
R
RADICAL
IS NORMAL
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by infonomia


01
WEIRD
IDEAS
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It may be true that there is more money available to invest in innovation, but there are also more people with ideas; the key point is that nowadays it is easier to make them reality

We live in an extraordinary time of innovation throughout the world. The literal "extra – ordinariness" can be found in the kind of news about what is around the next corner or what we have already gotten used to; projects or ideas that would never have been found except in magazines or science fiction books are now commonly found in what we would call "serious" media outlets. Radical projects have become normal. Strange ideas actually become possible. Projects like **Hyperloop**, a subsonic land transportation system based on the principle of induction could cover the 560 kilometers between San Francisco and Los Angeles in barely 35 minutes. The idea might sound "strange" at first, but maybe it sounds less strange when we hear that the guy who wants to make it happen is **Elon Musk**, co-founder of PayPal, SpaceX and Tesla Motors, projects which were definitely considered "strange" back in their day, but are a reality today.

It might also sound strange to hear rumors that Apple might want to acquire, of all things, **Tesla Motors** for an amount which could be one of the highest prices ever paid for a company. The thing is, one of the principal engines of this extraordinary time of innovation is in the equally extraordinary accumulation of capital by some leading tech companies. 178,000 million dollars in Apple's case, for instance. That cash could be invested in any one of the numerous "strange ideas" battling for the funding to make them reality. Without even leaving the topic of transportation, we find ideas such as a supersonic submarine designed in China that could join Shanghai with San Francisco in two hours. Or **Windskip**, which wants to design a mercantile ship to convert itself into a giant sail, thereby reducing its fossil fuel consumption by 60%. Closer to home, we have **Bound4Blue**, another "strange idea" conceived at the Aeronautic School of the UPC in Terrassa that's now a start-up advocating using huge sailboats to generate and store energy using the motion created by inverse turbines.

It may be true that there is more money available to invest in apparently strange ideas, but there are also more people with projects; the key point is that nowadays it is easier to make them reality. "Crowdsourcing" and "crowdfunding" have become the main driving force for apparently strange ideas that have changed millions of people's lives. For instance, using an empty plastic bottle to illuminate hundreds of thousands of shanties without electricity, which made the **"A liter of light"** project possible. Or **Glatt Stove**, a simple stove created to help avoid deforestation and the health problems associated with cooking over wood in thousands of impoverished home on all five continents.

The active participation of "the masses" in the economy creates an emerging trend to watch. There has been a huge surge in articles and books, as well as the growing number of projects, making reference to the so-called "Sharing Economy". Sometimes this is also referred to as being "collaborative" and it brings with it enormous potential to disrupt the traditional economy since the purpose is to activate assets not being taken advantage of today. This new perspective is developing in a completely different paradigm to the traditional economic context, in which if you have something, I have lost it. No, in this new "sharing economy", whatever is not shared, loses value. Here's an illustrative example: the unsustainable fact is that 95% of private vehicles sit unused 95% of the time. Car sharing companies want to make this a thing of the past.

Contrasting exactly with the traditional economy, the new paradigm of the "sharing economy" is that whatever is not shared, loses value

Besides activating untapped resources, we must pay special attention to the new abilities of the masses to generate and generalize creativity. Sectors of the productive economy are already reaping the benefits of creativity with projects such as **imcardboard**, where a community of users works together to improve an existing product already on the market. Or, this is an especially prevalent growing trend, there is more project collaboration related to 3D printing where you can share designs for all kinds of parts and objects using platforms such as **Thingiverse**, supported by **MakerBot**, a company specialized in 3D printers. Beyond the bounds of creativity, the masses have the option of participating by funding projects and ideas. **Kickstarter** is a pioneer and paradigm of the type of collective funding platform capable of disrupting a lot of different industries. Next could be the publishing realm, with readers and followers faithful to an author that fund their next book; or tech companies, now competing with gadgets whose creation and production have been financed by their future users, as in the case of the smartwatch **Pebble**.

However, besides the productive economy, this new empowerment of the people might be best demonstrated in an even more radical way- in the world of public administration and politics. One example would be **SeeClickFix**, one of the many projects that make active citizen participation possible, in this case by allowing residents to use their smartphones to report issues in their area such as a street light that has burned out or a repair needed to a sidewalk. Indeed, in the most extreme case of new participation in public life, it's clear the active contribution of 25 citizens in writing **Iceland's new constitution** using the feedback received via social media from many other Icelanders is a milestone.


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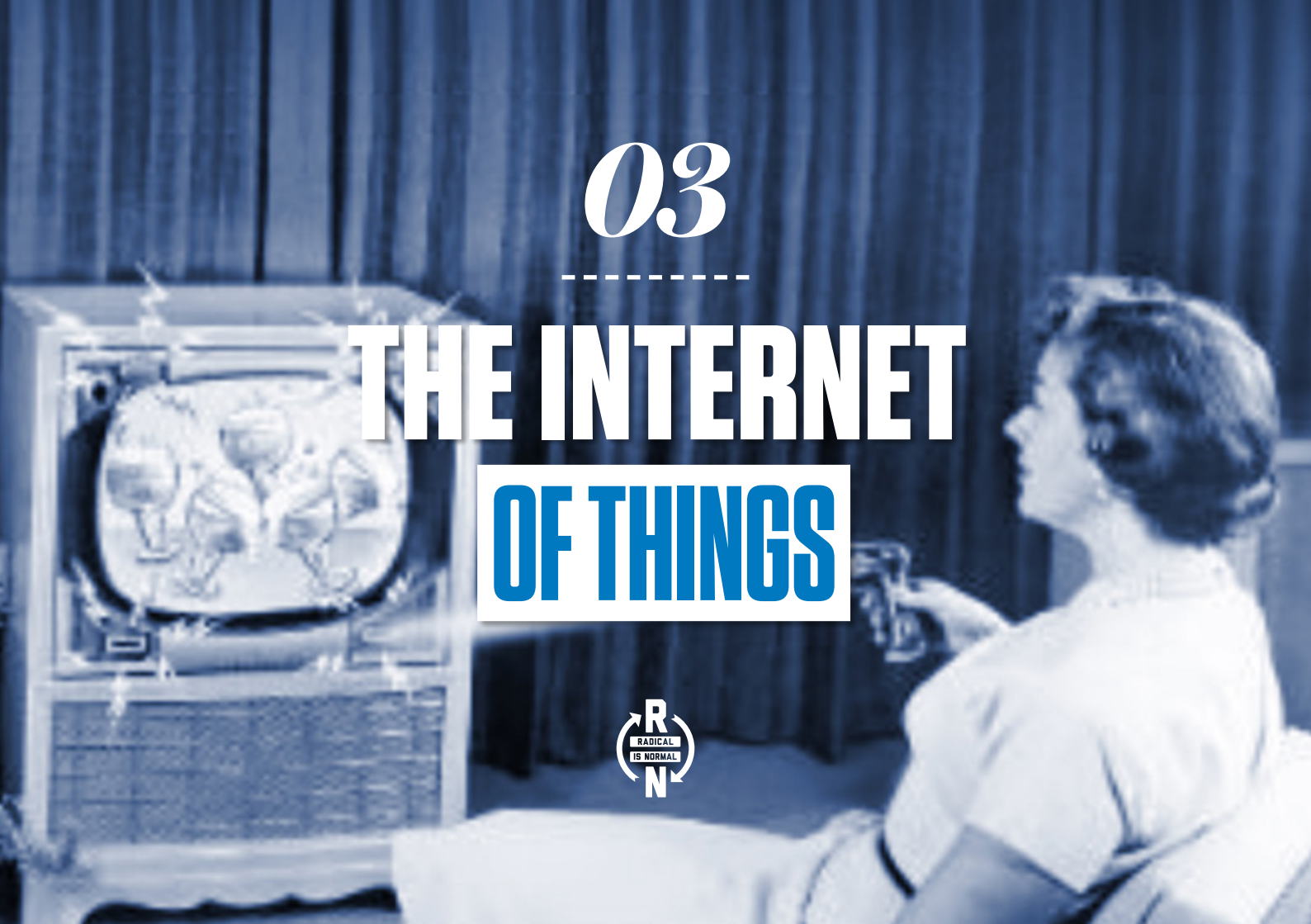
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THE INTERNET
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We don't realize up to what degree we live in a world of connected things until, for instance, our cell phone gets lost or stolen, and all we have to do is use another one to pinpoint its exact location. Cell phones have become a bundle of very sophisticated sensors, up to nearly 20 in the most advanced models, and today they might be the most familiar and paradigmatic example of the emerging and so-called "Internet of Things". Our vehicles seem to be the next step. One of the latest software updates for cars produced by **Tesla Motors** includes things such as the possibility to automatically synch our cars' speed to the car ahead of us. But even an apparently simple object like a lightbulb can now be controlled from an app on our phone. Philips' **Hue** lightbulbs work on the idea of "personal wireless lighting" which converts the concept of a simple bulb into a light transmitter that adapts to our ever-changing lighting needs.

No manufacturer will survive the next couple of years without adding intelligent, connected products to their catalog

As pointed out recently by **Michael E. Porter** in **Harvard Business Review**, no manufacturer will survive the next couple of years without adding intelligent, connected products to their catalog. Now that we've finally gotten used to talking about "smart" phones, now we will be using that word to refer to a wider and wider range of objects. For instance, a tennis racket by **Babolat** uses sensors to improve player performance by collecting data such as: speed, force, contact point, amount of forehands and backhands etc. A similar example can be found in the newest athletic shirt by **Ralph Lauren**; it can log a user's biometric data and send it back to a tablet or smartphone in real time.

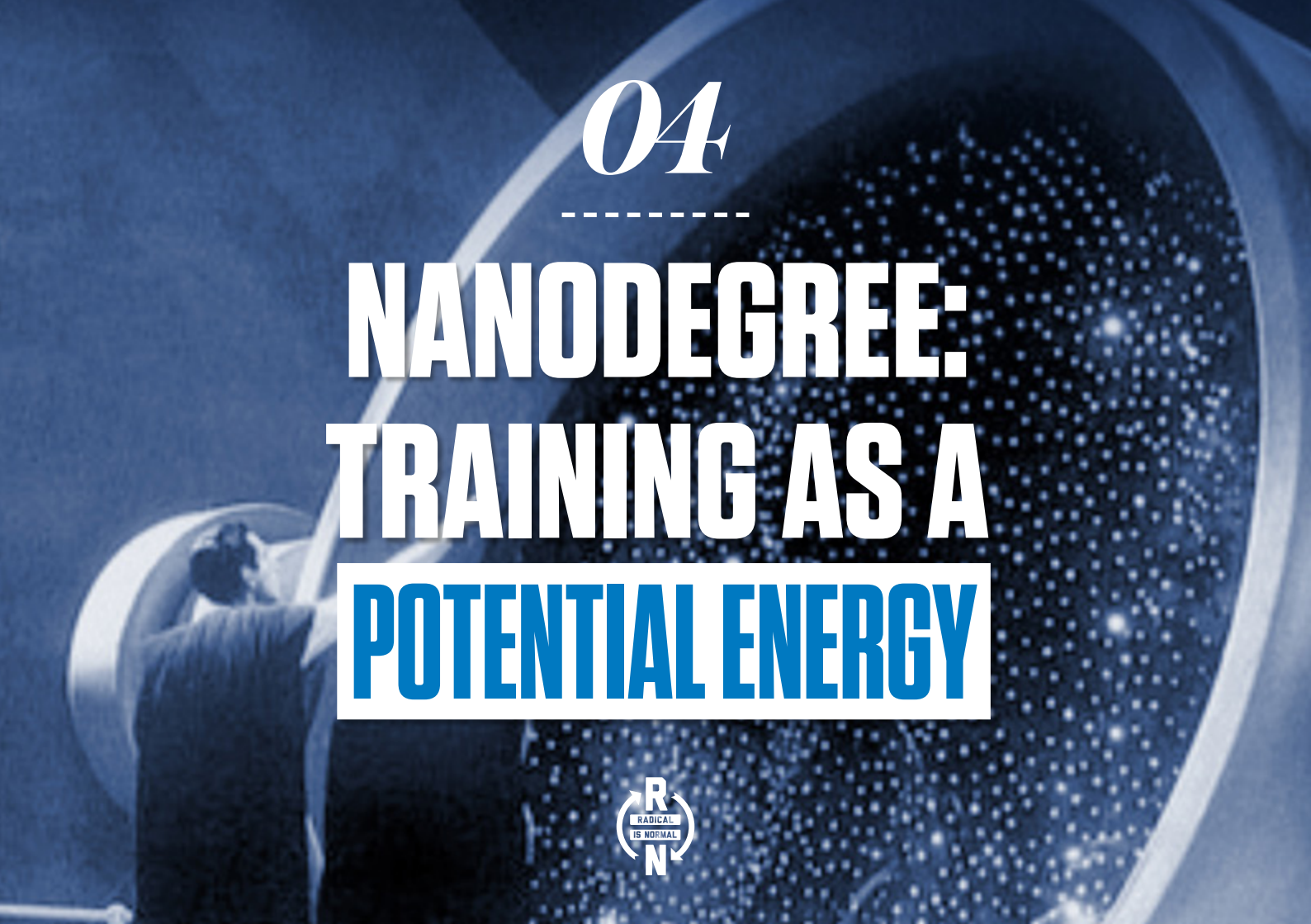
As many similar examples illustrate, objects are currently becoming "smart" with the mere objective of **monitoring**. In some other cases, they go a step further and make **control** possible. But the true potential for product connectivity will be accompanied by **optimization** or even **independent operation**. We have to go no farther than an object as simple as the humble fan to find an example. **BigAss Fans**, for instance, commercializes one that is not only sensitive to current conditions by detecting temperature, humidity and human presence in the room, it can also learn the users' preferences and adjust to them. The same idea is being used, albeit in a completely different league, by **General Electric**, who are placing sensors on their turbines and engines. Another use of this intelligence and connectivity is being applied by the Basque firm **Nem Solutions** to their wind turbines and locomotives. These examples are already proving what Porter predicted in the aforementioned article: we are moving from products to systems; and from systems to a system of systems.

New technologies allow us to teach very differently than we have done in the last century and a half. If we still teach the solar system, for instance, how we did 40 years ago, it must be because we want to: we have simulation tools that would allow us to illustrate it in a much more exiting way. Teaching and training are currently undergoing a latent revolution that has not emerged with as much force as it should. For some, this revolution will occur when certificates from alternative training systems are given the same validity as those obtained in traditional educational centers and formats. However, perhaps the true educational revolution will be in skill-based training rather than knowledge-based training. Or in generalizing the channels and formats that permit taking advantage of any context or moment to learn. The idea of offering skill-based training in doses or even microdoses come from this latent demand. This concept is illustrated by innovative proposals such as the new 2-day courses in the **MIT** program, or in **TechShop**, an academy specialized in all sorts of varied manual skills taught 24/7 in small workshops lasting just a few hours.

Perhaps the true educational revolution will be in skill-based training rather than knowledge-based

The success of **General Assembly** is also proof of this emerging demand. It is a new concept of business school, aimed at entrepreneurs and start-ups, which offers short courses lasting 2-3 weeks or 2-3 months or even a few hours. They give courses on technology, design or management skills in such diverse, specific topics as "Data Science" or "How to get your start-up into an accelerator". Spanish enterprise **Foxize** is based on a similar concept and offers an extensive catalog of 3 hour mini-courses to businesspeople looking to brush up on Digital Business skills. But we really owe "Nanodegrees" to **Udacity**, the training platform that coined the term and has found success with its business model. In partnership with leading edge tech companies, who know what their future hiring needs are, they create and deliver certification courses for professional skill sets based on a "learning by doing" methodology.

Other companies decide to become educational organizations, especially when the know-how or training offered is directly linked to their products or services. This is the case of **Apple**, who recently announced their intention to offer programming courses in retail stores, or the free 3D printing courses given by **Stratasys**, world leader in the field. Businesses are also lining up along a path taken just a few years ago by universities or other training centers, who now offer hundreds of free courses online. Some deliver courses directly and others opt for platforms such as **Coursera**, currently offering more than 1000 courses to their 12 million users. Coursera recently announced their intention to center their efforts on the skills unemployed people lack.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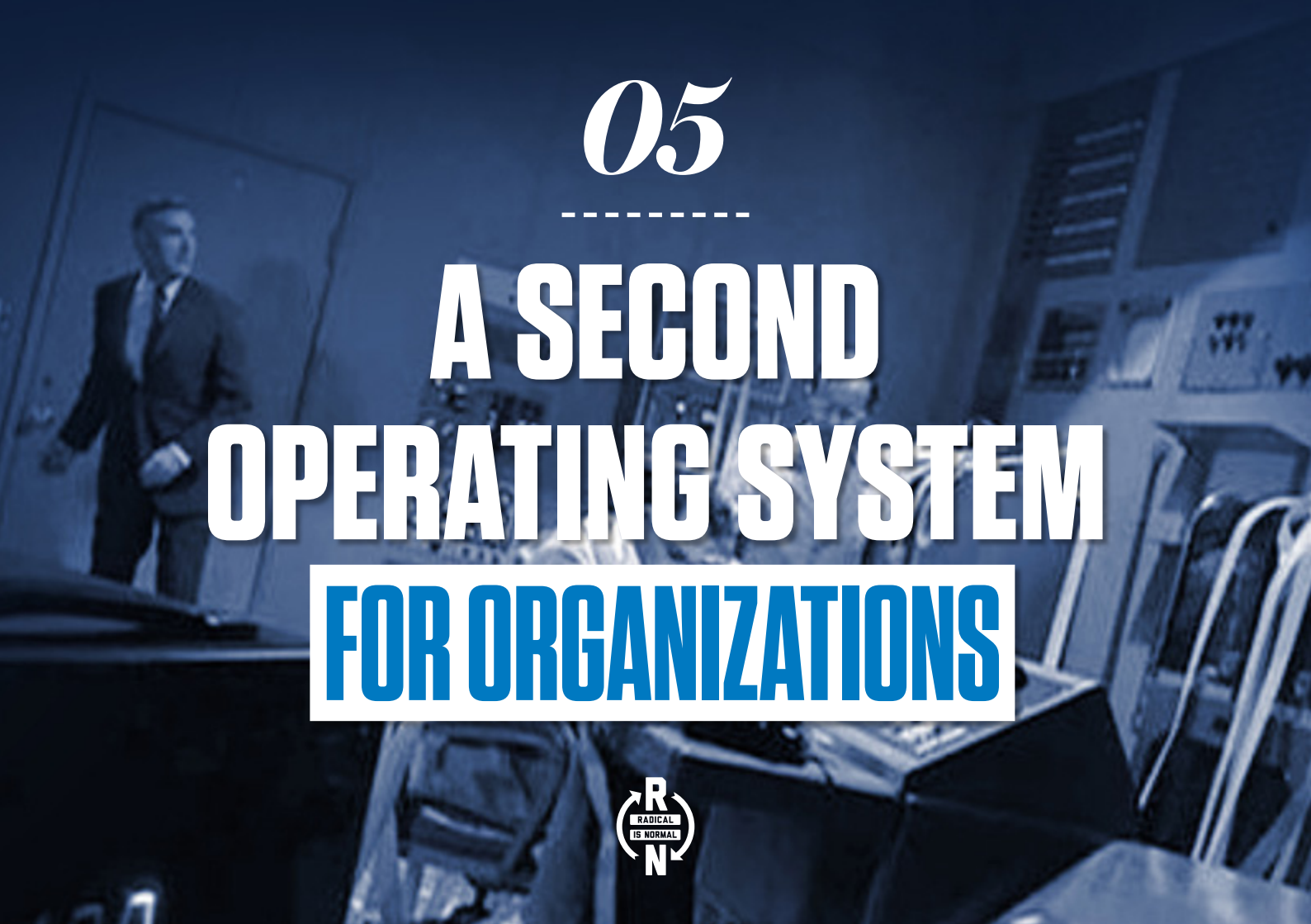
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A SECOND
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To deal with the exploit-explore dichotomy, businesses must simultaneously run dual "operating systems"

The world, markets... both move and transform at an ever-accelerating pace. Companies and all sorts of organizations are not capable of reacting efficiently to these changes. And it is impossible, or nearly so, to react efficiently coming from traditional organizational and operational structures based on hierarchy and bureaucracy. One solution that is gaining traction in the face of this contradiction is to recognize that companies must simultaneously work with two "operating systems". It's not too different than the way our brain works, as has been pointed out by psychologists such as **Daniel Kahneman**: our fast-thinking emotional system co-exists with another slower and more rational system.

The same thing should happen in companies. At least that is what **John P. Kotter** proposes in his book *Accelerate*. If we want to run our business efficiently, the only way we know how is by using bureaucratic and hierarchical systems. However, if we also want to be able to keep up with emerging challenges and opportunities, we have no choice but to use a completely different operating system that runs simultaneously to the first. Kotter proposes setting up a "volunteer army" within the company to strike quickly in the face of these changing circumstances. The volunteer army should be organized into networks, and it's crucial to maximize the variety of profiles in each group. As his research has shown, a group's success and creative abilities are largely determined by its open nature. We must foment diversity if this dual operating system is to work in companies.

Not far from this concept of dual operating systems, accelerators continue to become more and more popular. A growing number of companies are choosing to create innovation ecosystems with a "solar system" structure to surround them with smaller, more agile organizations that can supply the ideas and innovation they need. This is what **Nike** and **Disney** have done, and what the **Marriott** chain is trying to do in gastronomy-related innovation, or the case of the veteran incubator **Wayra**, by **Telefonica**. Innovation can also be internally boosted starting with simpler concepts. **Adobe** has launched an in-house booster project for internal entrepreneurship using **Kickbox**, a kit that comes with four elements to get your idea off the ground: innovation tools, instructions, caffeine and sugar (in the form of a Starbucks gift card) and, significantly, a pre-paid card with $1,000 on it. The essential value of the kit, besides the tangible items, is that it transmits a very important message to Adobe's employees: you have permission to work on your idea.

One of the ways to break down the lack of innovation in large enterprises is by fomenting experimentation. As a recent report from **McKinsey** states, the first step to making innovation more efficient is allowing the decision-making process to depend upon experimentation instead of bureaucracy. Science learned to experiment over the last couple centuries, however for the business world the concept is still strange and unknown. Opening up channels and facilitating tools for companies to learn from the scientific model is a task we have not yet undertaken.

Today we could not discuss experimentation in a business environment without referring to the ideas of prototypes and how they are now becoming an indispensable component in any innovation process. Proof of this growing importance is the coverage in a recent issue of **Harvard Business Review**, in which they encouraged innovating right now, using experimentation and prototypes and as quickly, cheaply and intelligently as possible. In fact, a growing number of organizations like **Google Ventures** are adding processes like **Design Sprint** to their innovation methodology in order to vet the potential of their ideas. In Design Sprint, you must rapidly design and build a prototype that allows for client testing in just five days. Using workspaces to favor prototype building is another one of the aspirations of Google Venture, where they have devised the so-called **War Rooms** specifically designed to build and test prototypes. Urban spaces are not far behind, and could also be an ideal space to experiment and build prototypes. A growing number of cities have set out to become a laboratory or a test bank for projects under development. Barcelona, for instance, has created a platform called **Barcelona Prototyping** to give visibility to the resources that the city offers to individuals or organizations that want to make their ideas reality.

Science learned to experiment years ago, however for the business world the concept is still strange and unknown

Besides methodologies or facilities, cases like the entrepreneur **Manu Prakash** are also an example of the new focus on prototypes as the beginning of all efficient innovation. The work of Prakash, of Indian origin and with years of experience in Africa, is based on the idea that we no longer have sufficient resources to innovate in the same way we have in the past. His idea lab specializes in rethinking projects already on the market to make them affordable for the BoP world population. The **Foldscope**, a microscope made from cardboard, or the **OScan**, which can make any smartphone into an oral cavity scanner, are some of the things that have emerged from his lab.

06

BRING EXPERIMENTATION TO INDUSTRY


07
STEAM:
INVENT TO LEARN
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Promoting the subjects included in the acronym **STEAM** will be one of the main indicators of what is just around the corner in education. STEAM = Science, Technology, Engineering and Mathematics as well as the recently added "A" for Art, in other words the creativity needed to use the knowledge derived from the other subjects in an innovative way. The concern that children and young people are not interested in the subjects that will be the most necessary in the future has created a movement whose objective is to turn that trend completely around. Without a doubt, a large part of children's apathy towards these subjects come from the way they are taught. For this reason, the STEAM movement is accompanied by a shift in the pedagogical model, by an urgency to find new ways to teach and learn.

The STEAM movement brings with it a shift in the pedagogical model, an urgency to find new ways to teach and learn

One initiative is to create a completely different relationship with technology, and **Kano** is a good example. Meant to be a child's first computer, it comes in a kit which first must be put together and programmed to work properly. **Osmo** is similar in that that it is a gadget that can make any tablet into a self-learning tool based on discovery, instantaneous stimulus and blending the line between the digital and physical world. It will be truly significant to see the results of the new competition by **XPrize**, which will award a total of 15 million dollars to the winning proposals that come up with a model that facilitates autonomous learning for children in developing countries, starting with the basic concepts of reading, writing and arithmetic. As this model has proven for other challenges in different areas, **XPrize Global Learning** challenge participants could achieve a one to two million dollar investment in the much needed re-invention of the learning process.

The good news is that this revolution is closer to us than we think. There are many trail-blazing schools that are promoting the STEAM subjects and have been for some time. Schools such as Barcelona's **Escuela Montserrat** have long reaped the benefits of using new tools and innovative learning systems for these subjects. As proof, nothing better than hearing from their own students. They gush about their experience learning with projects where you work with diverse materials for a common goal; projects that allow students to "do things we like, and we remember new concepts much better"; projects where you also learn hands-on skills not taught in a book: teamwork, compromise, learning from peers or sharing know-how.

A growing number of projects aspire to change or improve the way power has been given and exercised

We can't talk about the future without mentioning the current buzz of ideas, debates and projects having to do with reinventing power. Public opinion has grown to support the need for a major overhaul in how power has been given and exercised over the last few decades. There seems to be a common thread in the different stances: the growing economic inequality in which today the wealthiest 1% of the population control 99% of global riches. Social movements such as **15-M** in Spain or **Occupy Wall Street** in the U.S. are reactions to this demand to reinvent power. These movements, in contrast to their historical predecessors, are not foreign to the middle classes, who also recognize the threat to their present and future.

Vaclav Smil has studied wealth and his analysis highlights how the middle class is losing ground after having historically depended upon manufacturing and industrial production which the world's most advanced economies are now leaving by the wayside. Smil believes that one of the first consequences of a disappearing or significantly dwindling middle class will be the rise of populist policies. The origin of the current growing inequality is partly due to the executive class that set their compensation based on their stock market value of the companies they led. Hedge funds applied the so-called "Phoenician Formula" and also make their money based on the stock market performance of companies they managed. In summary, a controlling economic class was created that did not generate wealth by creating value, but by commercializing it. **Thomas Piketty** has received worldwide attention for his work reviewing capitalism in the 21st century, where he proposes solutions such as introducing a global wealth tax to control capital exchanges between countries.

However, the rhetoric around reinventing power is purely political, not financial. More and more projects aspire to change or improve how we choose politicians. Many studies have shown that truly informed voters cast their votes in a significantly different way. Projects that strive to reinvent power by using new technologies not available just a few years ago are on the rise. **Osoigo**, a Spanish start-up aiming to facilitate political transparency, has created a site where public figures can respond directly to questions by citizens. **Intuitive Voting** endeavors to improve electoral processes by using an app that simplifies each voter's access to information. Another app, **Informacam**, is a tool to verify the images collected by regular citizens. Besides technology, others propose reducing the number of direct voters in exchange for more representation by a trusted delegation. Other even defend implementing political representation systems based on algorithms, similar to **Google PageRank**.


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09
EXPONENTIAL
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We have barely gotten used to 3D printing when new possibilities emerge from that technology that surprise us again

Many technologies no longer go through a progressive evolution. There is an exponential pace of innovation in some fields. This is the case of the area of new material creation, for instance, in which Nano manufacturing can now produce iron 10 times stronger than before. Thanks to its properties for manufacturing electronic circuits the size of a molecule, **Corannulene**, a recently discovered carbon molecule, has been nicknamed "the new graphene". Venturing outside the lab, **Rovalma**, in their foundry near Barcelona, has successfully made steel with properties considered impossible just a few years ago. Robotics is another field taking giant steps. Robots can now be equipped with image recognition capacities that allow them to put objects in the correct order regardless of where they are positioned on the assembly line. This was unthinkable not so long ago, but the industrial robots at **Fanuc** prove it to be true.

We have barely gotten used to 3D printing when new possibilities emerge from that technology that surprise us again. That is the case of **Voxel8**, a 3D printer which can print an object in three dimensions while printing an electronic circuit on it as well. Meanwhile, the idea of **4D printing** starts to make waves, the idea of printing objects that change after a certain time, after coming into contact with certain conditions (temperature, for example). Perhaps the world of smartphones is the best representative of exponential technologies that we have right now. For instance, **Columbia University** has recently launched a gadget for smartphones that lets you test for AIDS in barely 15 minutes. We also have **Peek**, an app that allows you to carry out a professional eye exam with just a smartphone. Energy is another field which is constantly undergoing changes that seem to overtake the last one. Proof is in **Tesla's** recent announcement of future production of a new type of battery which can supply energy not to vehicles, but to entire homes.

Exponential innovations could also be considered those which emerged from projects that didn't seek just any sort of improvement, but were created expressly to generate significantly disruptive advances. This is the case of **Singularity University**, a project with names such as Google or NASA behind it, whose mission is to make reality ideas that could positively affect the lives of no less than 1 billion people in no more than 10 years. Along similar lines, we have the **Solve** project by **MIT**, which brings together the world's sharpest minds to find exponential solutions to problems in four main areas of need: education, health, energy and manufacturing.

Watson, the Artificial Intelligence Project by IBM that we talked about in the first edition of *Radical Is Normal*, has started to be put to use. The **University of Toronto** has created an application for Watson that helps attorneys do research work for legal proceedings. Within this same field, research indicates that analysis of the data generated in the proceedings means it could even be used for sentencing. For now, IBM has confirmed they are developing a much demanded, but less "glamourous" application: finding a more efficient and less stressful way to deal with incoming email. Watson will use a logarithm that learns over time from our actions and decisions when dealing with our virtual mailbox.

Applications like these, and others that will be here before we know it, pose the important question of how to deal with the consequences of intelligent systems that can replace man, even in those intellectual or cognitive functions which have been exclusive to humans up to now. Lately, well-known people such as Bill Gates or Elon Musk, among others, have expressed their concern about advances in Artificial Intelligence which we, as a society, are not prepared for. In their book, ***The Second Machine Age***, **Erik Brynholfsson** and **Andrew McAfee** state that a solution for a world of machines more intelligent than us is simple, we must make them even more human. That is to say, they suggest we foment the human qualities such as creativity, intuition or human empathy differentiating us from these intelligent systems.

From the point of view of industry, Brynholfsson and McAfee believe the solution is joining forces with the new capacities promised by Artificial Intelligence so that, together with the distinctly human qualities, they can respond faster to change. Growing acceptation for the idea of "**Responsive Organizations**", or business that can quickly react and adapt to changing market environments; companies able to produce prototypes and test ideas agilely; companies and businesses that set themselves up in networks, that learn faster so as to answer all that which seems so radical today, but that will be normal much sooner than we think.

The idea of "Responsive Organizations", or organizations with a special ability to quickly react and adapt to changing market environments, has been established


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Building
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