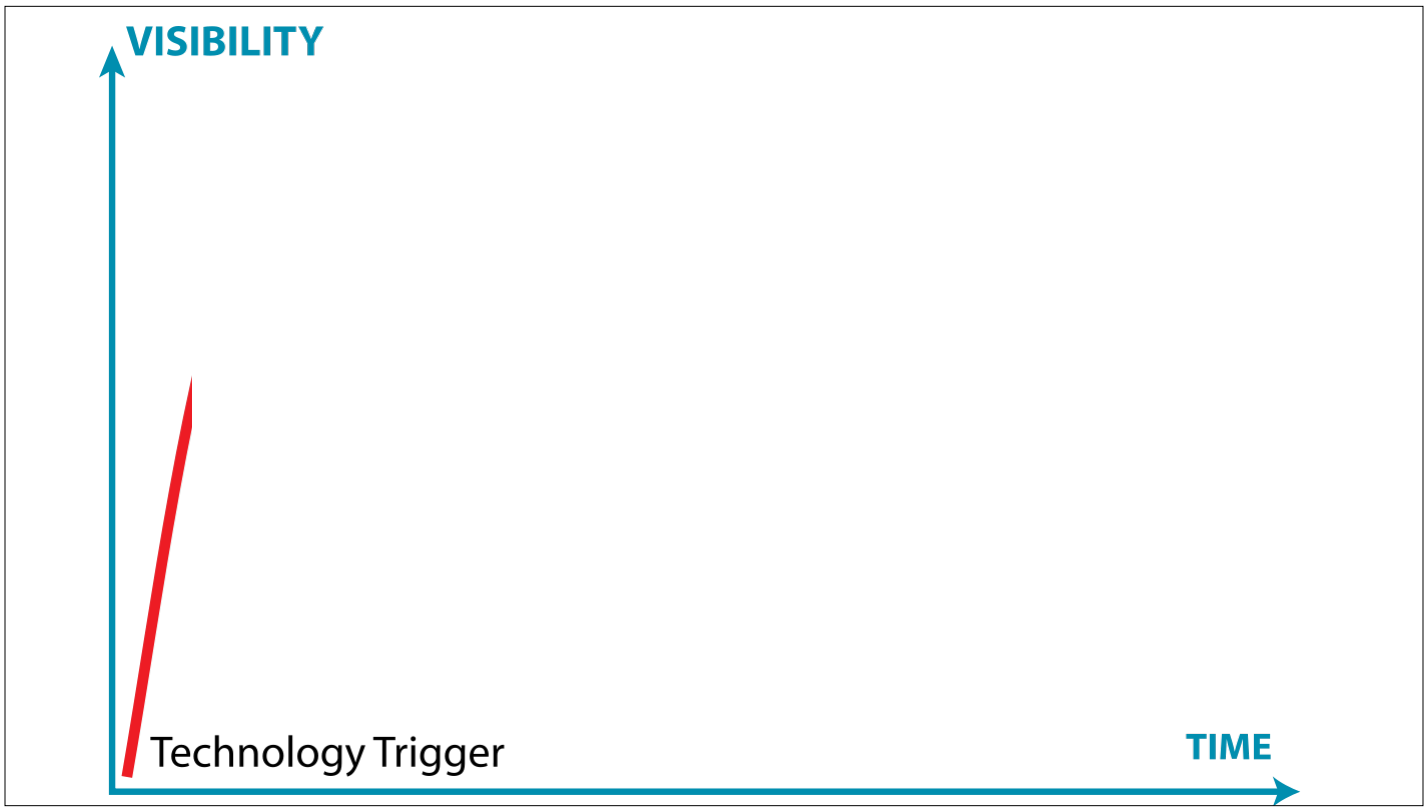
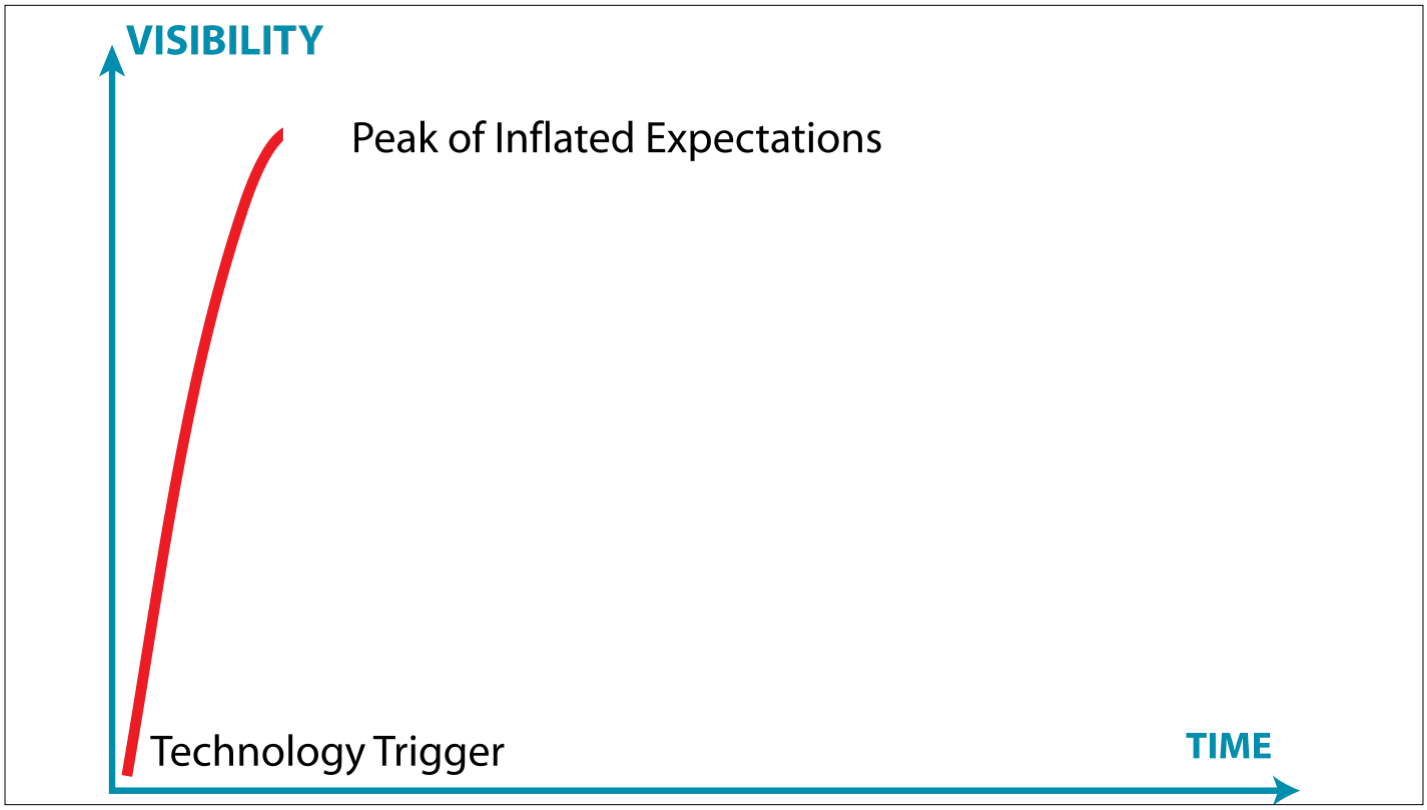
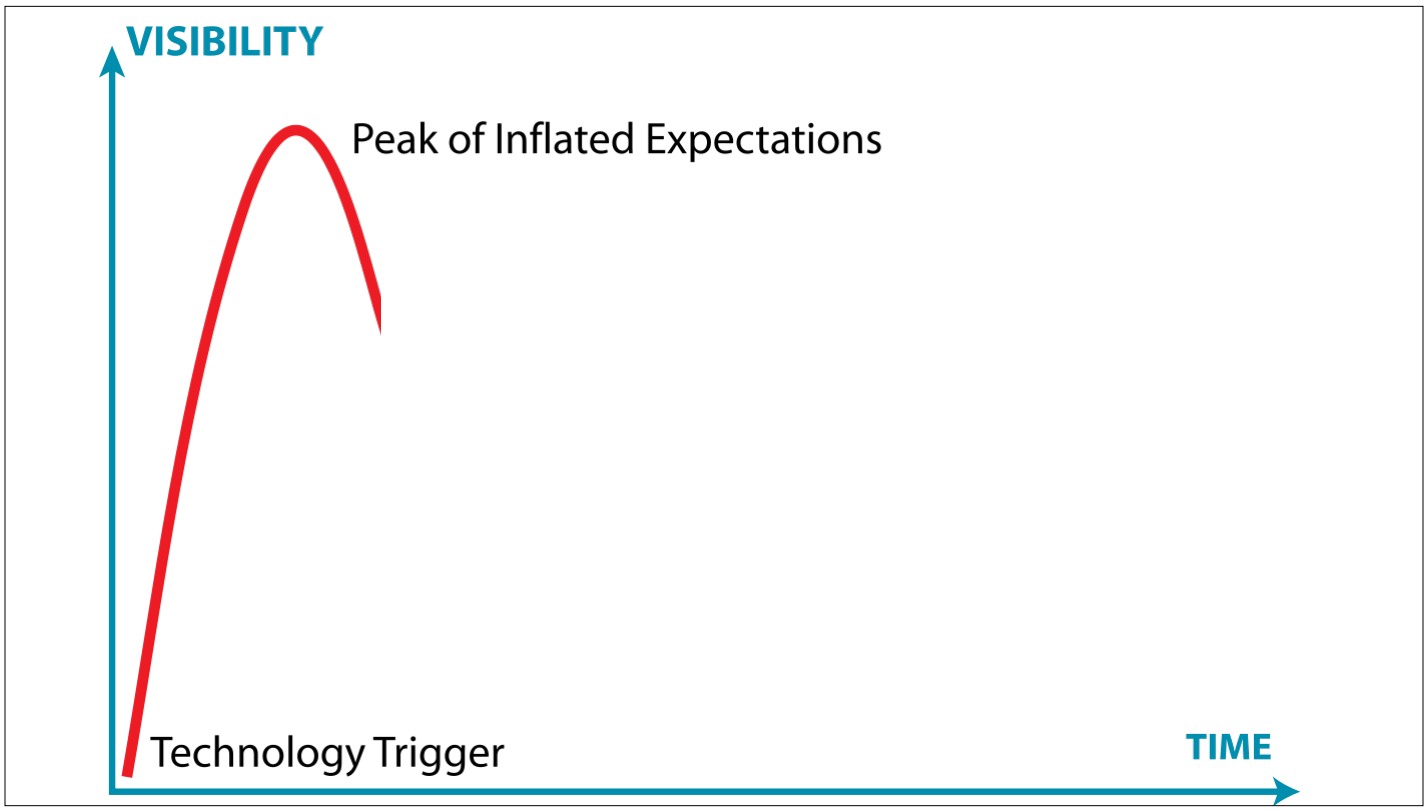

VISIBILITY
Technology Trigger
TIME


VISIBILITY
Technology Trigger
TIME


VISIBILITY
Peak of Inflated Expectations
Technology Trigger
TIME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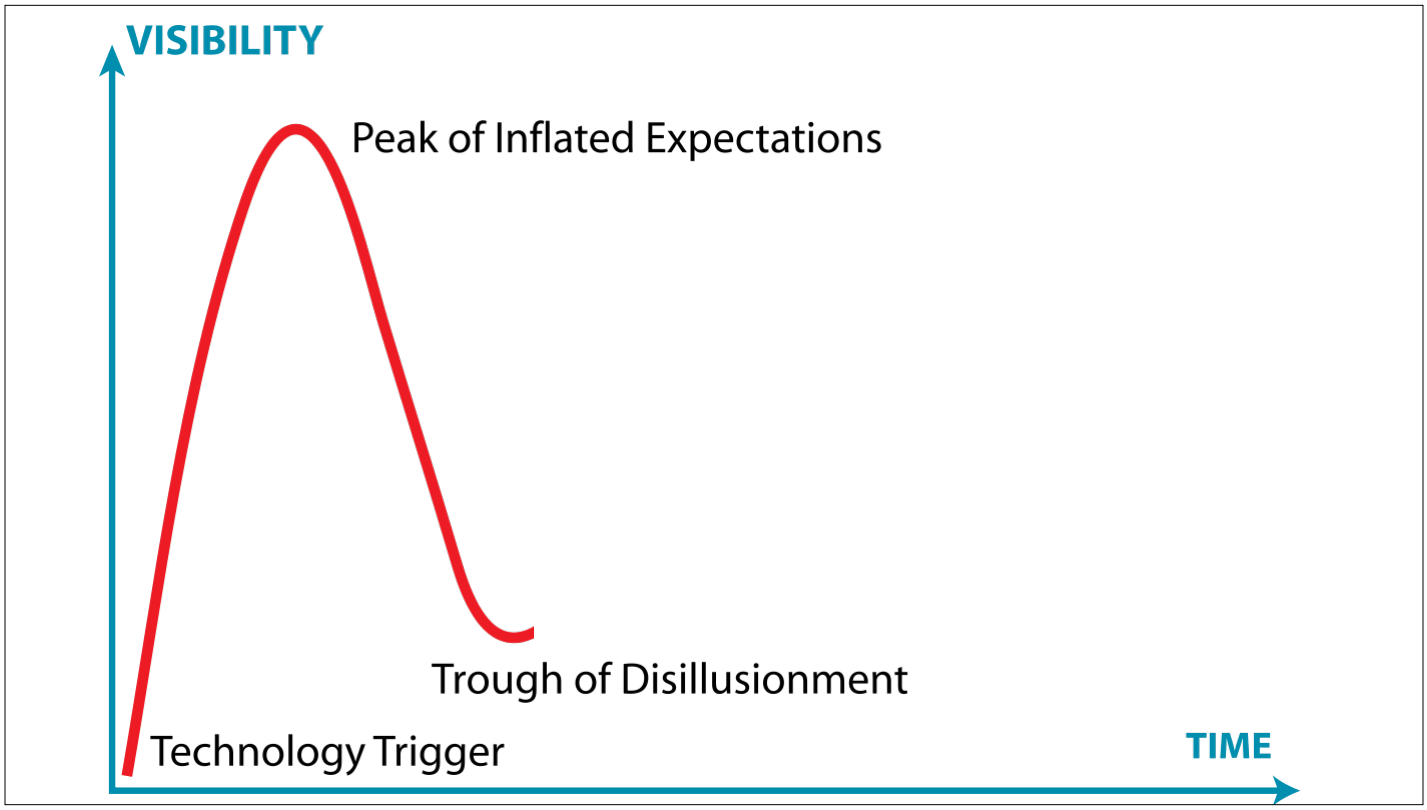
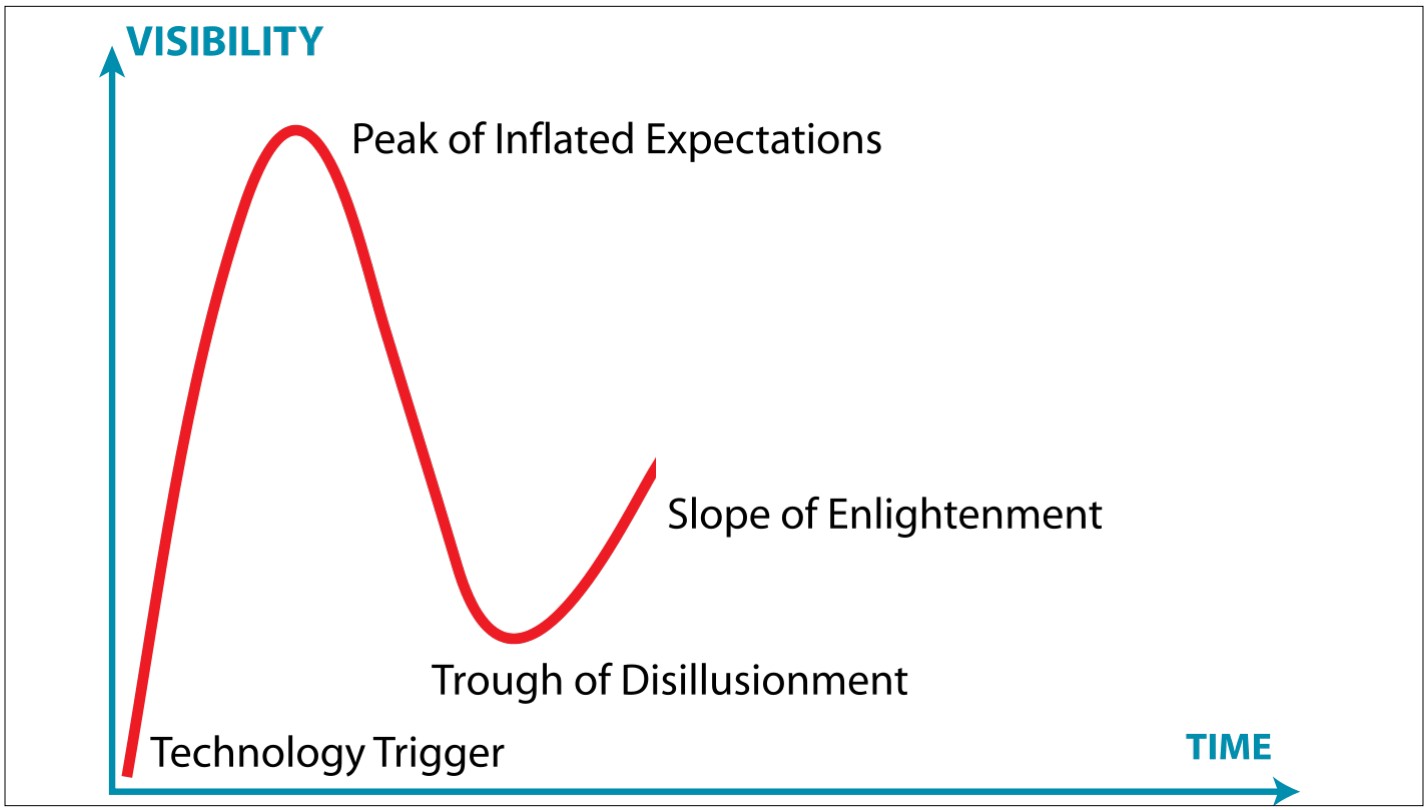
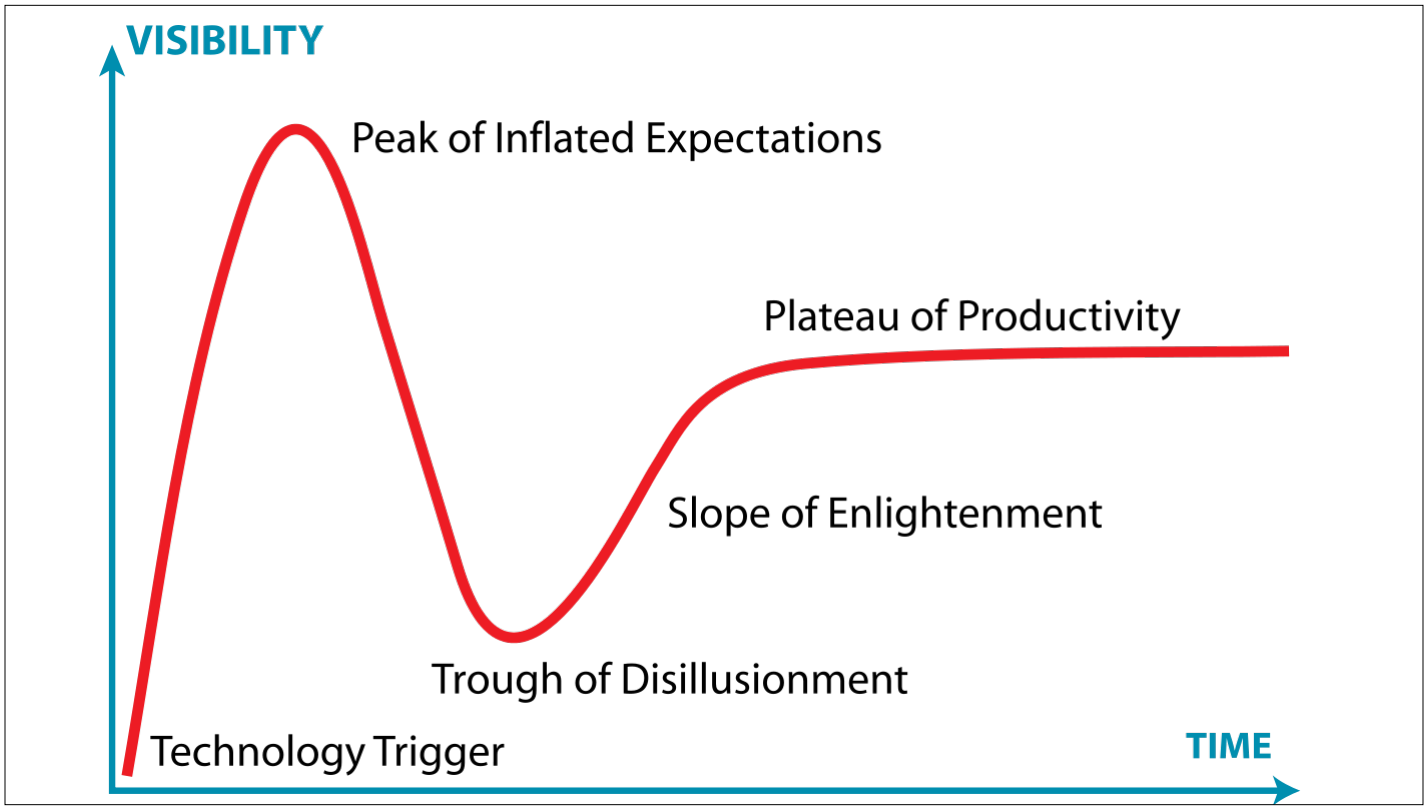
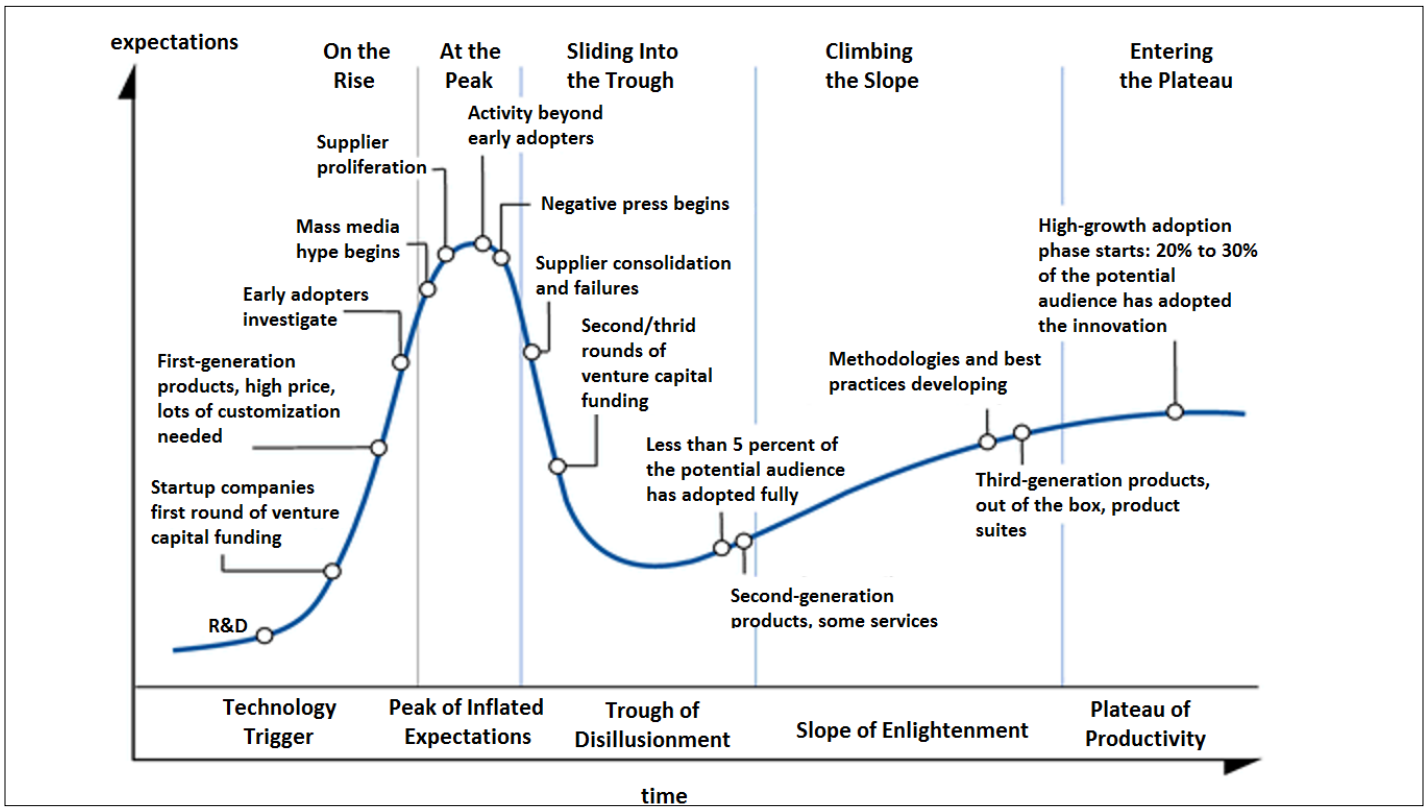
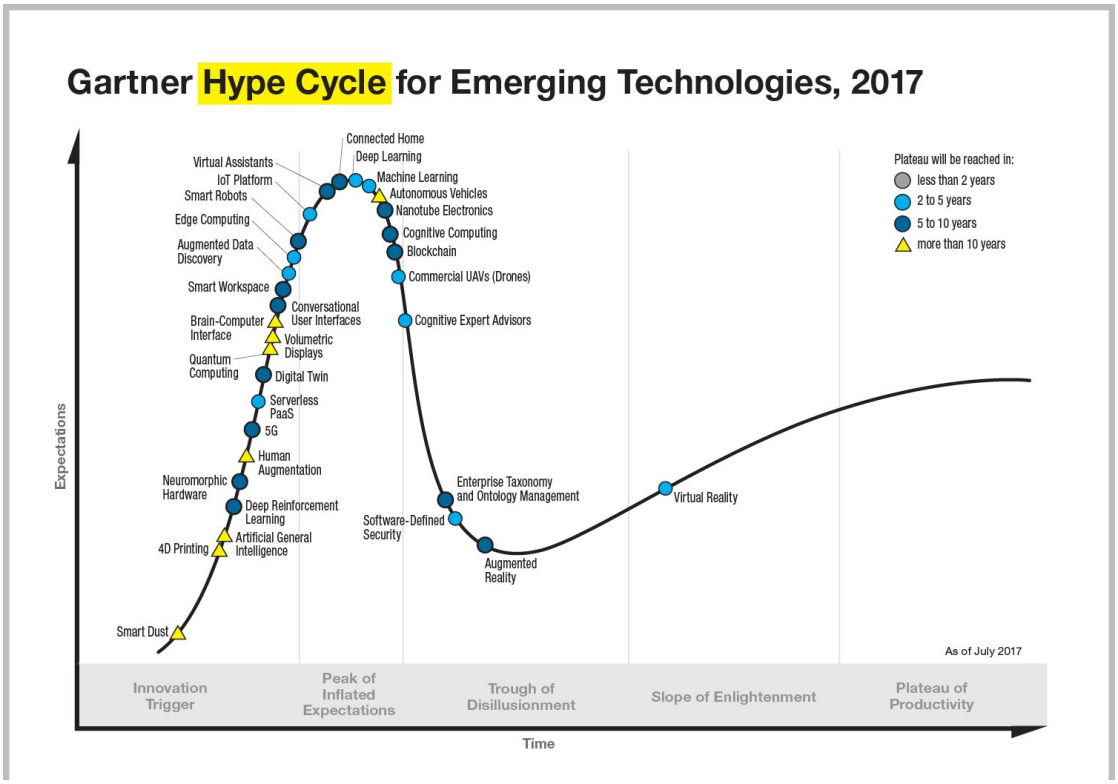
Peak of Inflated Expectations
Technology Trigger
TIME


VISIBILITY
Peak of Inflated Expectations
Trough of Disillusionment
Technology Trigger
TIME


VISIBILITY
Peak of Inflated Expectations
Slope of Enlightenment
Trough of Disillusionment
Technology Trigger
TIME


VISIBILITY
Peak of Inflated Expectations
Plateau of Productivity
Slope of Enlightenment
Trough of Disillusionment
Technology Trigger
TIME


expectations
On the Rise
At the Peak
Sliding Into the Trough
Climbing the Slope
Entering the Plateau
Activity beyond early adopters
Supplier proliferation
Negative press begins
Mass media hype begins
Supplier consolidation and failures
Early adopters investigate
Second/thrid rounds of venture capital funding
First-generation products, high price, lots of customization needed
Methodologies and best practices developing
High-growth adoption phase starts: 20% to 30% of the potential audience has adopted the innovation
Less than 5 percent of the potential audience has adopted fully
Startup companies first round of venture capital funding
Third-generation products, out of the box, product suites
R&D
Second-generation products, some services
Technology Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity
time



Gartner®

Hype-Cycle

Technology Adoption LifeCycle

Technology Adoption LifeCycle

The technology adoption lifecycle is a sociological model that describes the **adoption** or acceptance of a **new product** or **innovation**, according to the demographic and psychological characteristics of defined adopter groups.

—wikipedia

Technology Adoption Life Cycle

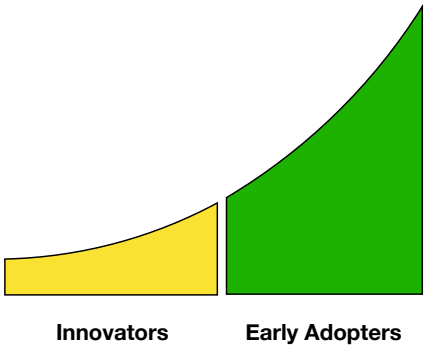
Innovators

Technology Adoption Life Cycle

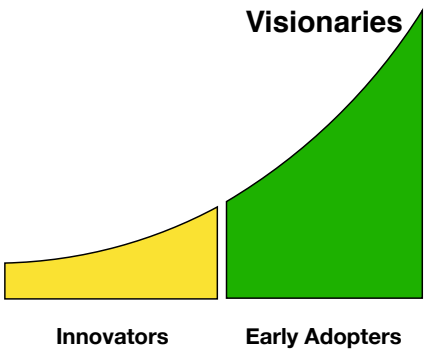
Techies

Innovators

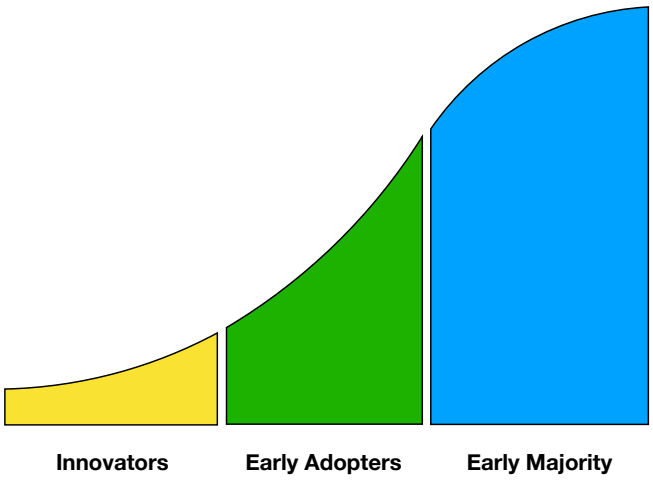
Technology Adoption Life Cycle



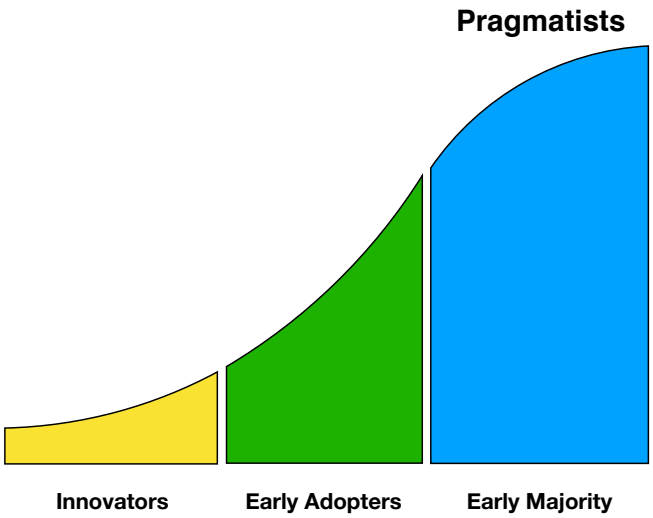
Technology Adoption Life Cycle



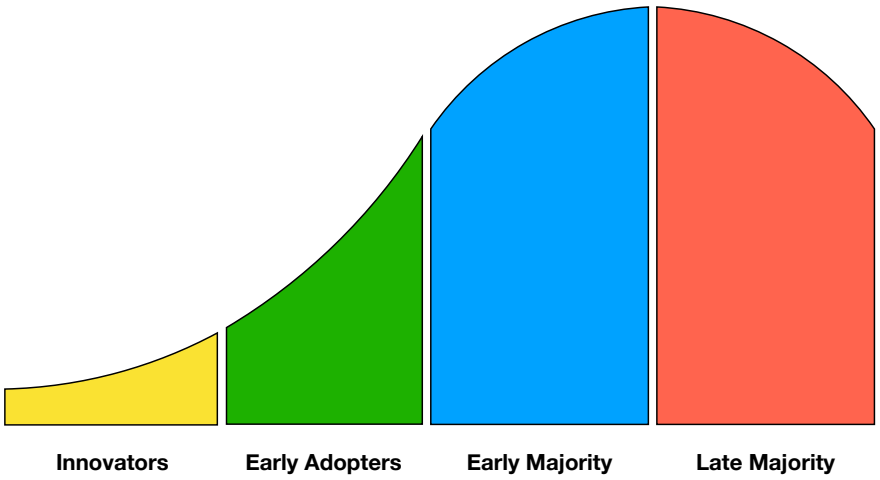
Technology Adoption Life Cycle



Technology Adoption Life Cycle



Technology Adoption Life Cycle



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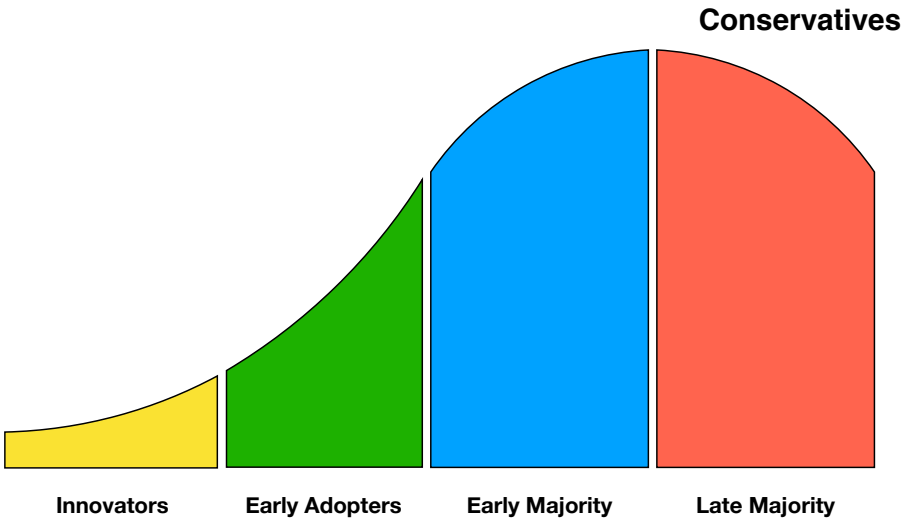
Technology Adoption Life Cycle



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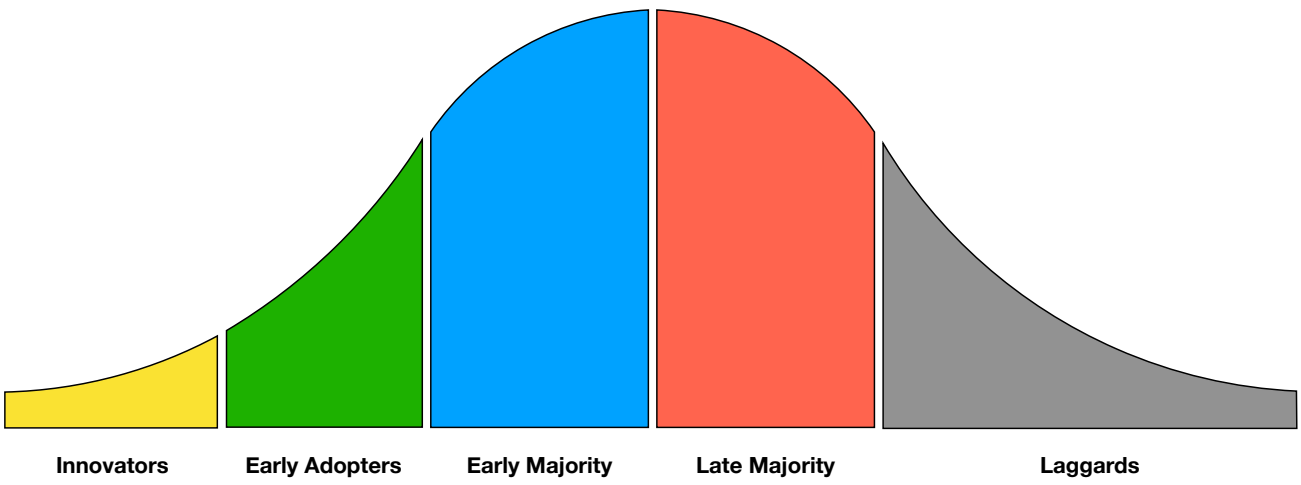
Technology Adoption Life Cycle



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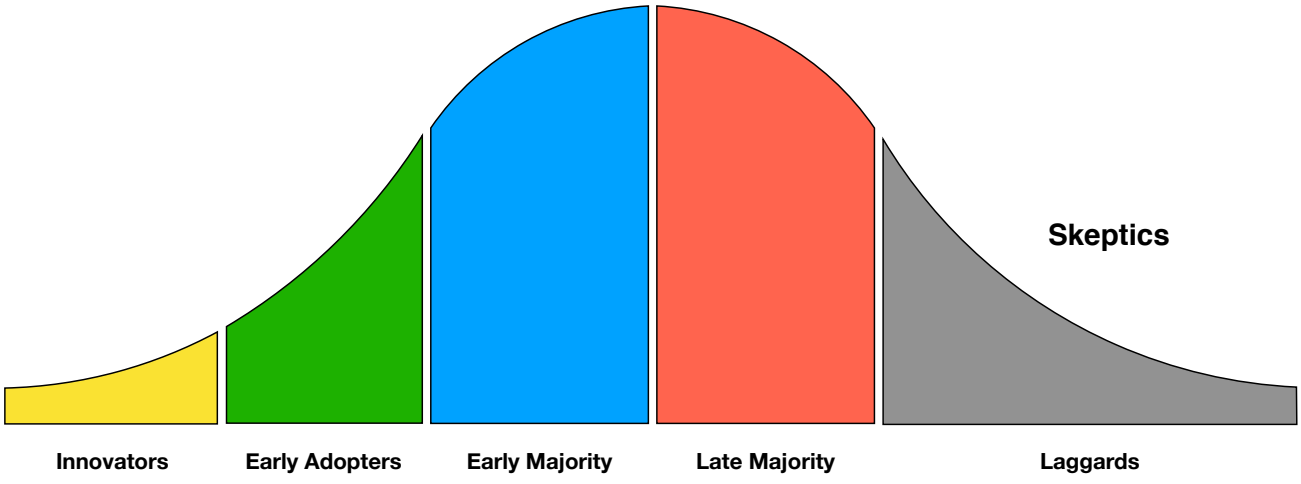
Technology Adoption Life Cycle



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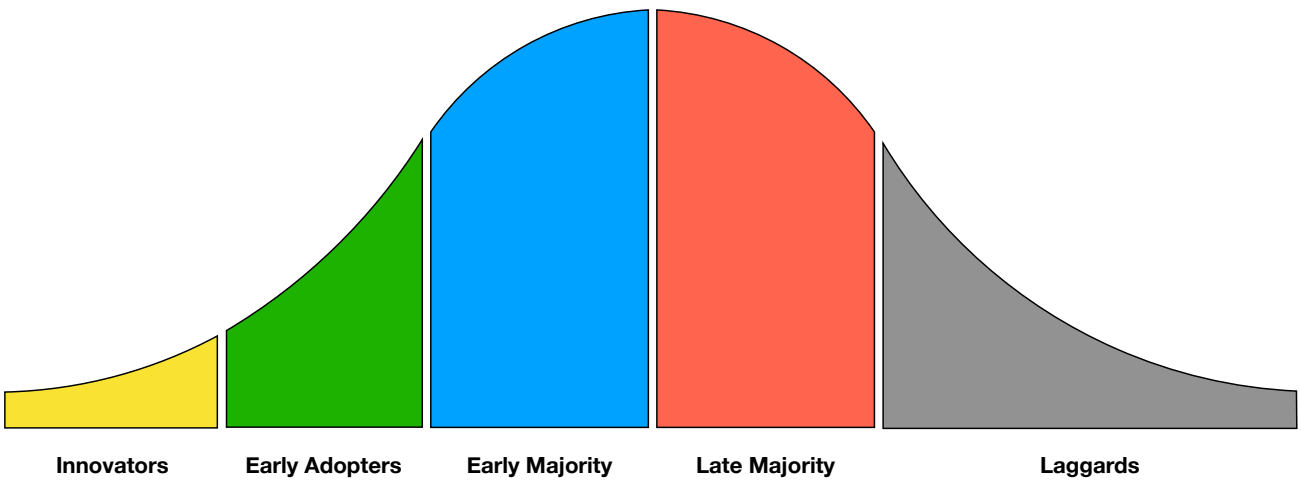
Technology Adoption Life Cycle



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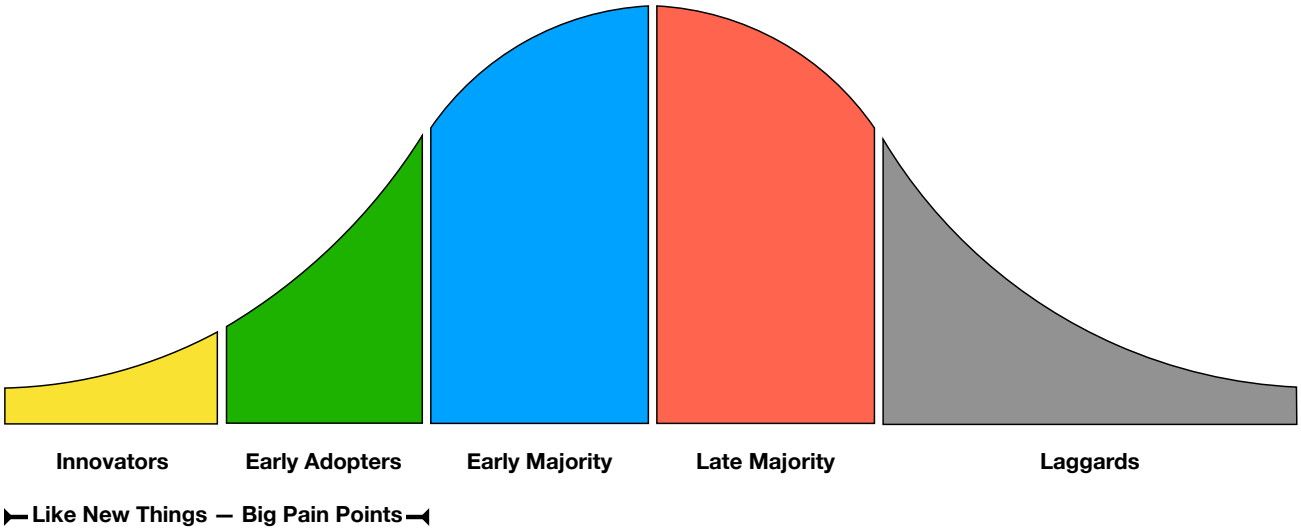

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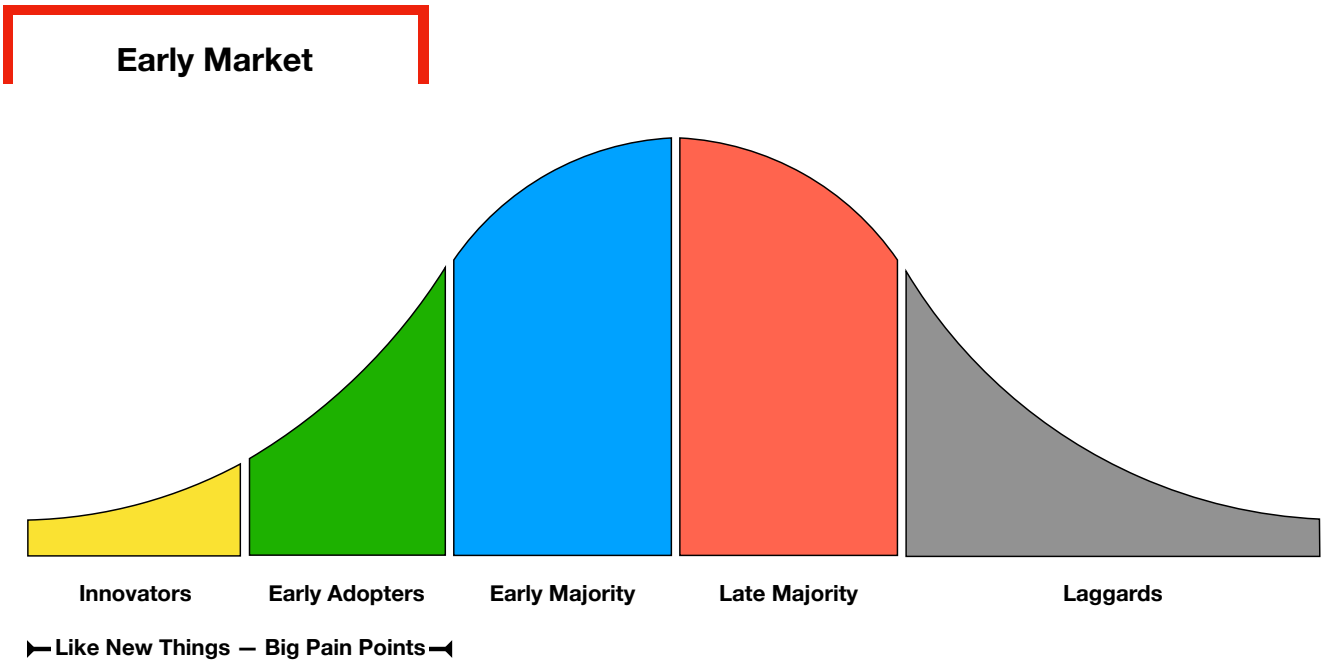
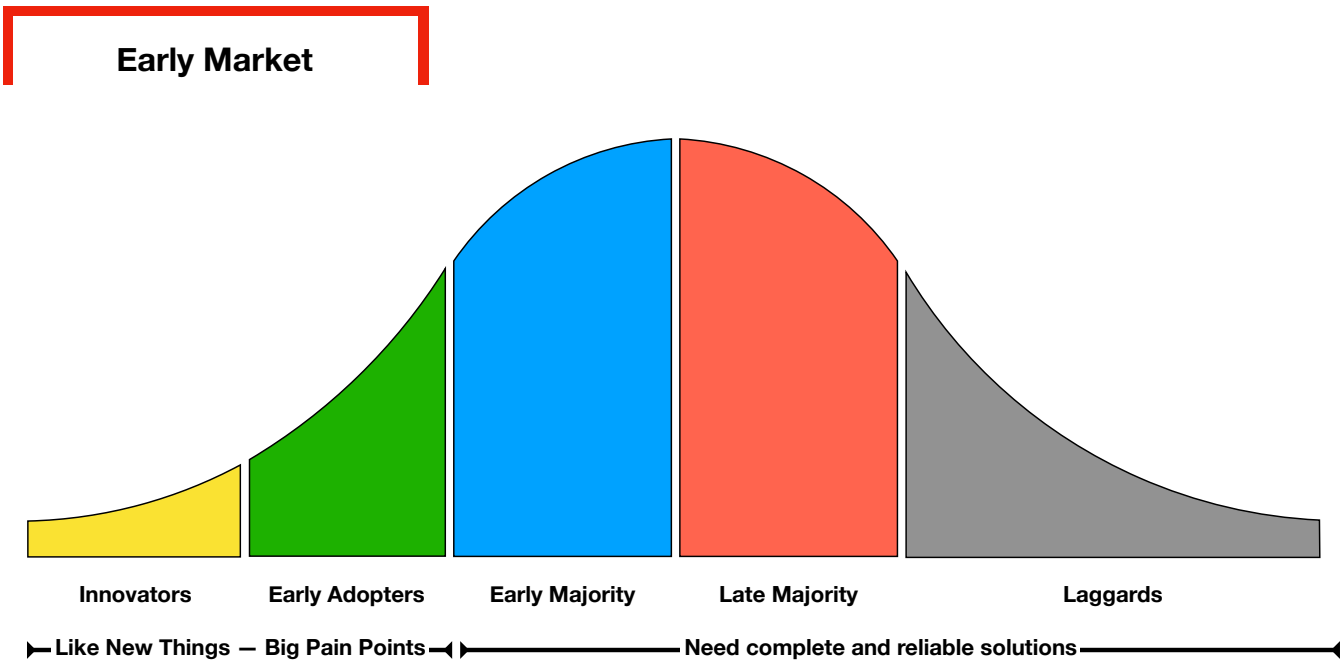
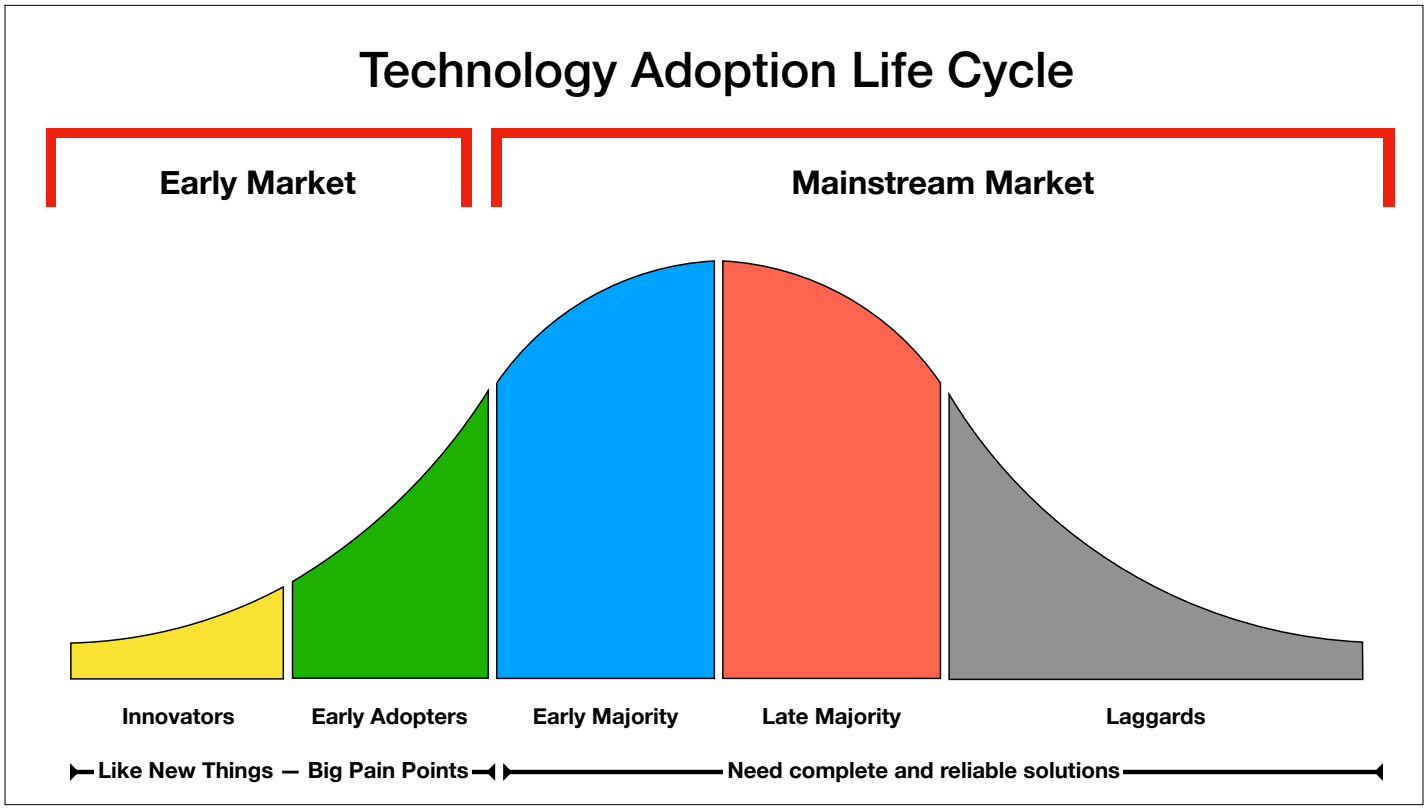
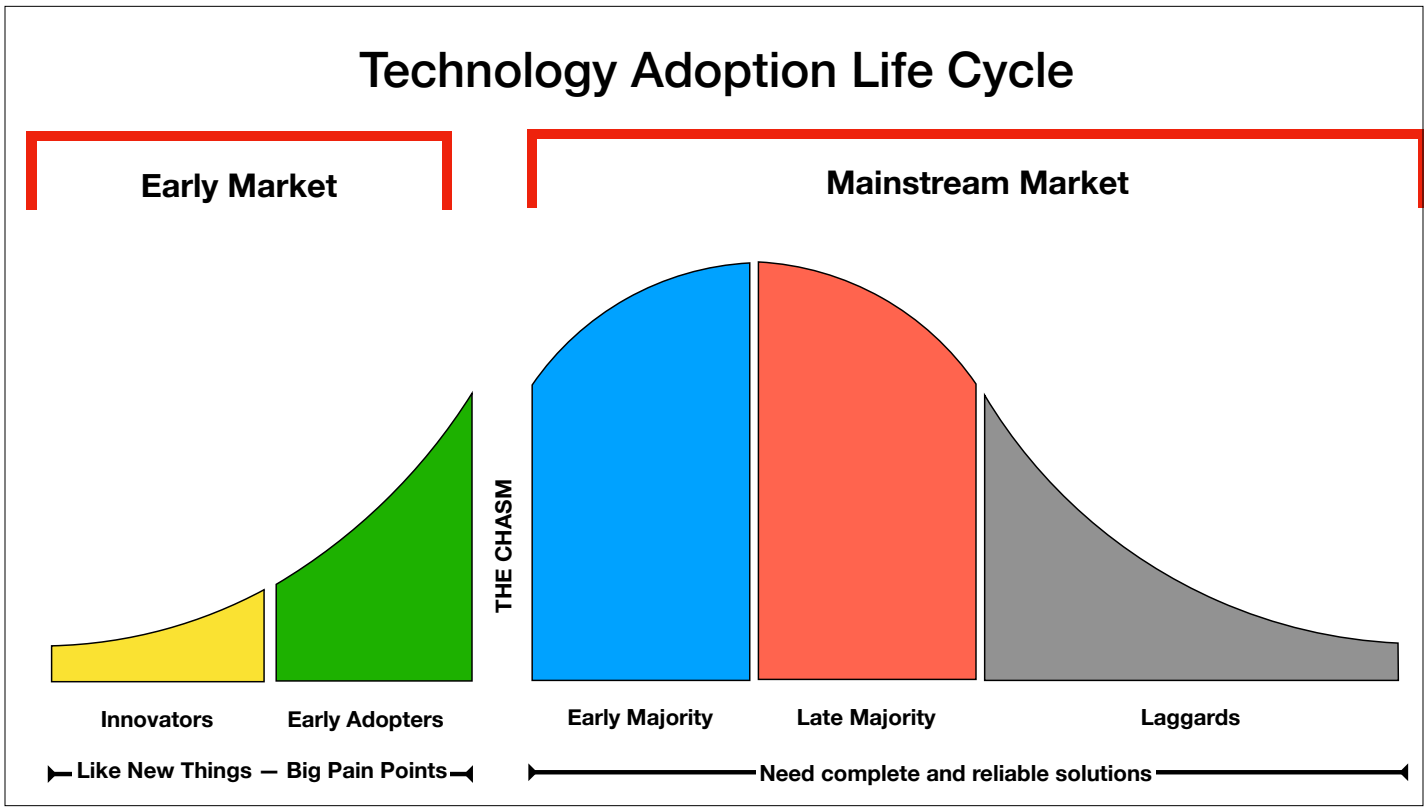


Technology Adoption Life Cycle




Technology Adoption Life Cycle
Early Market
Mainstream Market
Innovators
Early Adopters
Early Majority
Late Majority
Laggards
Like New Things — Big Pain Points
Need complete and reliable solutions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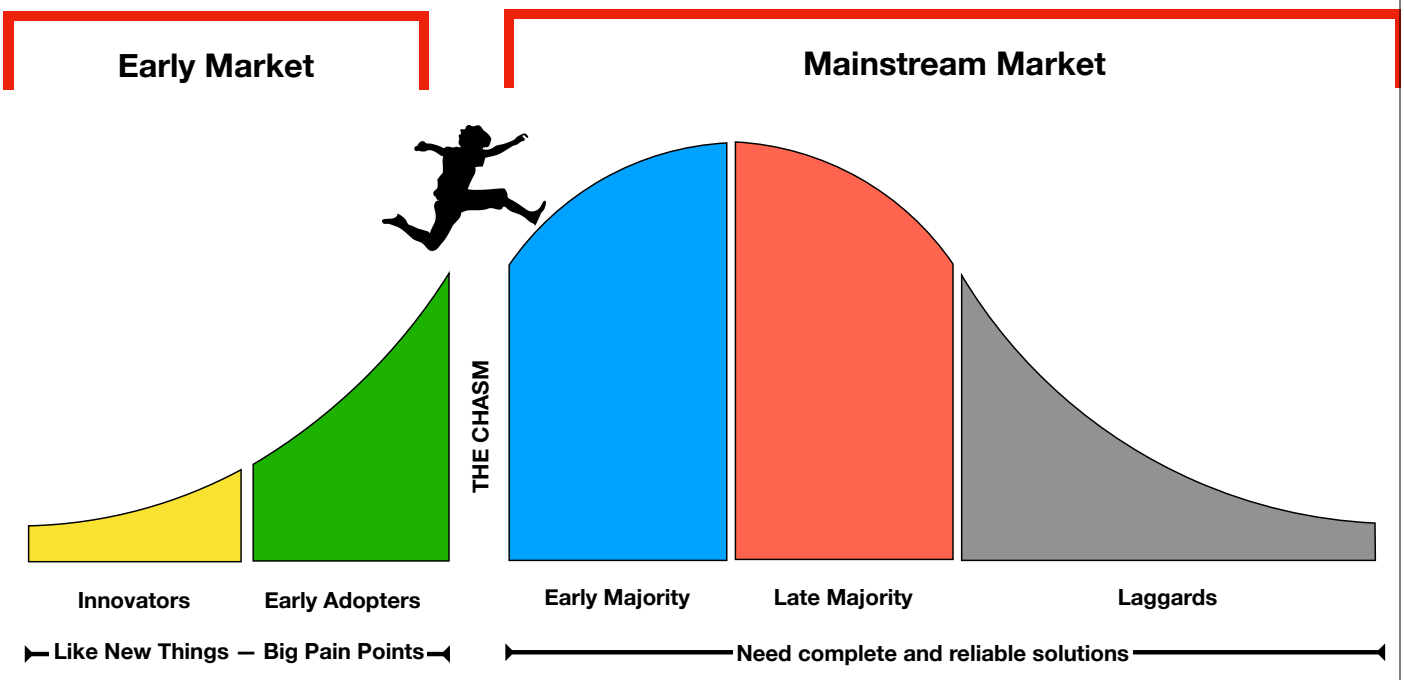
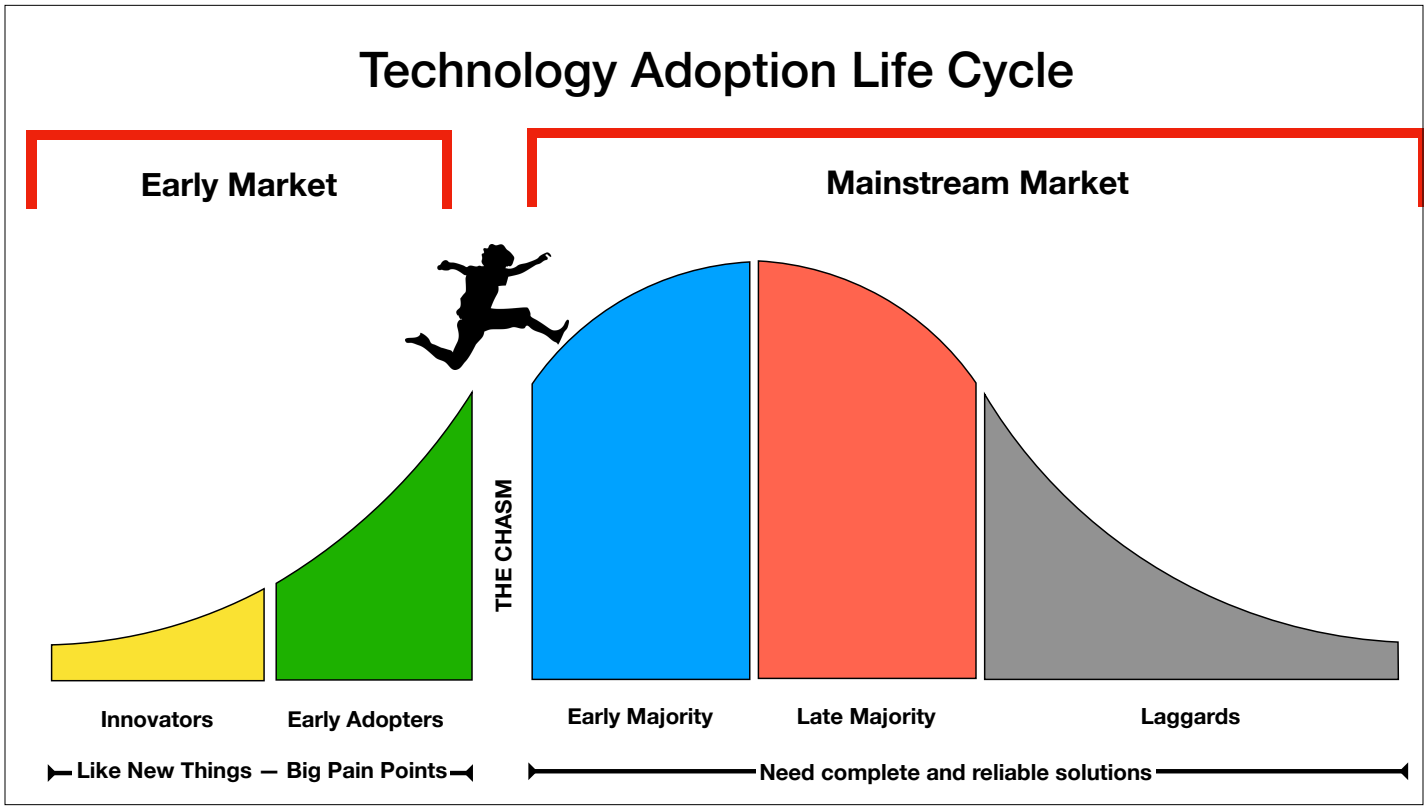
Technology Adoption Life Cycle



How startups can cross the chasm.

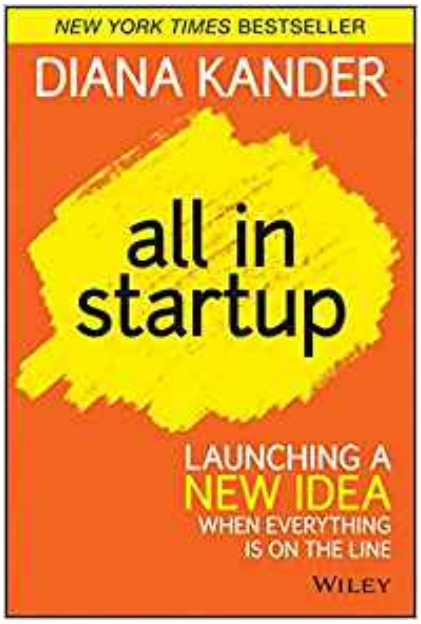


It is not **First** to Market, but the **First** to Cross the **Chasm** who wins

Many startups never cross this Chasm, regardless of the adoption of the technology

Many startups never cross this Chasm, regardless of the adoption of the technology

WHY?



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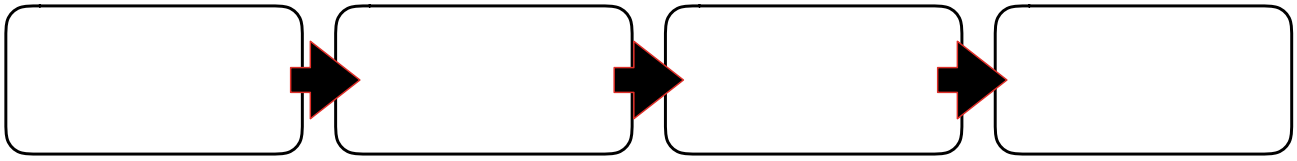
Here's how a startup typically works:



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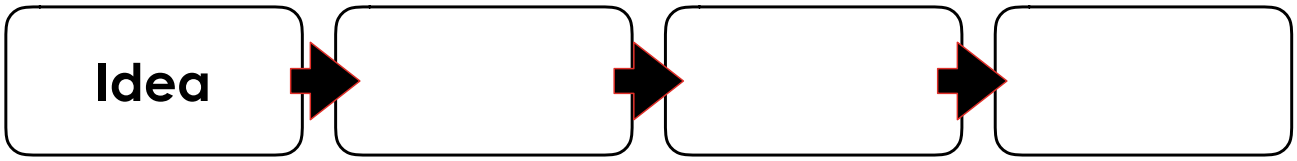
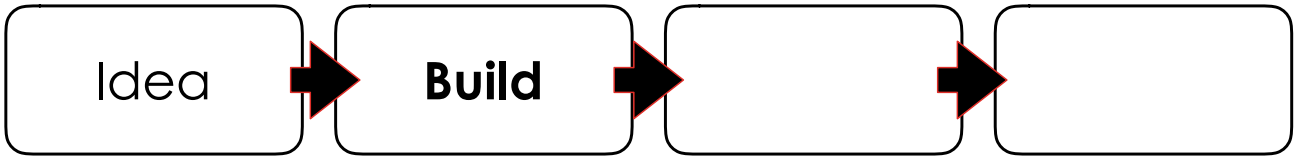
Here's how a startup typically works:



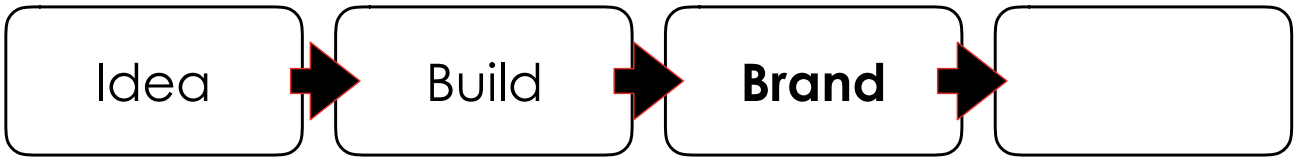
An entrepreneur gets an idea and his mind starts racing with all the possibilities of what it could turn into, the impact it could have on the world, and all the money it could generate.

Here's how a startup typically works:



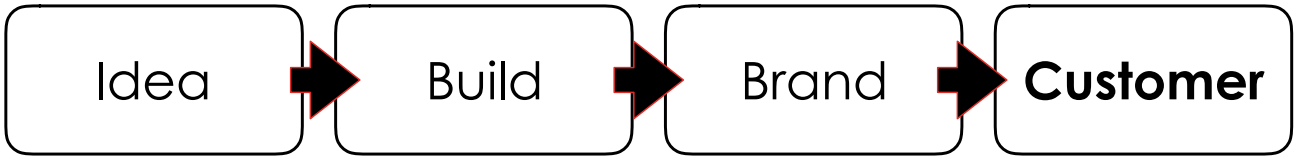
Next, the entrepreneur builds his idea. He spends a lot of time and money trying to build the most comprehensive version of it, rarely showing it to anyone because he wants it to be perfect before potential customers see it. First impressions are everything!

Here's how a startup typically works:



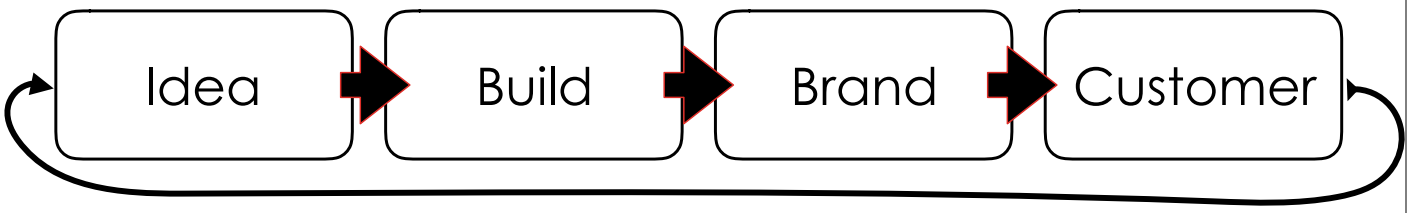
Then, the entrepreneur brands his idea. He develops a catchy name and a logo. He purchases a domain and builds a website. He creates marketing materials. This has to look professional, he tells himself.

Here's how a startup typically works:



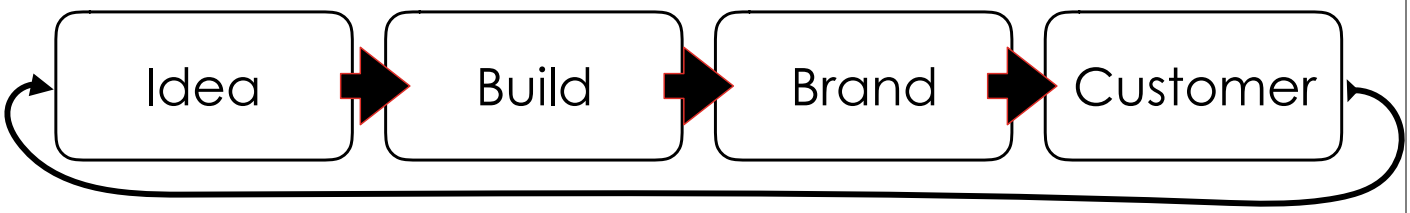
Finally, he goes out looking for customers and, more often than not, strikes out big time, causing him to realize that something is wrong with his initial idea. He revisits the idea and starts brainstorming how to make it better.

Here's how a startup typically works:



And then he repeats step one through four all over again, spending a lot of time and money, without making any forward progress.

Here's how a startup typically works:



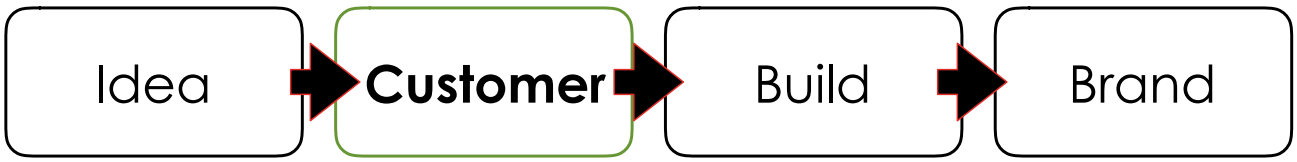
And then he repeats step one through four all over again, spending a lot of time and money, without making any forward progress.

This is the startup loop of **despair**.

Innovations are about finding **customers**, not building **products**

No entrepreneur fails because they couldn't **build their product**. They fail because **no one wanted to buy** what they built.

Here's how a startup should work:



How do you know if you customers will buy your product or service?

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