

**The FIDIC - SIDiR - EFCA Regional
Infrastructure Conference
Krakow, Poland - 7/8 March 2016**



Is an Exponential Organization A Problem or an Opportunity ?

For more information check out the links below:

Explainer video of Collaborative Engineering

www.collengworld.com

www.te-x.net

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2. Definition of ExO

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5. Massive Transformative Purpose (MTP)

- Five external attributes (SCALE)

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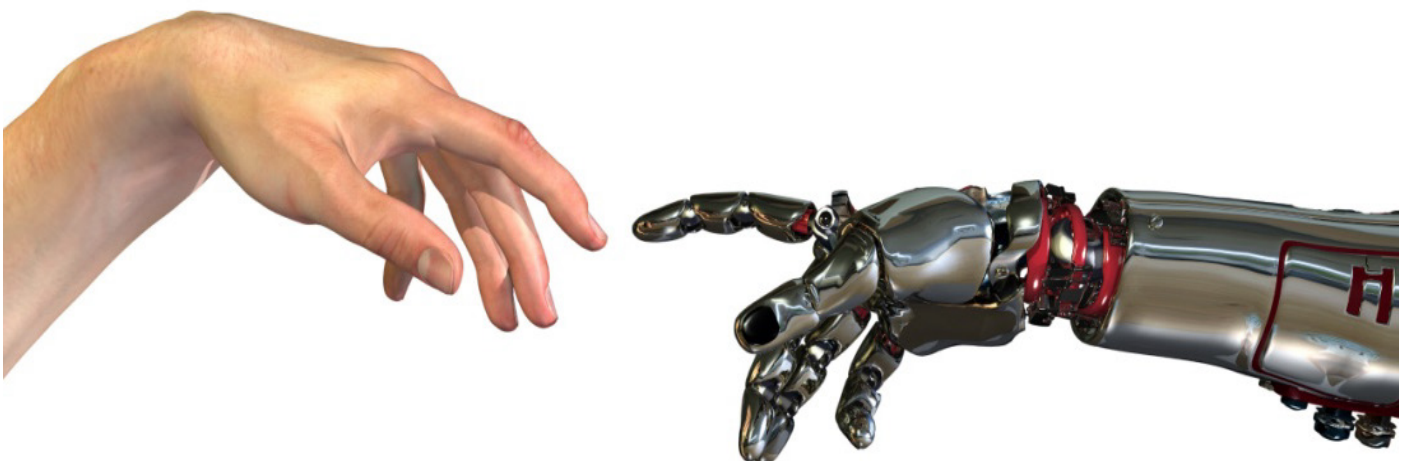
10. Bibliography

1. Introduction

In 2011 futurists predicted that within 10 years 40% of existing Fortune 500 Companies would no longer survive.

In fact Richard Foster has estimated that *“The average lifespan of an S&P 500 company has decreased from 65 years in the 1920s to 15 years today”*

Today potent forces are emerging in the world using Exponential Technologies. Areas such as infinite computing, sensors, networks, artificial intelligence, robotics, digital manufacturing, synthetic biology, digital medicine and nanomaterials.



Innovators, crowdfunding and crowdsourcing will give us the power to solve many of the world ' s grandest challenges and the potential to meet the needs of all over the next 20 years.



INNOVATORS



CROWDFUNDING



These same forces are now empowering smaller and smaller teams to do what was once only possible via governments and the largest corporations.

Our competition is no longer the multinational corporation, it's now the guy in his Silicon valley garage using the latest online tools to design and cloud print their latest innovations

But questions remain:

- How can we harness all this creative power?
- How can we construct an enterprise that is as quick, adept and innovative as the people who will be part of it ?
- How will we compete in this accelerated new world ?
- How will we organize to scale ?

The answer is the **Exponential Organization**.

What's an ExO?

2. Definition of ExO

“An Exponential Organization is one whose impact is disproportionately large, at least 10x times larger, compared to its peers because of the use of new organizational techniques that leverage accelerating technologies.”

— Salim Ismail, Exponential Organizations: Why new organizations are ten times better, faster, and cheaper than yours.

3. Brief History of ExO

In 2009 the ExO paradigm was first identified by experts as a weak signal.

After 2 years, in 2011, it was revealed that several new organizations were following a specific model.

Since 2011 they have been seriously researching this ExO model at the Singularity University.

In 2014 Salim Ismail wrote a specific book called “Exponential Organizations” and this new paradigm has assumed a central role in the modern economy.



“Our mission is to educate, inspire and empower leaders to apply exponential technologies to address humanity’s grand challenges.

Singularity University is a benefit corporation based in San Francisco that provides educational programs, innovative partnerships and a startup accelerator to help individuals, businesses, institutions, investors, NGOs and governments understand cutting-edge technologies, and how to utilize these technologies to positively impact billions of people.

Today everything is being disrupted by this process. Amazon, Twitter, eBay, Booking.com and Apple's iTunes have disrupted their relative markets such as bookstores, newspapers, local stores, travel agencies and record stores. It's hard to identify any industry that hasn't been fundamentally disrupted.



And not just businesses, but jobs as well.

As David Rose says:

“Every single job function we can identify is being fundamentally transformed...Even old industries such as construction are in the throes of disruption.”

Mike Halsall, a construction company executive, has said that significant transformations to his industry include :

- Increased collaboration
- More sophisticated design software (BIM)
- 3D Printing

Halsall estimates that the sum of these disruptions could reduce the number of people working in construction by MORE than 25% within 10 years.

4. Why are ExO ten times better, faster and cheaper?

I'd now like to introduce what's called an Iridium Moment: “ using linear tools and the trends of the past to predict an accelerating future “

Motorola invested \$ 10 billion in a satellite communication network called “Iridium “.

By the time the system was completed it was already obsolete and no longer profitable.

The Iridium business plan was in place 12 years before the system became operational, long enough for it to be almost impossible to predict where digital communications would be by the time the satellite system was finally in place.

Another well documented example is Kodak.

In 1975 their employee Steve Sasson invented and presented his bosses with the digital camera.

What happened next seems now incredible but the reality is that Kodak were totally unimpressed

“They were convinced that no one would ever want to look at photos on a television set”.

1975

Sasson showed first digital camera device to his bosses at Kodak.

At the time, it took 50 milliseconds to capture the image but 23 seconds to record it to tape.

If your employee came to you in 1975 and told you he'd invented the digital camera, what would you do?

If you were Kodak, the answer was to effectively shove him in a closet and hope the product never reached the mass market.

His bosses were unimpressed. “They were convinced that no one would ever want to look at their pictures on a television set.”



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But things went differently.

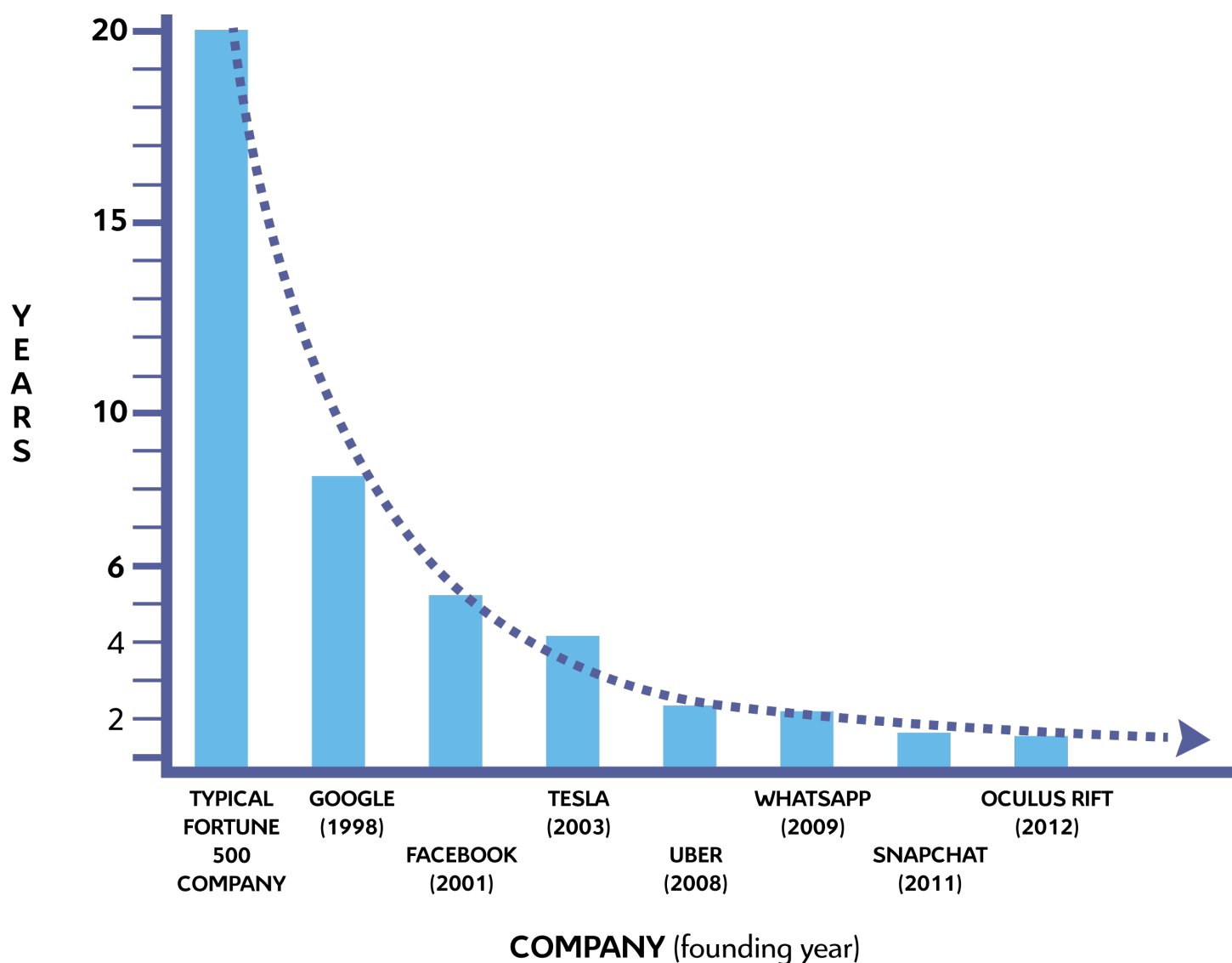
Kodak declared bankruptcy in 2012 and at the same time a digital photo- based App Instagram was bought by Facebook for \$ 1 billion.



This chart shows the accelerating metabolism of the economy, in particular it shows the number of years taken to reach a market cap of a \$ 1 billion by a typical “Fortune 500 Company” contrasted with companies operating exponentially.

-it took 20 years for a traditional Fortune 500 Company only 8 for Google, 5 for Facebook, 2 for WhatsApp.

So the trend is clear.

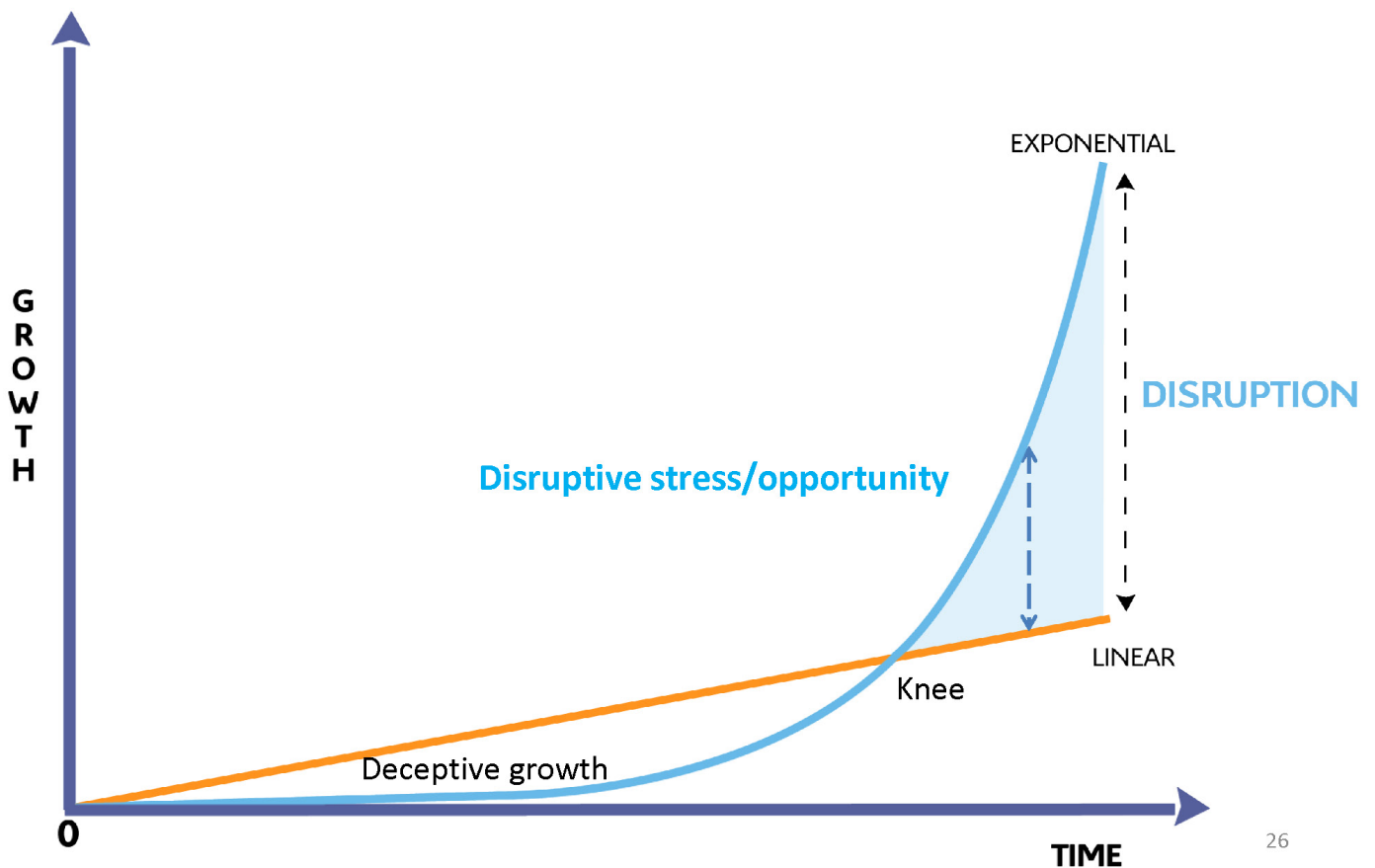


In his book, “The Singularity is Near” Ray Kurzweil identifies a right fundamental observation:

“When you shift to an information-based environment, the pace of development jumps onto an exponential growth path, and price/performance doubles every year or two.”

This is Kurzweil Exponential curve.

LINEAR vs EXPONENTIAL



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It shows the difference between Linear Local growth and exponential global growth.

Linear growth is the way we actually think; for example historically in human power, doubling the hands doubled output.

Nowadays a digital transformation is taking place transactions are digital, several key technologies are information-enabled and never in human history have we seen so many technologies moving at such a pace.

We can see exactly where the Disruption takes place.

Once the knee of the Exponential curve is reached growth, that initially looked slow, becomes literally unstoppable and disruptive. Creating new disruptive opportunities for startups that leverage IT, or disruptive stress for CEOs of traditional companies, and neither age, nor size, nor reputation, nor even current sales guarantee that they will be around tomorrow.

Mead's Law

“If the amount of computer power for a given cost doubles every two years, then the cost of computing power must halve over the same period”

Economy of Abundance

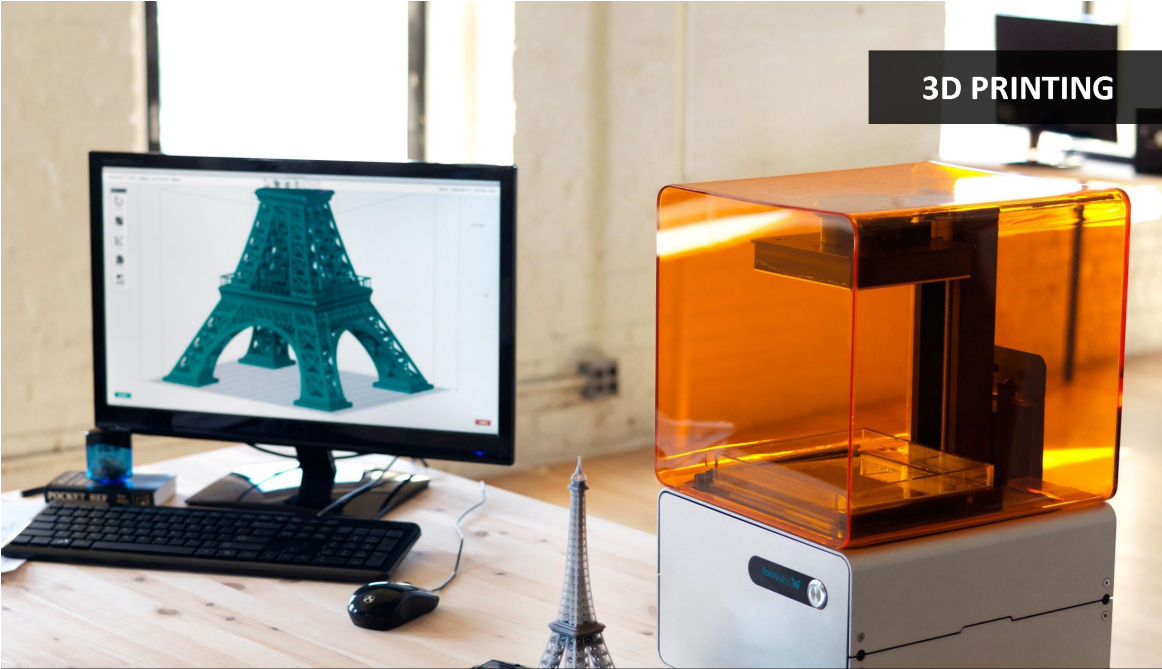
“Everything that bits touch is also touched by their unique economic properties—cheaper, better, faster.”

For example, the first human genome was sequenced in 2000 at the cost of \$ 2.7 billion. Today it costs about \$ 100 and is expected to drop to just 1 penny by 2020.



We are also seeing similar trends in many other technologies such as:

3D PRINTING

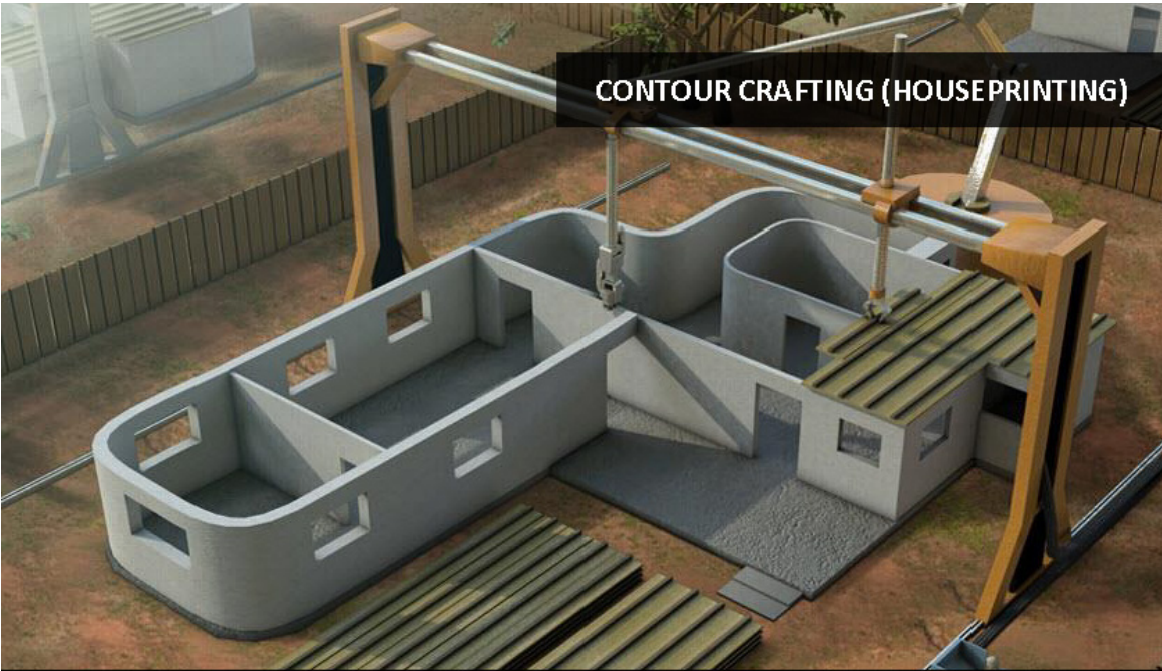


\$40.000 (2007) → **\$100** (2014)

SCALE:
400x in **7** years

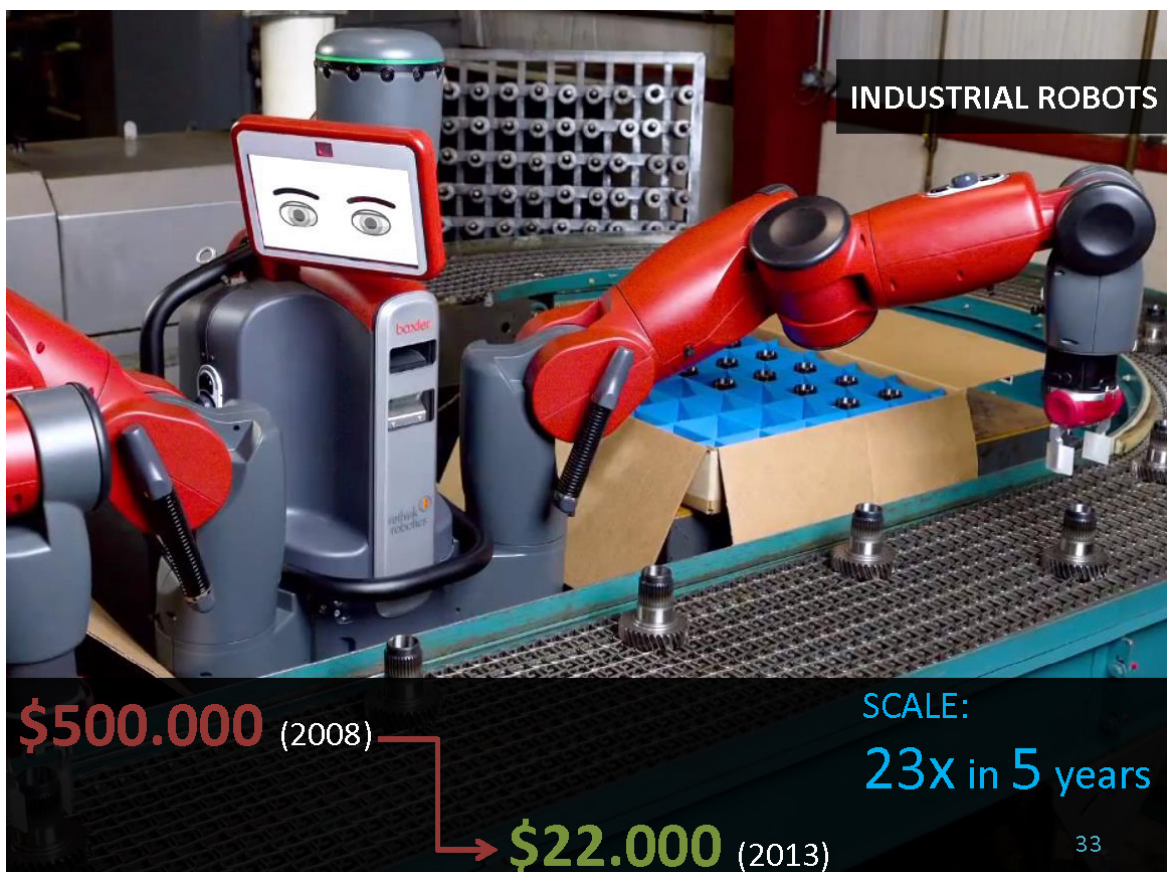
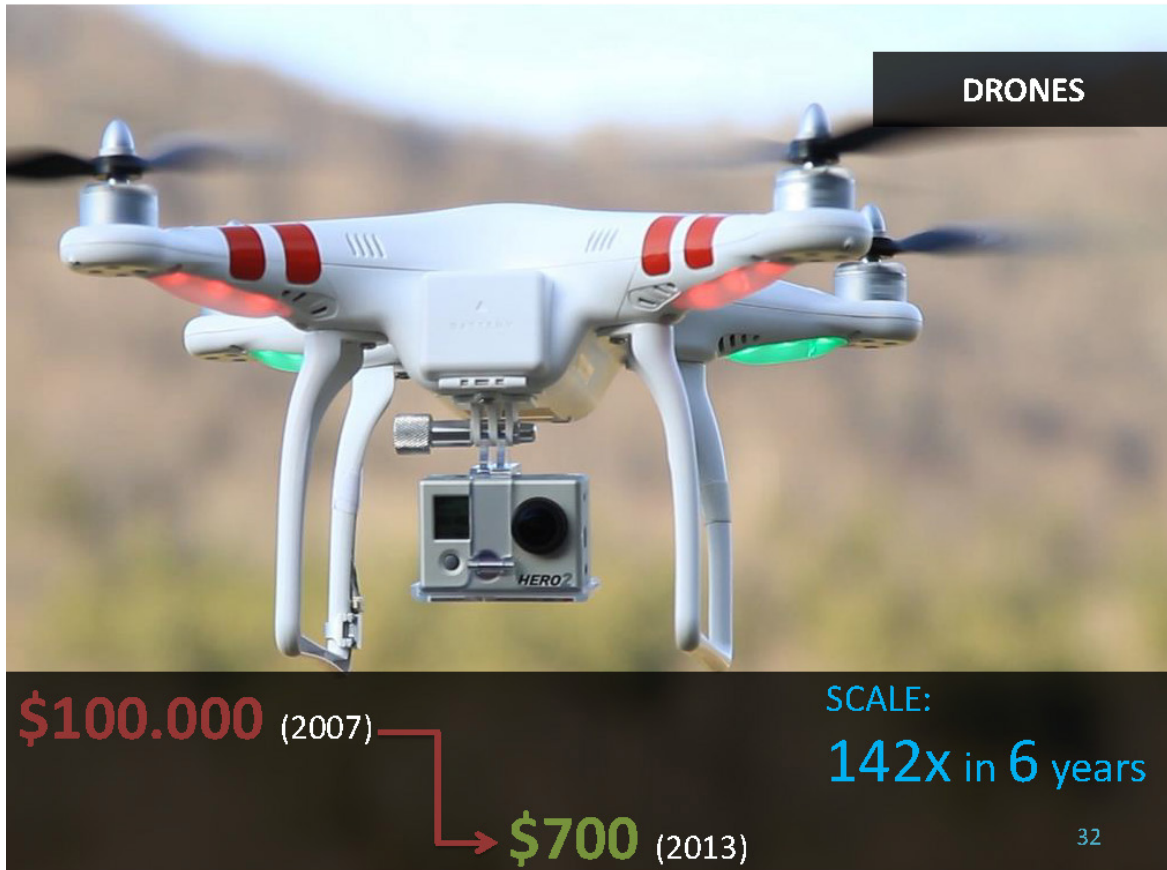
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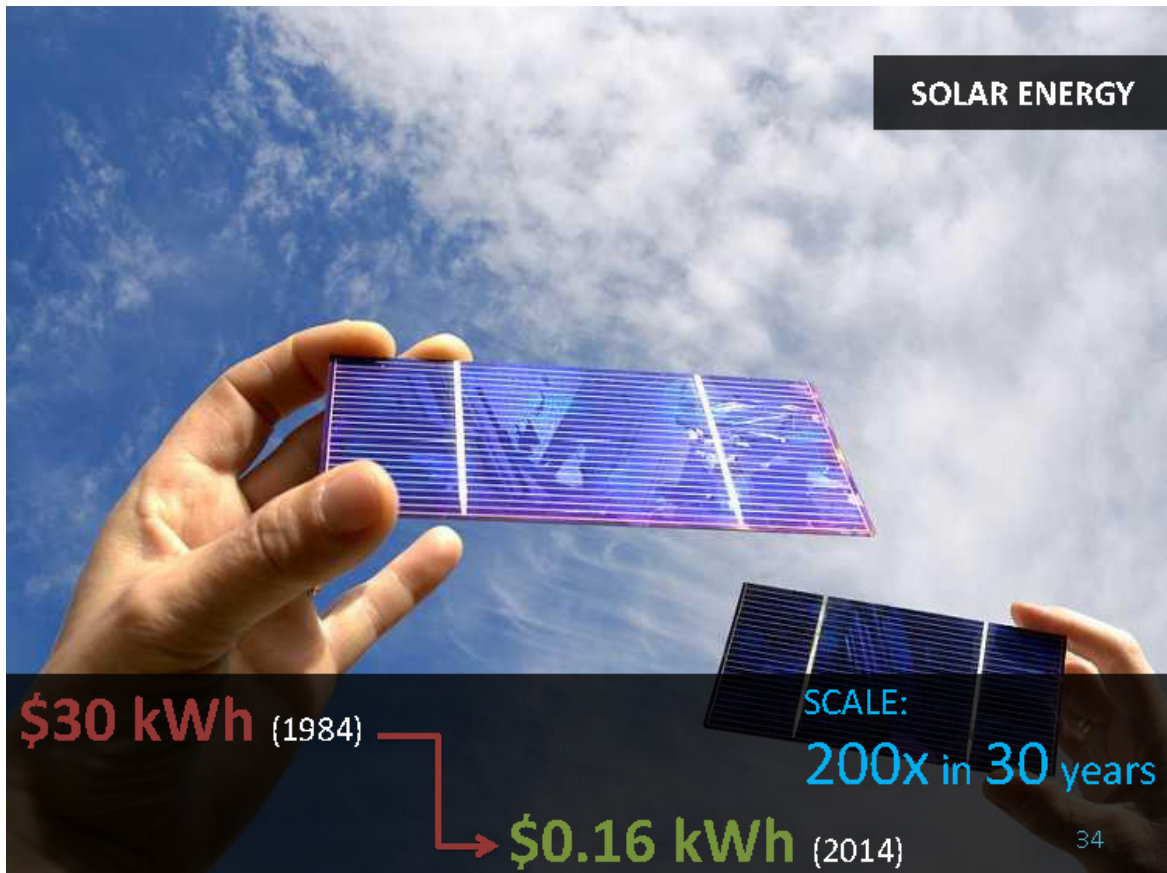
CONTOUR CRAFTING (HOUSEPRINTING)



PREDICTED A **60%** COST REDUCTION

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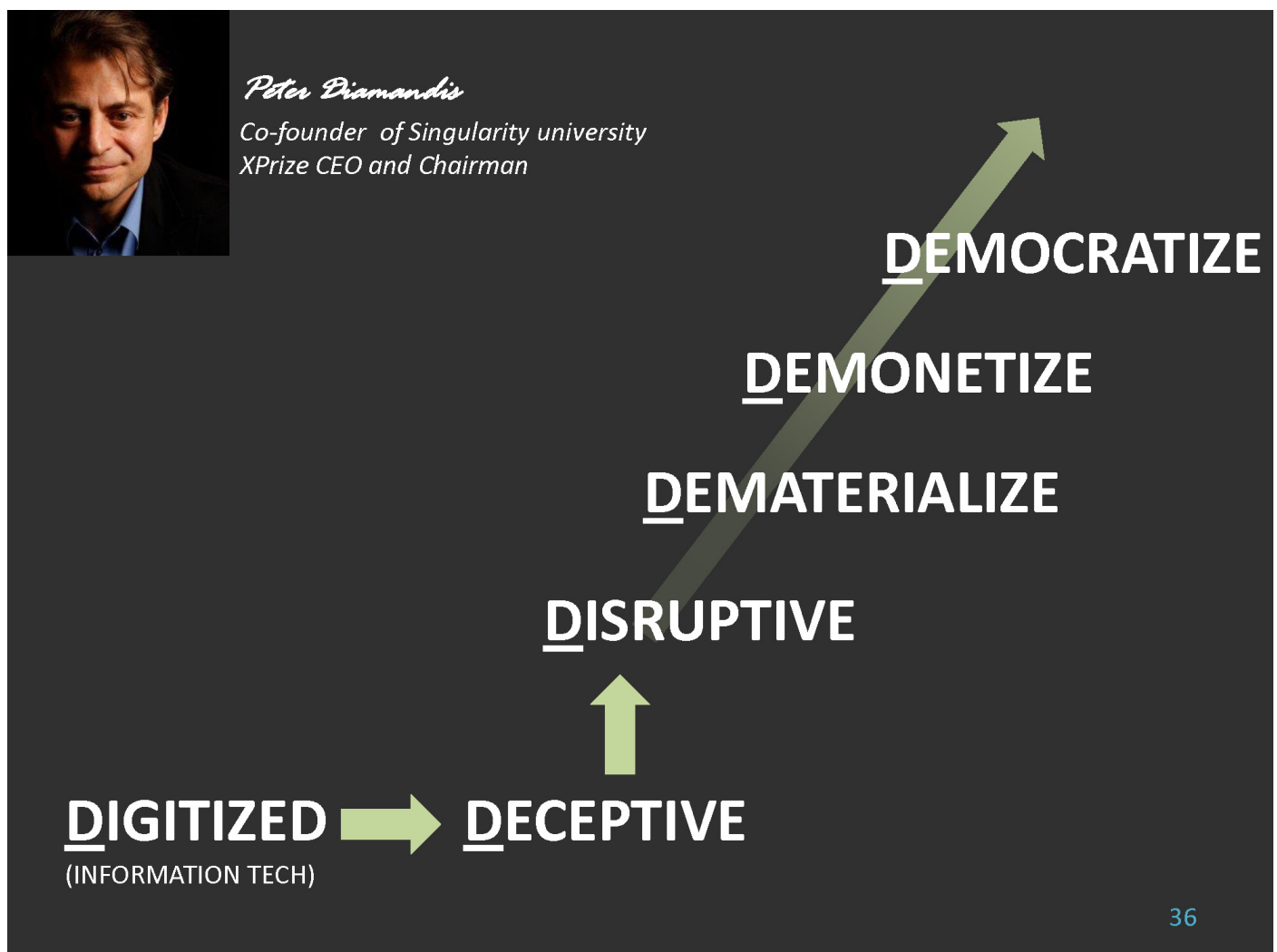




In Italy From 2013 to 2015 the value of Engineering services dropped by **40%**.

Considering the “3D printing of a building, using Open Source processes”, and the rise of “Collaborative Commons” it is easy to understand the future of the cost of engineering services.

Recently, Peter Diamandis has begun to teach what he calls the 6Ds.



Any technology that becomes **Digitized** enters a period of exponential growth. For example , medicine is being digitized, finance is being digitized and engineering services are most definitely being digitized.

After digitalization the technology initially enters a period of **Deceptive growth**, the doubling of small numbers all basically looks like a zero.

But once it reaches the knee of the curve, it's only

10 doublings from 1000x,

20 doublings from 1 million x and

30 doublings from 1 billion x

Such a rapid rise describes the third D, **Disruptive**.

The technology then **Dematerializes, Demonetizes and Democratizes**.

“All of these have been Dematerialized and Demonetized as apps onto your smartphone”

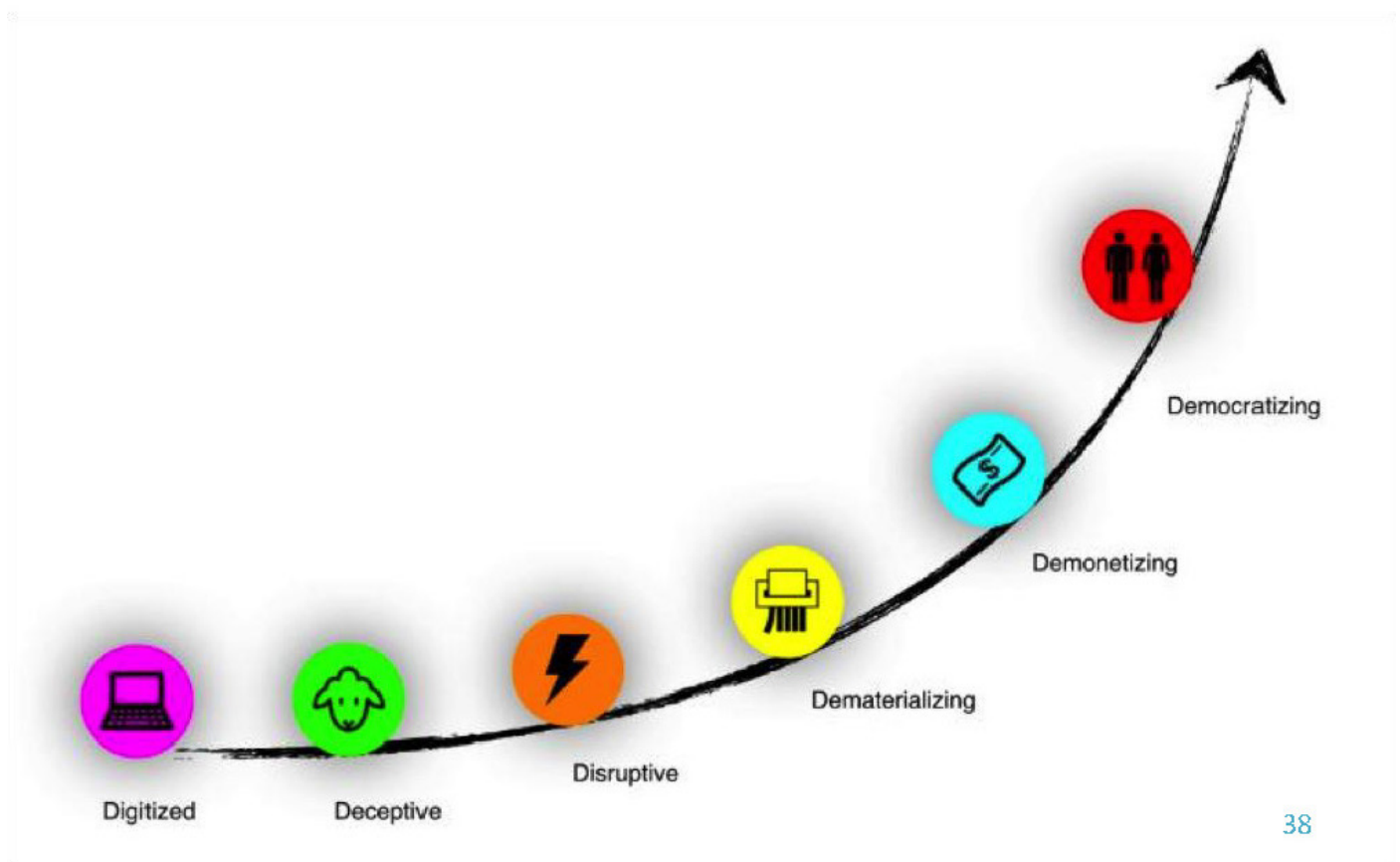
Now, after 20 years,
ALL of these fit in
your **pocket**...

... and come for **free**
on your smartphone!



The final step is Democratization.

Today a kid in his garage can upload an App onto a few key platforms reaching potentially 2 Billion people. The ability to touch humanity has been democratized .



Exponential Organizations leverage external resources to achieve their objectives

For example, they maintain a very small core of employees and facilities, allowing enormous flexibility as margins soar.

Our organizational structures have evolved mainly to manage scarcity of people, money and assets / resources

The concept of ownership works well for scarcity.

Accessing or sharing works better in an abundant, Information – based world.

Traditional organisational structures, designed over the last hundred years to manage physical assets or people, are rapidly becoming obsolete.

To compete in our rapidly changing world, we need a new kind of organisation, one that is not only able to manage this change, but also thrive on it.

Exponential Organizations have the capability to adapt- to this new world of deep and ubiquitous information and convert it into a competitive advantage.

The ExO, is in fact the appropriate commercial response to our exponential new world.

To get an idea of this flexibility let's take a look at Quirky and Airbnb

A traditional consumer packaged goods company takes up to 300 days to move a new product from invention to retail store shelves. This is considered blistering pace.

Quirky

Is an ExO in the consumer packaged goods Industry. It accomplishes this same cycle in only 29 days.



Founded in 2008

-1.400 Employees

-500.000 listings in 33.000 cities

-NO physical assets

Value: **\$10 BILLION**

This is **MORE** than



Hotels and resorts

-45.000 Employees

-550 properties

This slide shows the most successful ExOs



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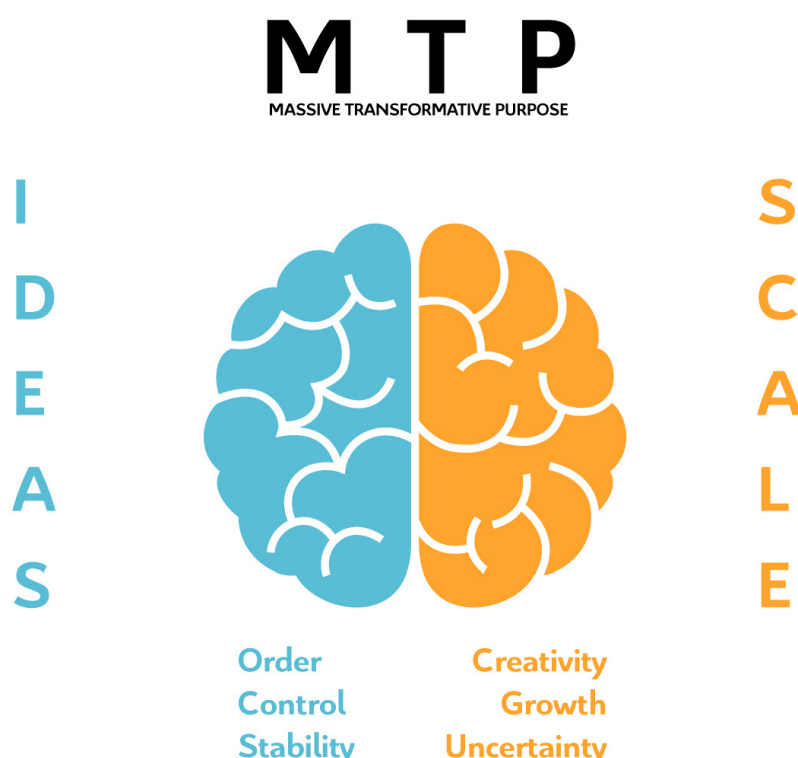
5. Massive Transformative Purpose (MTP)

Let's now examine the major characteristics of ExOs.

Based on research from Singularity University, which includes the top hundred fastest growing startups worldwide over the last 6 years, they have identified common traits across all ExOs.

- They include a Massive Transformative Purpose (MTP), as well as 10 other attributes that reflect the internal mechanisms and externalities they're leveraging to achieve exponential growth.

$$\text{ExO} = \text{MTP} + \text{SCALE} + \text{IDEAS}$$



MTP is the highest aspirational purpose of the organisation, capturing the hearts and minds of those both inside and (especially) outside the organization.

They use the acronym SCALE to reflect the 5 external attributes , and the acronym IDEAS for the 5 internal attributes.

Research indicates that a minimum of 4 implemented attributes will achieve the ExO label. A good metaphor used to frame ExO attributes is the two hemispheres of the brain. The right brain manages growth, creativity and uncertainty, while the left brain focuses on order, control and stability.

Examples of MTP

TED : “ Ideas worth spreading “

Google : “ Organize the world ‘ s information “

Quirky : “Make inventions accessible “

ExO’s attributes: 5 internal SCALE and 5 external IDEAS.

$$\text{ExO} = \text{MTP} + \text{SCALE} + \text{IDEAS}$$

M T P
MASSIVE TRANSFORMATIVE PURPOSE

Interfaces

Dashboards

Experimentation

Autonomy

Social Technologies



Order
Control
Stability

Creativity
Growth
Uncertainty

Staff on demand

Community & Crowd

Algorithms

Leveraged assets

Engagement

6) Why ExO concerns Engineering Companies

The confluence of breakthrough technologies (BIM, Cloud computing and 3D printing) different crowd-sourcing options (Collaborative Commons, Internet of Things, Social media, Collaborative Consumption and Sharing Economy), and crowdfunding opportunities create a compelling scenario for new engineering **exponential company creation**.

In fact **hundreds** of companies are now producing physical products the way software produces information in the form of video, audio and text.

It is called **3D printing** and it is the «manufacturing» model that accompanies an «Internet of Things» economy.

The **open source** design conceives the production of goods as a dynamic process in which **thousands**, even **millions**, of players learn from one another by **making things together**. While the technology is still at the Research & Development stage, it is already clear that 3D printing of buildings **will reinvent the way constructions are designed and built over the coming decades**. Engineers and architects need to be prepared for this new future standard.

7) Risks and Opportunities

Disruption is the New Norm.

Throughout every industry, the Democratization of accelerating technologies is allowing hundreds of startups to attack and disrupt traditional markets.

And while of course many newcomers won't succeed, their sheer number means that plenty will be around long enough to create a revolution.

Today, if you are not disrupting yourself, someone else is ; our future outcome is to be either disrupter or disrupted.

There is no middle ground.

8) How to manage ExO in an Engineering Company

We have created a new Engineering company by following combinations of the steps below .

Step 1: Select an MTP



1) OUR MTP:

“Collaborative Engineering, a revolution for the benefit of humanity”

Step 2: Join or Create Relevant MTP Communities

We have already created a scalable community called “The world of Collaborative Engineering “

THE WORLD OF
**COLLABORATIVE
ENGINEERING**
MANIFESTO

WE HAVE THE RIGHT TO	SHARE & COLLABORATE TO IMPROVE PARTECIPATIVE DECISION MAKING IN DEMOCRACY	TO HARNESS EVERYONE'S CREATIVITY POTENTIAL PASSION AND MAKE THE DIFFERENCE	IN ORDER TO STOP	CORRUPTION LOBBIES IMPROVISATION BARONS UNSHARING
WHY ACCESSIBLE?	TRANSPARENCY IS IMPORTANT TO COLLABORATE WITHOUT PREJUDICE & KEEP PEACE WITH THE PLANNING PROGRESS			
BECAUSE IS OPEN SOURCE	ENSURE enviromental sustainability	RESPECT THE paris cop21 agreement		
BECAUSE IS UP TO DATE & CONNECTED				
JOIN US WITH	WWW.COLLENGWORLD.COM		A CREATIVE REVOLUTION	

Step 3: Compose a Core Team

Our core Team is Composed of

- 1) CEO (Chief Exponential Officer)
- 2) PM (Project Manager)
- 3) Procurement Manager
- 4) BIM Manager
- 5) Information Technology Manager
- 6) Community Manager
- 7) Staff

Step 4: Breakthrough Idea

“Thrive in zero marginal cost Engineering “

Step 5: Build or Find a Business Model

Lean Startup model

- Immediacy
- Personalization
- Authenticity
- Findability Step

Step 6: Build the MVP (Minimum Viable Product) and Validate Marketing and Sales

TE.x aims to cut the cost of engineering services by about 60%.

Step 7: Implement SCALE and IDEAS

All 10 attributes have been implemented

Step 8: Establish the Culture

Our “open source” paradigm has been established

Step 9: Ask Key Questions Periodically

ExO attributes are evolving quickly so TE.x continually revises and updates the model

Step 10: Building and Maintaining a Platform

Our open Platform is being implemented and designed in order to facilitate peer-to-peer interaction

Now let's have an in- depth look at **SCALE** and **IDEAS** with in an Engineering Company :

SCALE

Staff on Demand

Heavy dependence on Staff on Demand as a creativity booster.

We have built a fully autonomous multidisciplinary engineering team for every target country. Key attributes include passion, imagination commitment and self starter mentality. Young people are preferred.

Thanks to the Internet, the cost of finding and tracking outside staff drops to almost zero.

For talented workers, working on and getting paid for multiple projects is a particularly welcoming opportunity.

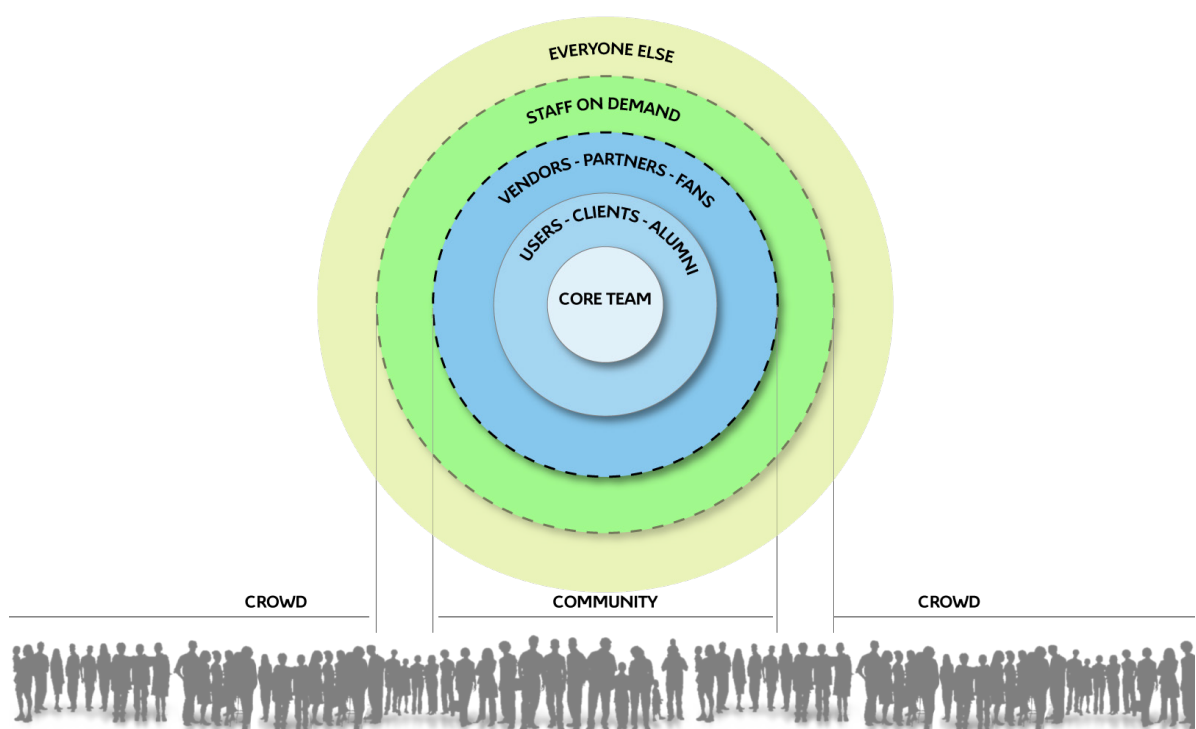
In 2010, the world had 1.2 billion people online globally. By 2020 that number will have reached 5.

Community & Crowd

Within “ The World of Collaborative Engineering “
(the community we have created) TE.x can and does leverage the entire open source community for internal work.

The world has over a trillion hours a year of free time to commit to shared projects and this number will triple by 2020.

For an organisation or enterprise, its
“community “ is made up of core team members, alumni, partners, vendors, clients, user and fans. The “ crowd “ is everyone else outside these layers.



Algorithms

Use proprietary algorithms (Machine Learning) to find and track multidisciplinary engineering teams.

Use proprietary algorithms to manage competitive tenders

Leveraged Assets

Rather than own assets TE.x prefers to rent, share or leverage them.

TE.x uses cloud computing.

The latest wave of non-asset businesses is known as Collaborative Consumption and Sharing Economy.

Engagement

TE.x listens carefully to the community and crowd, which feed directly new ideas and experiments.

Competitions are also used to challenge, leverage and motivate the community in order to solicit potentially radical breakthrough ideas.

These engagement techniques are also used to find promising people in the crowd and move them into the community.

IDEAS

Interfaces

Using 4 people within the core organisation TE.x develops special processes and mechanisms to manage, rank, filter and engage the community in a systematic and automatic way.

Dashboards

TE.x monitors Objectives and Key Results (OKR).

This information is available in real time internally, via a sophisticated, adaptable and intuitive control panel.

Cash flow is tracked in real time.



Experimentation

TE.x believes strongly in iteration and short feedback cycles, especially with clients and users.

Due to its decentralised, responsive, transparent and self-organizing company culture, there is continuous and open iteration of new ideas in every team across the organisation. To avoid chaos, TE.x has developed open, easy-to-use internal platforms and effective communication.

In this way, new team members are able to be productive from the first day they join a project.

Autonomy

Authority and decision-making are completely decentralized.

Teams self-organize, and the staff for any given project make the key decisions on that team's initiatives.

That said, everyone in the company is encouraged to contribute to and act as advisor on decisions that are being made elsewhere in the organisation.

As a result, the recruitment process is primarily focused on self-starters who have passion, purpose and potential.



Social Technologies

Internally, TE.x makes full use of social media.

Employees are encouraged to communicate through social media collaborative platforms such as Asana and LinkedIn, and to support the community organisations through these accounts.

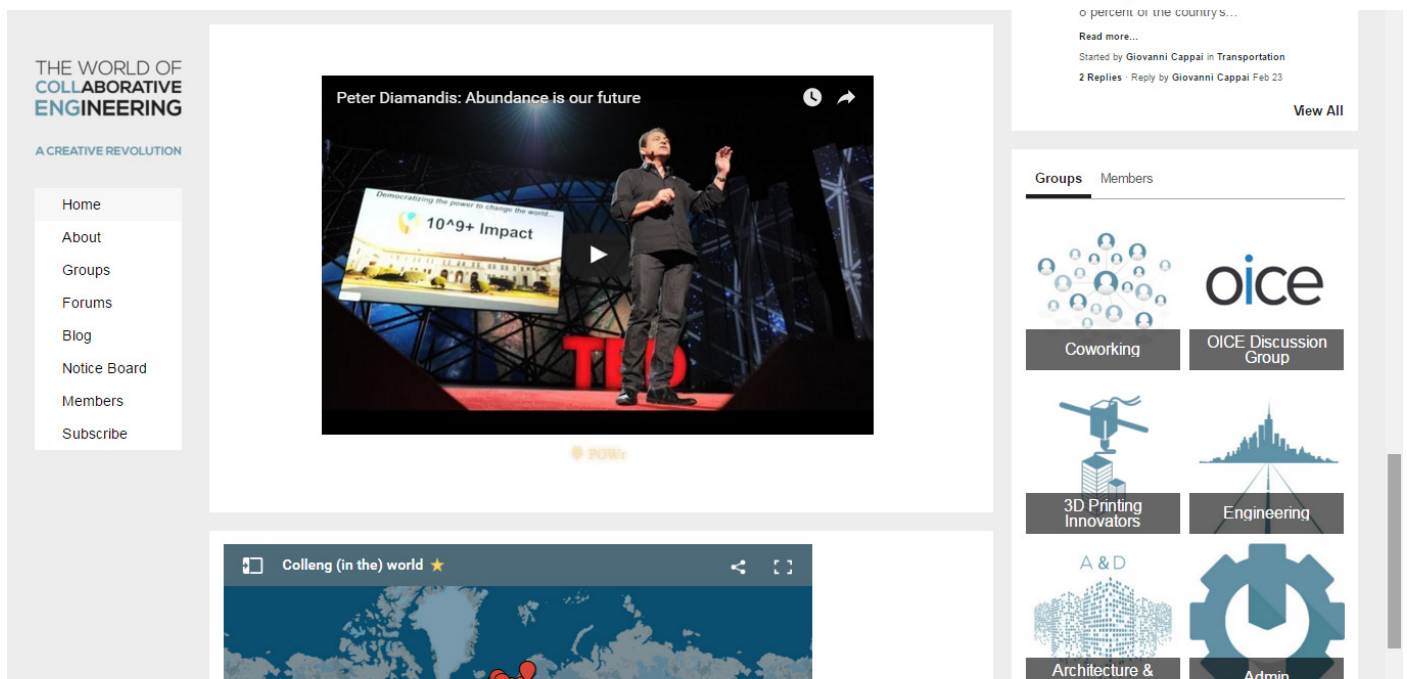
Externally TE.x, uses videoconferencing on Skype in order to provide faster conversations and faster decision cycles.

Conclusion

The Exponential Organization is the future for any enterprise with a strong information component, which is, of course, every enterprise.

You can enter this new world now or later.

But, in the end, you will enter it.



The World of Collaborative Engineering is an open source community built on collaboration, sharing, respect and transparency.

Feel free to join us on www.collengworld.com

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Note: The first part (chapter 1 to 5) of the presentation is a summary of the book “Salim Ismail, Exponential Organizations, 2014.”