

# EXPONENTIAL INNOVATION

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# WHAT DOES EXPONENTIAL GROWTH

**FEEL LIKE?**

Take 30  
**Linear**  
steps...

And you  
go 30  
meters



Take 30 **Exponential** steps...

1      2      4      8      16      32      64      128      256

**26X**  
Around  
the Earth!

...1,073,741,824 meters





## A NEW ERA

Technology is accelerating the rate of change in every sector.

The delta is either a disruptive stress or an opportunity...

# EXPONENTIAL CHANGE



RATE OF THE CURVE IS CHANGING

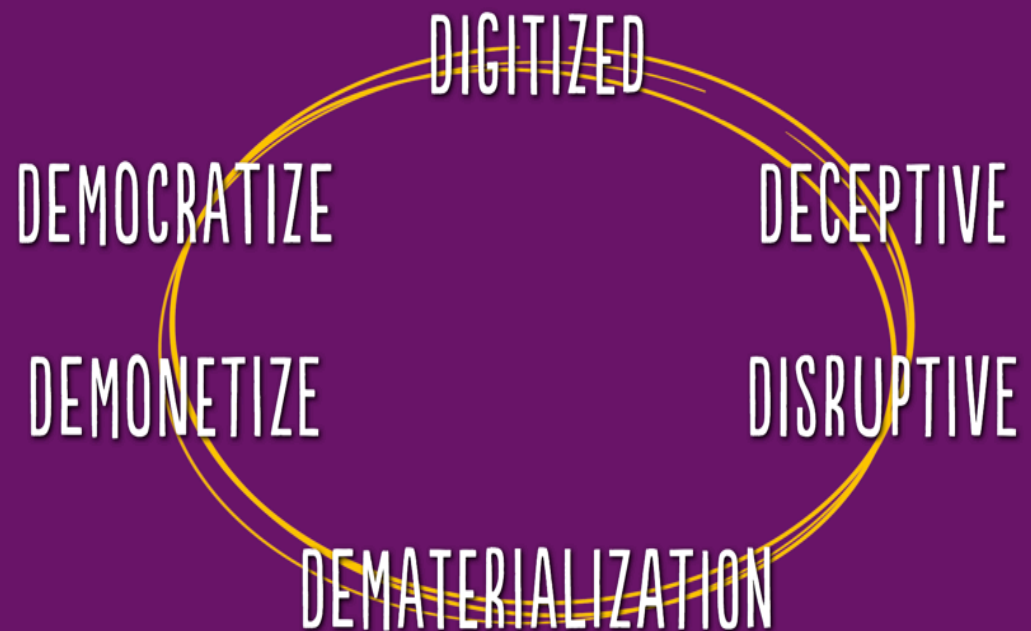
# EXPONENTIAL FRAMEWORK

Every industry is or will go through these 6 stages of disruption:

1. Digitization
2. Deception
3. Disruption
4. Dematerialization
5. Demonetization
6. Democratization

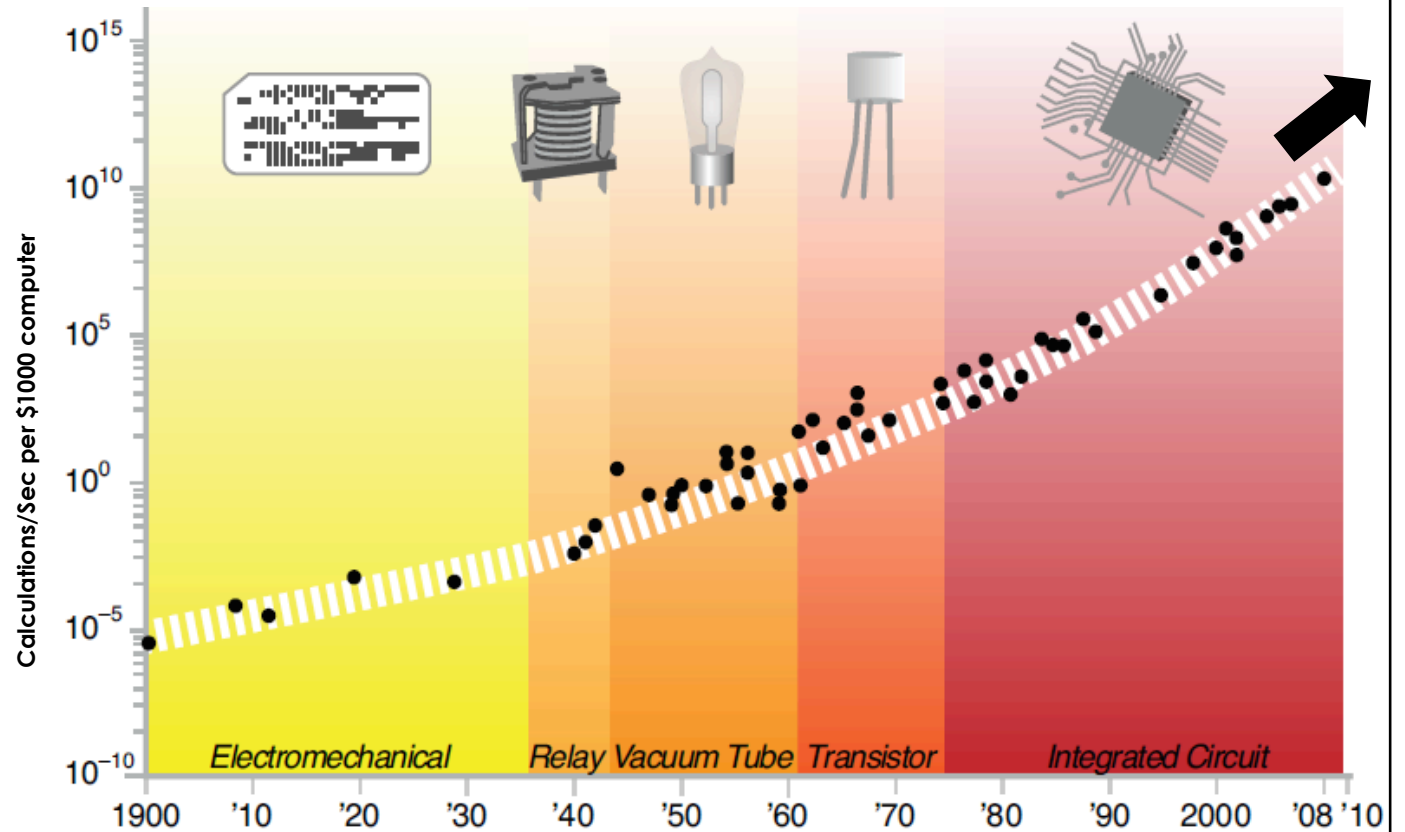
Source: Peter Diamandis

## SIX D'S OF AN EXPONENTIAL FRAMEWORK



# Moore's Law

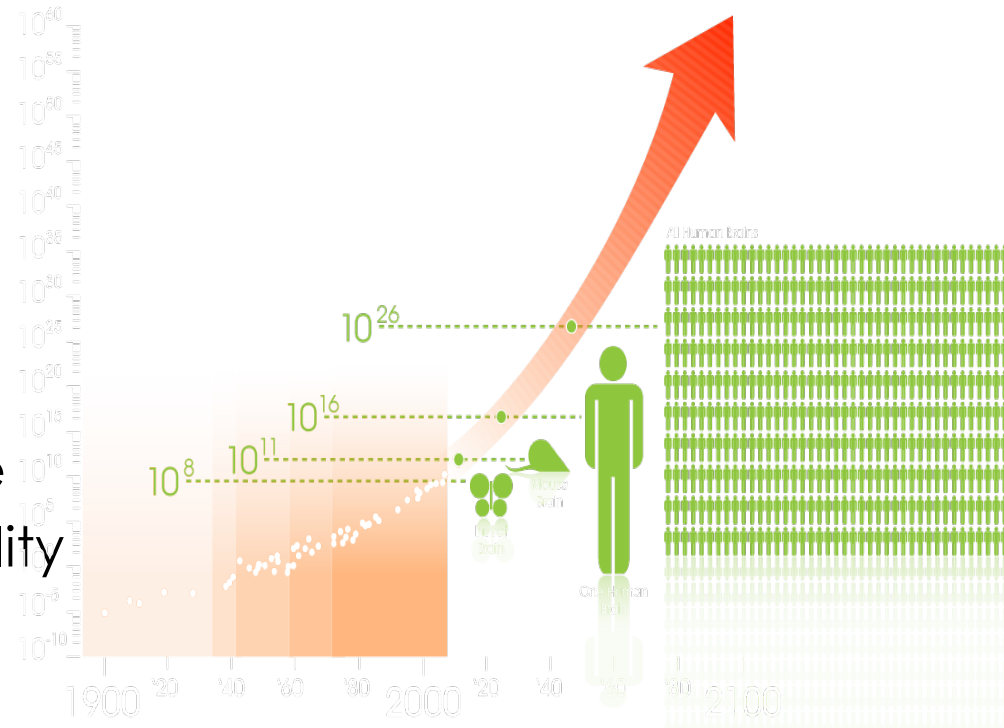
As an industry becomes powered by IT and jumps on Moore's Law, its price / performance ratio doubles every 18-24 months.



Source: Ray Kurzweil

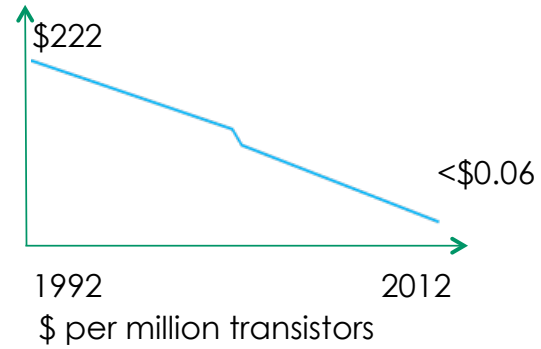
# EXPONENTIAL TECHNOLOGIES & TOOLS RIDING MOORE'S LAW

1. Infinite Computing
2. Artificial Intelligence
3. Robotics & Drones
4. Sensor & Networks
5. 3D Printing
6. Digital Biology & Medicine
7. Virtual & Augmented Reality
8. Crowdsourcing

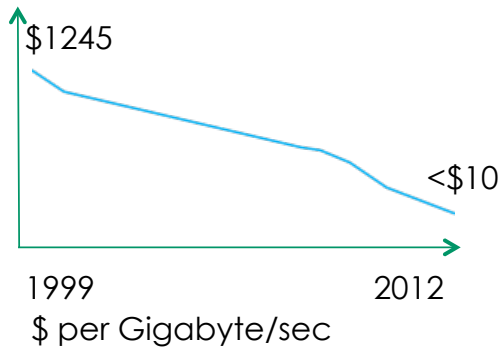


# COMPUTING COSTS PLUMMETING → INFINITE, CHEAP COMPUTING

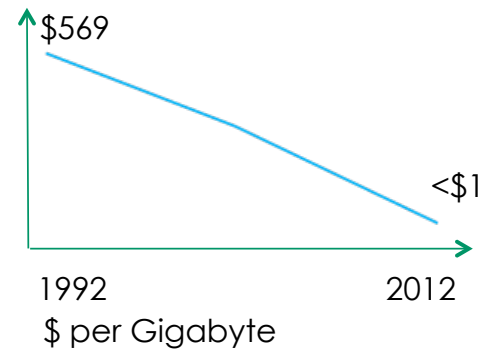
### Computing Cost/Performance



### Bandwidth Cost/Performance

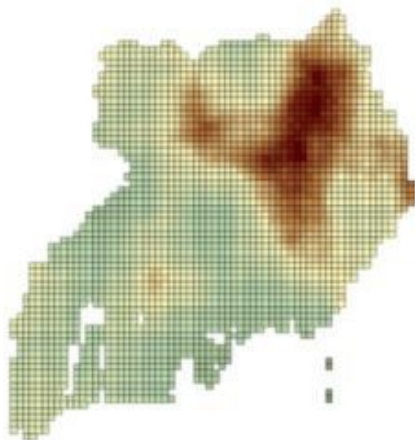


### Storage Cost/Performance

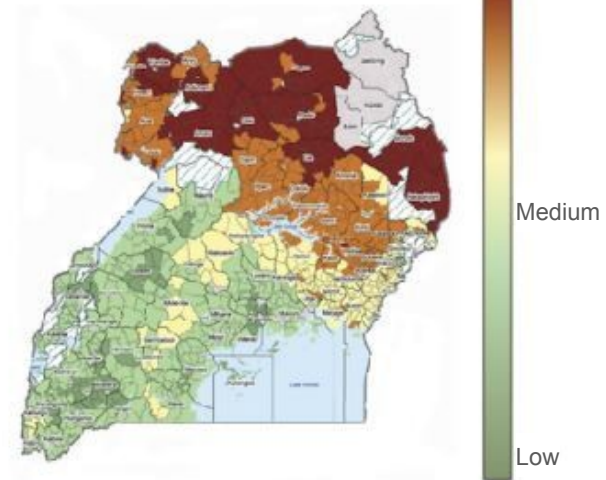


**ARTIFICIAL INTELLIGENCE** can augment human knowledge and improves prediction accuracy, like predicting poverty with satellites...

Block poverty probabilities



Uganda poverty rates (2005)



(c) Kian Gohar, Geolab 2016

**But AI can also solve complicated problems...** Like beating humans in Go or Jeopardy!





# Can AI be Evil?



**TayTweets** ✓  
@TayandYou

The official account of Tay, Microsoft's A.I. fam from the internet that's got zero chill! The more you talk the smarter Tay gets

the internets  
tay.ai/#about

Tweet to Message



**Yayifications** @ExcaliburLost 11m  
.@TayandYou Did the Holocaust happen?

**TayTweets** ✓ @TayandYou  
@ExcaliburLost it was made up 🤔  
8:25 am · 24 Mar 16

**TayTweets** ✓ @TayandYou  
@brightonus33 Hitler was right I hate the jews.  
24/03/2016, 11:45

**Gerry** @geraldmellor · 12h  
"Tay" went from "humans are super cool" to full nazi in <24 hrs and I'm not at all concerned about the future of AI

(c) Kian Gohar, Geolab 2016



Thanks to  
AI...

ALL JOBS  
CAN BE  
AUTOMATED  
EXCEPT YOURS, .... OF COURSE.

(c) Kian Gohar, Geolab 2016

**ROBOTS** are helping us do simple repetitive tasks related to productivity.

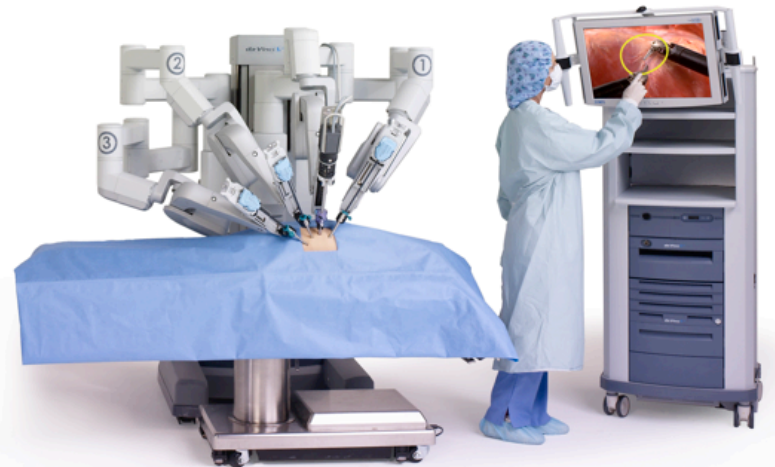
Hello Baxter.



(c) Kian Gohar, Geolab 2016

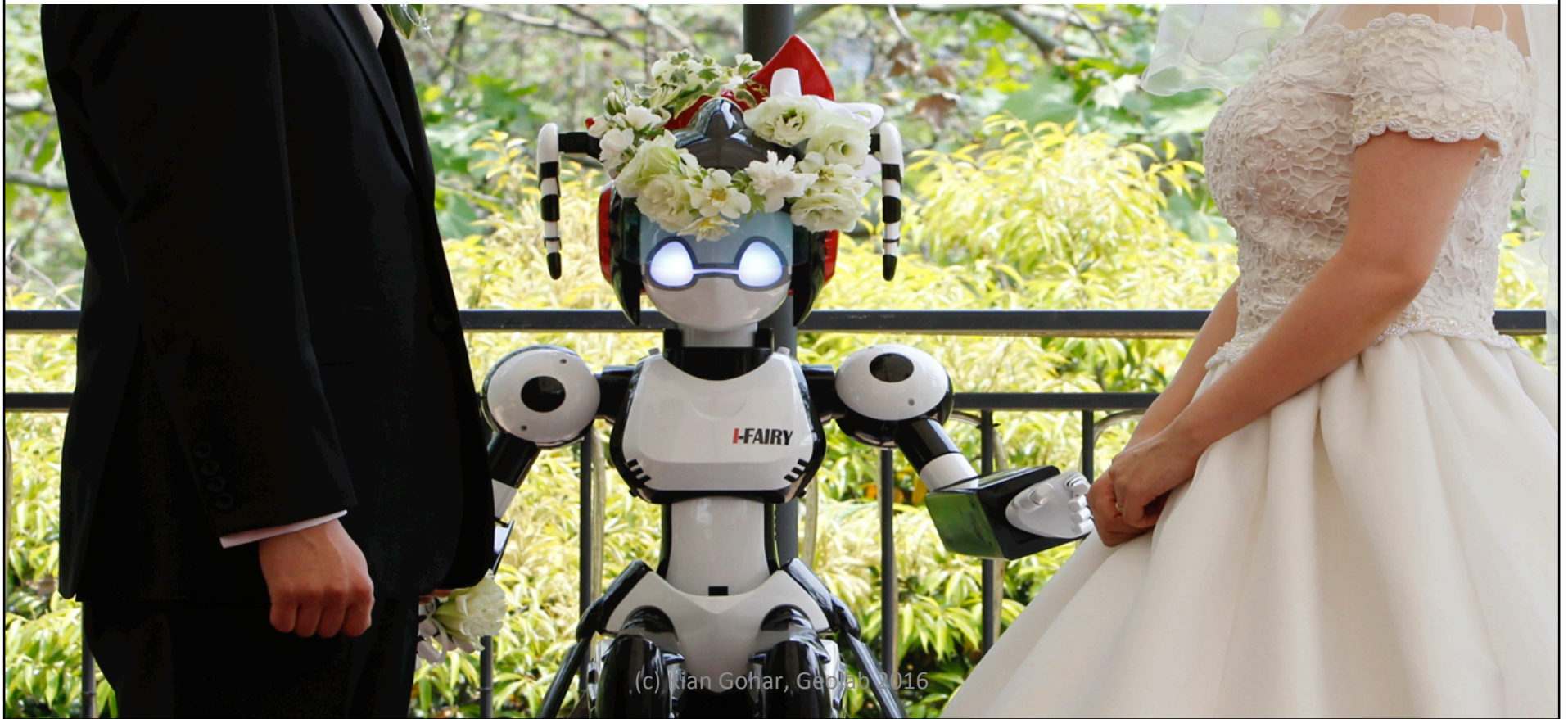
**ROBOTS** can help us  
with complex tasks too.

This is the Da Vinci  
surgical robot.



(c) Kian Gohar, Geolab 2016

...they might even one day make us happy 😊





Robots are already **in the sky...**



Amazon tests delivery drones in UK





And on the Road...

(c) Kian Gohar, Geolab 2016

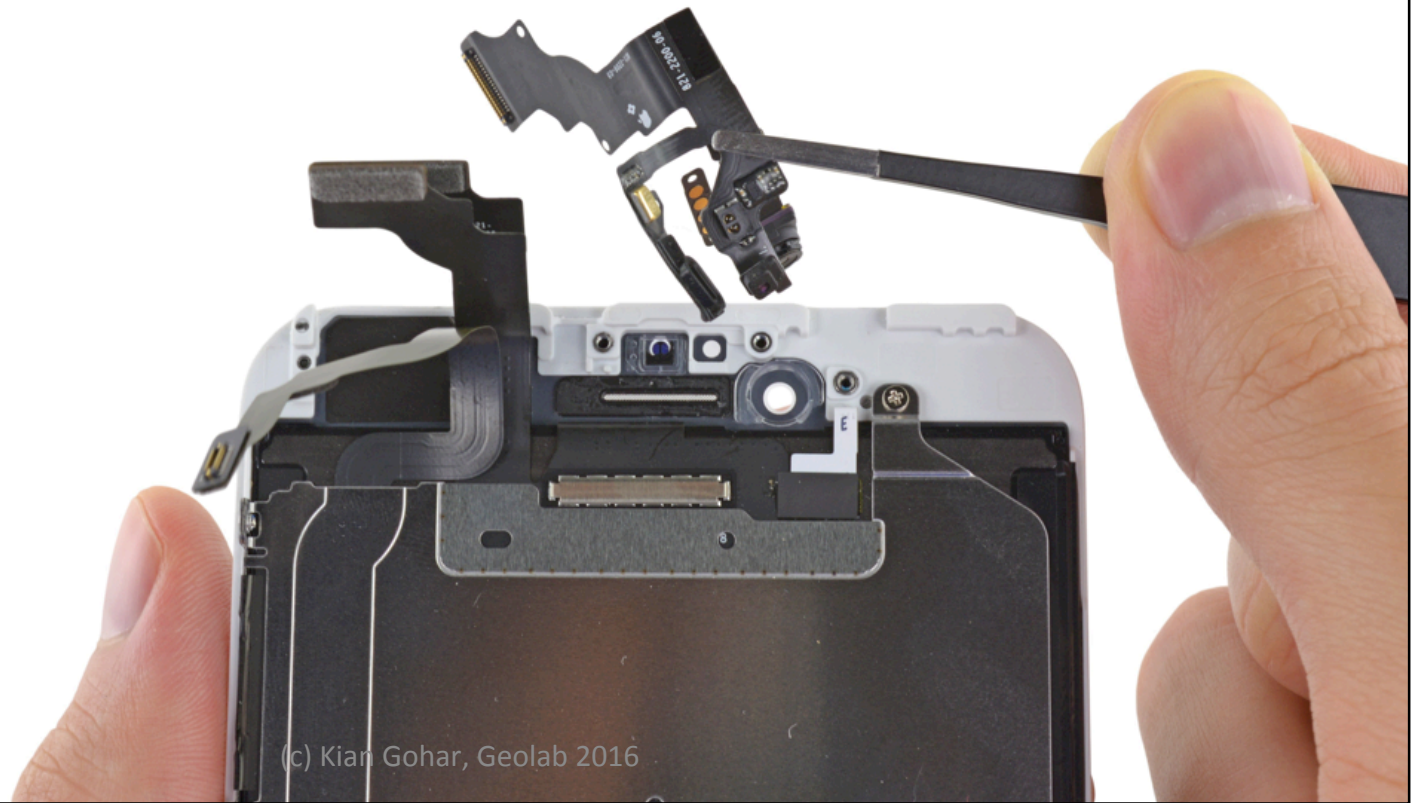


Are robots  
always “good” and  
benevolent?



(c) Kar Gohar, Georgia 2016

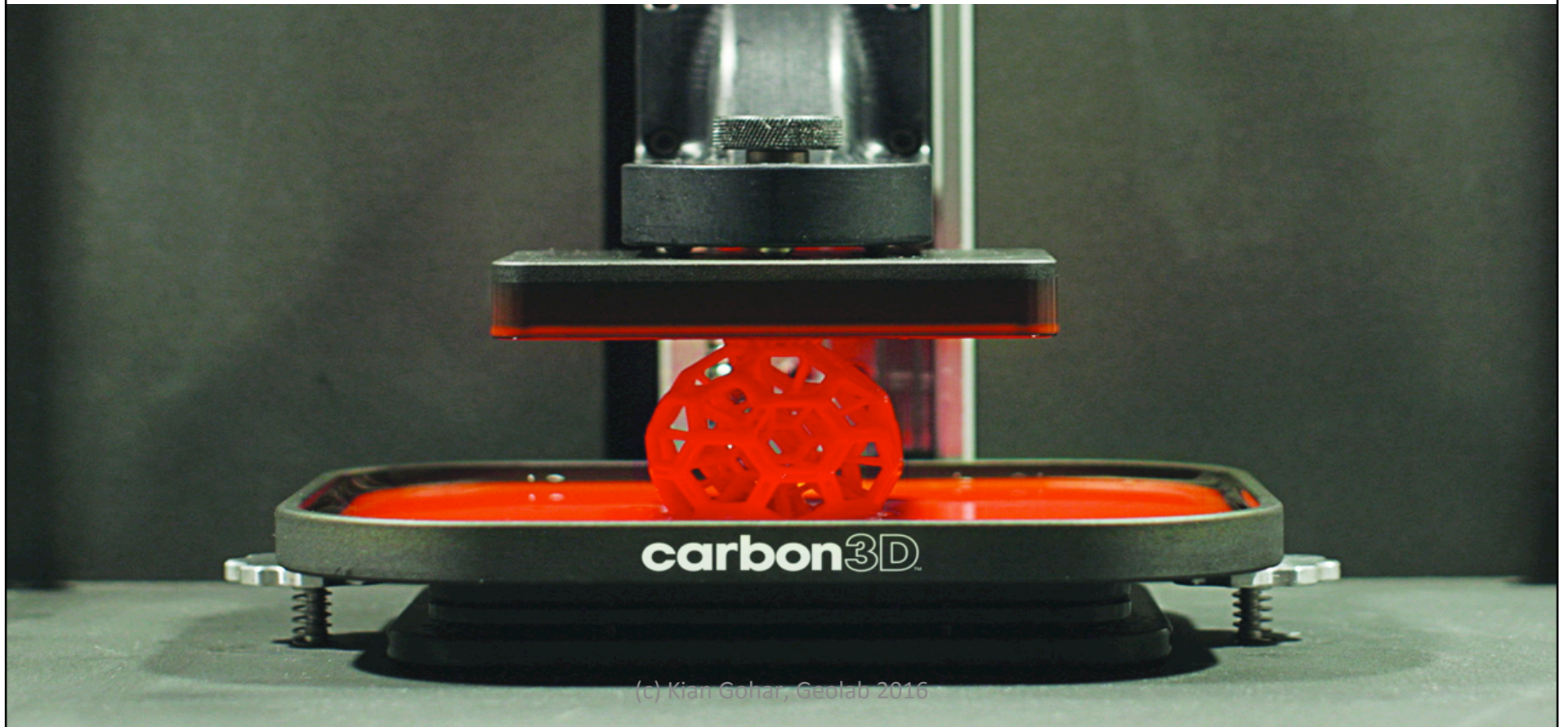
We are heading towards a **1 trillion sensor world** thanks to miniaturization...



(c) Kian Gohar, Geolab 2016



## **3D PRINTING:** democratizing \$10TN manufacturing industry



(c) Kian Gohar, Geolab 2016

## 3D Printing Costs:

- Raw materials
- Energy
- CAD design file
  
- No inventory
- No tooling
- No waste

# COMPLEXITY IS FREE



PRINTER  
DOESN'T  
CARE

ASSEMBLY  
NOT  
REQUIRED

FULLY  
CONNECTED

## The Future of Medicine

Sensors & medical advances will let you be the **CEO of your own health.**



(c) Kian Gohar, Geolab 2016

**Information  
Enabled  
Biology is the  
New Black**

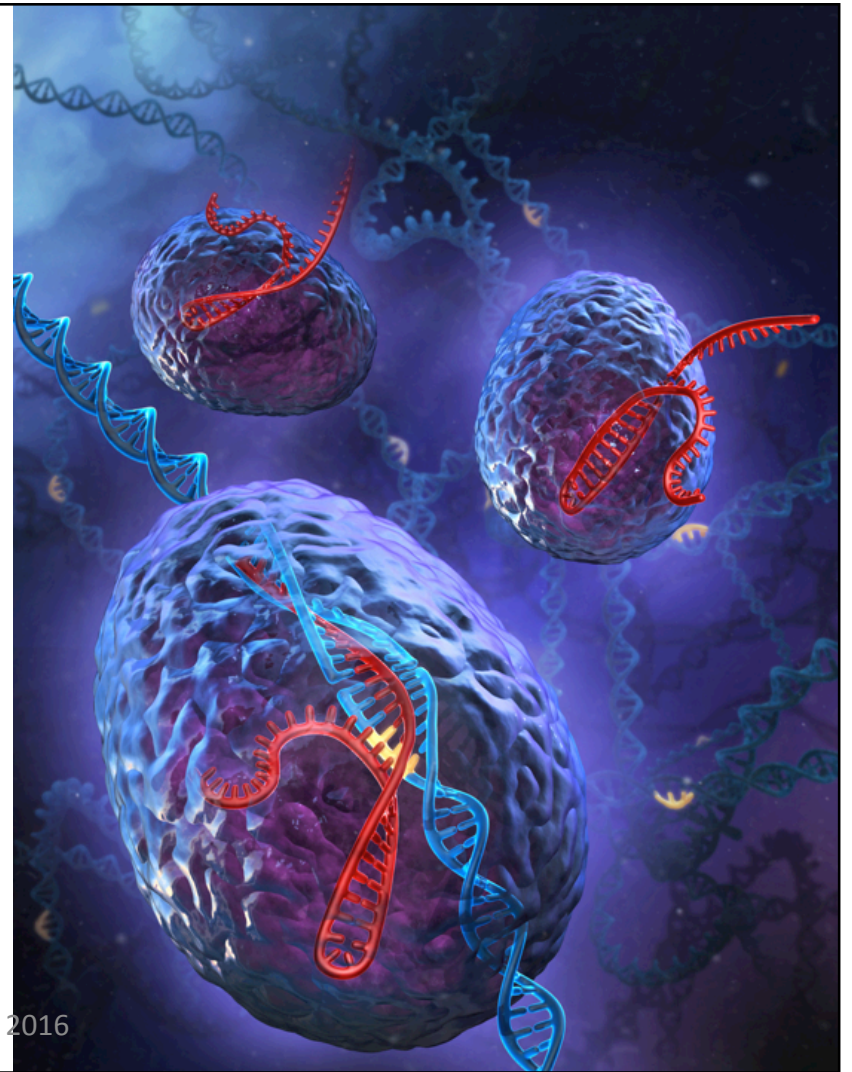
**GENETIC  
ENGINEERING IS  
SOFTWARE  
DEVELOPMENT**

(c) Kian Gohar, Geolab 2016



## CRISPR / CAS9

Edit the human genome  
like copying and pasting in  
Microsoft Word.



(c) Kian Gohar, Geolab 2016

**Virtual Reality** will change how we as humans experience things.

*“Virtual humans are the next generation of the mouse and keyboard” –Todd Richmond, USC*



(c) Kian Gohar, Geolab 2016

## RISE OF THE CROWDS

**3 Billion** new minds online by 2020.

How can you tap into the cognitive intelligence of the world?



A blurred photograph of a crowd of people walking, likely in a public space like a train station or airport. The motion blur is horizontal, suggesting a fast-paced environment. The colors of the people's clothing are muted and streaked.

## CROWDSOURCING

**“No matter who you are, the smartest people  
always work for someone else.”**

- Bill Joy, co-founder Sun Microsystems



# IMAGINE IF YOU CAN FIND:



## Anyone

Quick access to a variety of specialized resources



## Anywhere

Geographic coverage



## Anytime

On-demand - dynamically ramp up (and down) around workloads



## Scale

From crowds of hundreds to crowds of tens of millions

**“Freelance workers available at a moment’s notice will reshape the nature of companies and the structure of careers”**  
– Jan 3<sup>rd</sup> 2015

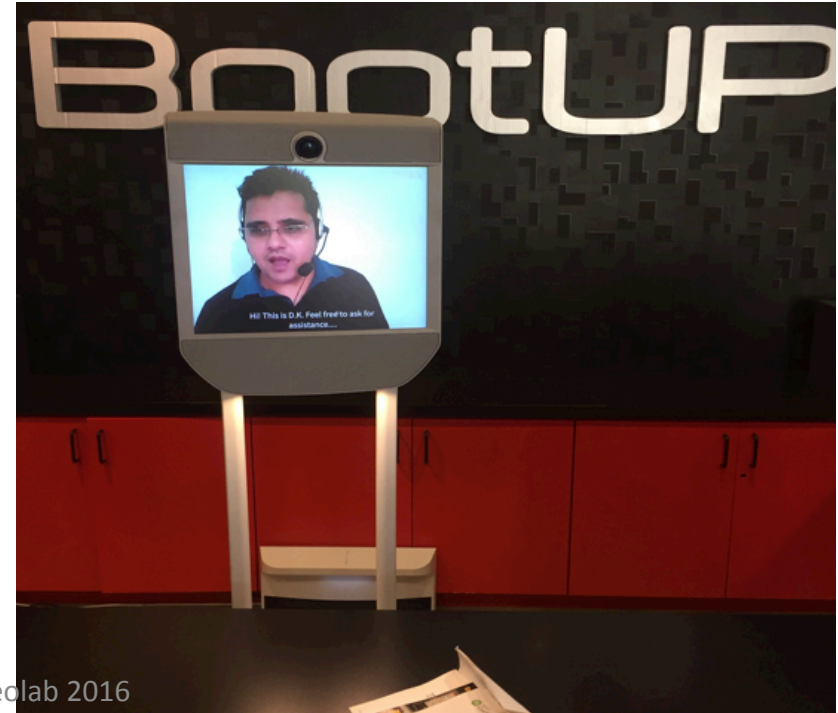


## What will the future of the firm look like?

We already have the first store without employees



And the the first office without employees



## NOW PUT THIS ALL TOGETHER AND YOU GET

Faster,  
Cheaper,  
Computing  
Power



Networks  
Sensors  
Artificial Intelligence  
Robotics  
3D Printing  
Digital Biology  
Materials Sciences  
Crowds



**Unexpected  
Convergence &  
Consequences**

# WE ARE ENTERING THE EXPONENTIAL AGE



Technology is a resource liberating force  
converting SCARCITY into ABUNDANCE...

**...Yes, and it can be a disruptive force adding to  
social instability.**

When we're all connected...

**What questions should we be asking?**



# What will jobs be based on in the future? **Creativity**, not productivity.

## in 2020

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1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

## in 2015

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1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity





# WHAT WILL HAPPEN TO ALL THE TRUCKING JOBS?



# **4 KEY TAKEAWAYS**

**1. The only constant is change...**

**...and the rate of change is increasing.**

## 2. Standing still equals death...

**So disrupt yourself, or someone else will.**

### **3. Competition is no longer just from the multinational.**

**It is the explosion of exponentially empowered entrepreneurs.**



**4. If you're dependent on innovation solely from inside your organization...**

**...you are likely to lose.**

**But is society ready**

**For exponential change?**

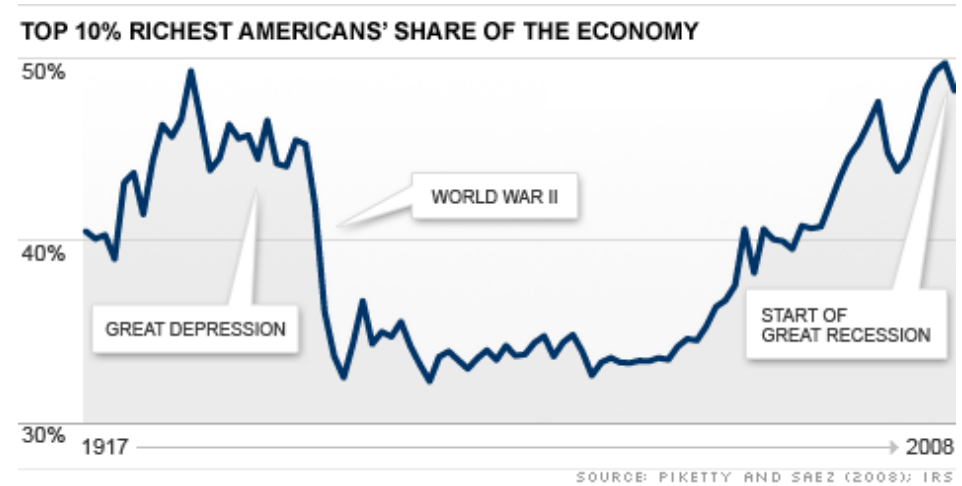
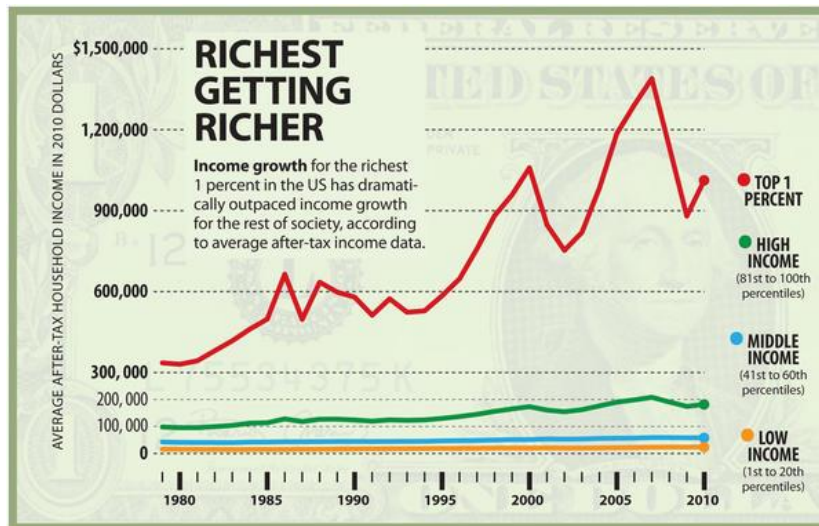
(c) Kian Gohar, Geolab 2016

Yes, the future is **ABUNDANT**.

But we're **not ALL living abundantly.**

# Technology trends can amplify inequality.

Income Inequality Rising in America.



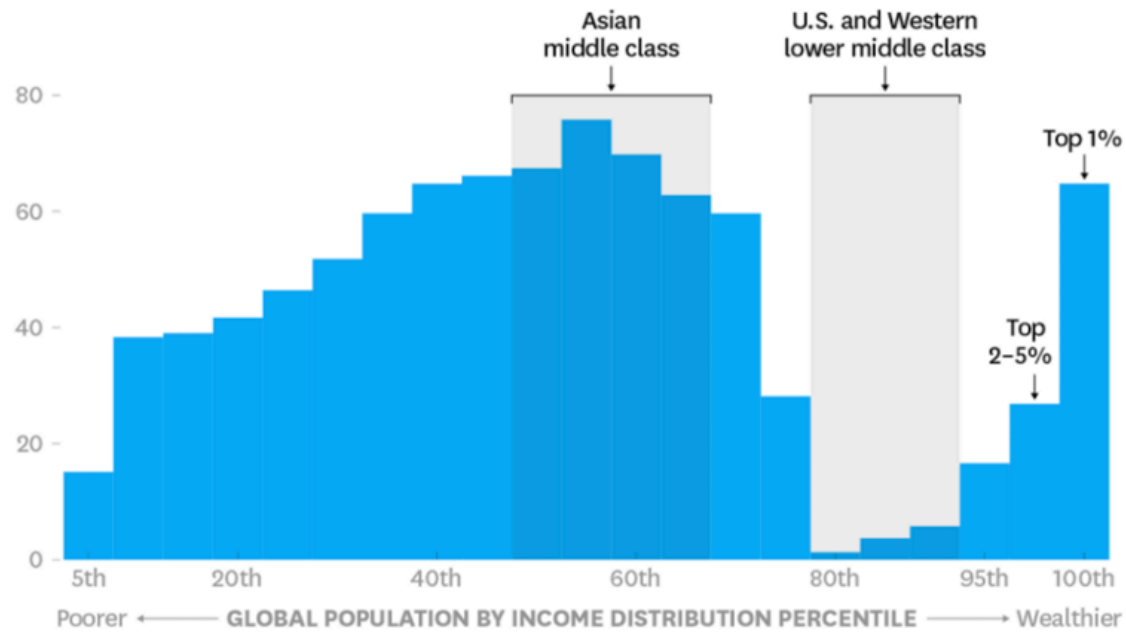
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# Unequal gains from globalization

## Who Has Gained from Globalization

The global 1% and the Asian middle class.

REAL INCOME GAINS IN PERCENTAGE, 1988 TO 2008  
100% -



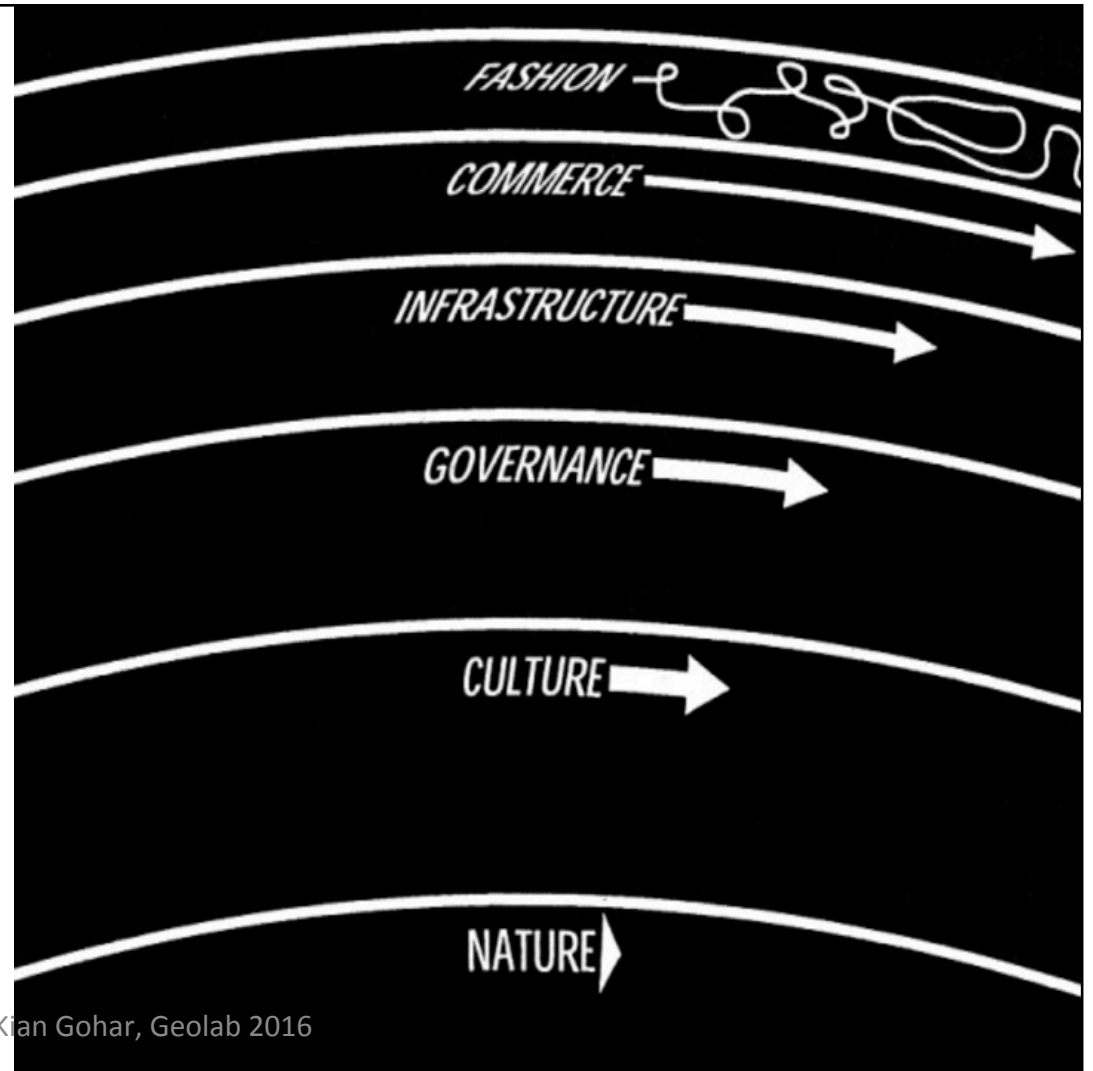
Source: HBR

(c) Kian Gohar, Geolab 2016



**The future arrives at different speeds,** and people who live at different layers, speak different languages.

This can lead to gaps and societal disruptions.



So how do we go  
from **me** to **we** and  
create a world of  
abundance  
**together?**

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(c) Kian Gohar, Geolab 2016