14 Tech Predictions for our World in 2020

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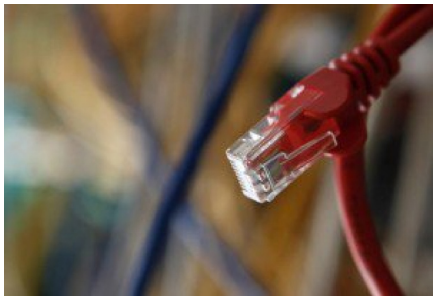
We asked our 2015 intake of Technology Pioneers for their views on how technology will change the world. From printable organs to the "internet of everywhere", here are their predictions for our near-term future.



(1) The 'humanized' internet

The evolution of modern connectivity is often summarized as: the internet – the world wide web – mobile devices – big data/the cloud – the internet of things. For the next stage, it seems inevitable that even more personalization will be an important component. What we refer to as the internet of things will be central. However, more than simply connecting humans with devices, the next stage in connectivity will include "humanized" interfaces that constantly evolve to understand the user's patterns and needs and, in a sense, self-optimize. This would include the functions and features on our devices, as well as the selection/curation of information we receive. It may not be the kind of artificial intelligence found in science fiction, but I expect this injection of personalization will bring monumental changes as our level of connectivity continues to grow. Sirgoo Lee, co-CEO of Kakao

(2) The end of the 19th-century grid

One of the biggest changes we will see, or at least have made substantial progress towards 2020, is global electrification. In the US and Europe, most people take electricity for granted. But that is not the case in many parts of Latin America, Africa and Asia. More than 1.3 billion people still aren't connected to the grid. More than 1.5 billion people still don't have regular access to electric light: they use oil lamps, which are a safety hazard. Even where the grid exists, it is fragile: power blackouts are a major problem in many megacities. Power theft also plagues Brazil, India and South Africa. Safe, reliable power will have a transformative effect on these countries. Not only will there be near-term benefits such as greater productivity, but we will see long-term quantum leaps in educational achievement, healthcare and quality of life. These communities don't have power now because our 19th-century grid is too expensive. The advent of new technologies is changing both the business models and use-case scenarios to make it possible. In a few years, the world will finally, truly, be wired. Amit Narayan, CEO of AutoGrid

(3) The end of scarcity

The world said humans were not meant to fly, and hundreds of years of human invention had been unable to make it work. But in a small bicycle-repair shop, two brothers with no government funding and only a basic education had a vision and a will to invent. And in 1903, thanks to the determination of these two unsuspecting inventors, humans flew. The distance of the first human flight was 120 ft. Years later, one of the inventors of that breakthrough would marvel that the wingspan of modern airplanes

was longer than the entire distance his first plane had flown. The potential of technology is limited only by our imagination and our will. Abundance of water, food, clean air … peace: the end of scarcity in the supply of our basic needs is possible. Perhaps not by 2020, but it starts with the dream, the determination to turn dreams into reality, and the understanding of this truth, so well embodied in the invention and rapid evolution of human flight: that all things are possible. Mark Herrema, CEO of Newlight Technologies

(4) Fewer fancy phones, more fulfilment

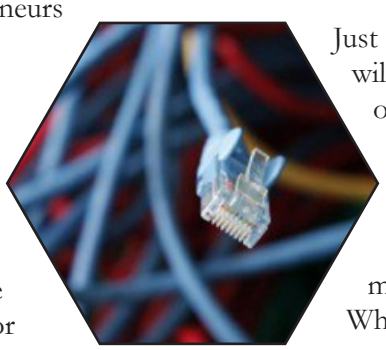
The world many of us live in is changing at an exciting pace. Innovations are generating new gadgets, more convenient services and greater opportunities. But many of these changes target a small percentage of the globe's population. In the villages I've worked in, nobody has seen an iPhone or can download an app. However, there is tremendous room for entrepreneurs to adapt innovations intended for the wealthy to serve the world's poor. Solar panels and LED lights, designed for sale in rich nations, are stimulating growth in commercial off-grid electrification in India and Africa. Mobile telecommunication is being used to facilitate financial inclusion in developing countries across the world. Once-expensive

medical procedures can be done amazingly cheaply. Even the financial sector is innovating in order to reach the world's poor; as well as investors looking for opportunities that not only help them increase their net worth but also improve the world. Better financing opportunities are opening up for social entrepreneurs who build businesses to serve the poor profitably. I see a slight but significant shift in innovation, that instead of producing fancier phones, we will create more fulfilling lives for people who have been mostly ignored to date. Nikhil Jaisinghani, co-founder,Mera Gao Power

(5) Cheaper, more widespread solar power

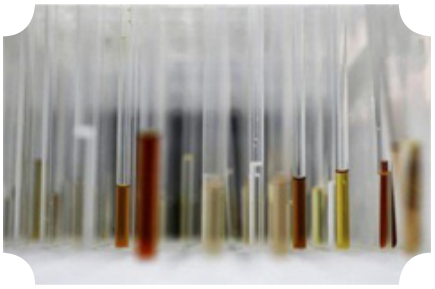
By 2020, solar technologies could account for a significant portion of global power generation, helping economies and businesses guard against rising energy costs and the impact of climate change. However, finding opportunities to further reduce the cost of solar technologies will be key to unlocking this potential. Because polysilicon, the primary raw material used by solar module manufacturers, is the single largest cost in the solar supply chain, it represents the most significant opportunity for cost reduction. Over the next several years, new lower-cost methods of polysilicon production will commercialize, providing the solar industry with a more affordable source of raw material. In turn, these cost improvements will trickle down throughout the solar supply chain, accelerating the adoption of solar energy around the world and helping the industry realize its global potential. Terry Jester, CEO of Silicor

(6) Internet of things no longer about things



Just about every business will become an internet of things (IoT) business. The convergence of the digital and physical worlds makes this inevitable. When the products companies sell are connected 24/7/365, dynamic and ever-improving value can be delivered to customers throughout the product's life cycle. This will become the norm. Therefore, launching a successful IoT business requires a fundamental shift, a transition from product-centric to service-centric business models. Companies looking to capitalize on IoT will become IoT service businesses. Operations dependent on one-time product sales will become obsolete as business value moves from products to the experiences they enable. This transformation will fundamentally change how businesses operate,

interact with customers and make money. Those who recognize that the internet of things is not about things but about service will be positioned to meet these new customer demands, unlock new sources of revenue and thrive in this connected world. Jahangir



Mohammed, CEO of Jasper Technologies, Inc

(7) New cures from the bacteria that live in the human body

In life sciences, we will have greater understanding of the dynamics of how our microbiome – the tiny organisms, including bacteria, that live in the human body – influences multiple systems in our body, including our immune systems, metabolic processes and other areas. This will result in seminal discoveries related to a variety of conditions, including autoimmune diseases, pre-term birth and how our metabolism is regulated. Regenerative medicine approaches to creating new tissues and organs from progenitor cells will expand significantly. Finally, the long-awaited ability to employ precision medicine, providing specific treatments to a specific patients, will become much more common. Mark Fischer-Colbrie, CEO of Labcyte Inc

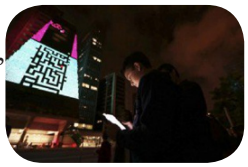
(8) The beginning of the end for cancer

The emergence of real-time diagnostics for complex diseases will mark the beginning of the end of their debilitating reign by 2020. The ability to monitor cancer, the dynamic immune system, intestinal flora and pre-diabetes in real-time will change the nature of medicine and usher in a new era of human health where wellness is protected versus illness treated. As a result, fundamental shifts in healthcare will occur, causing it to become largely preventative rather than fire-fighting. It is far more productive and economical to stop a fire from happening in the first place than to rebuild something after the fire has taken its course. Helmy Eltoukhy, CEO of Guardant Health

(9) Data-driven healthcare

The amount of data available in the world is growing exponentially, and analyzing large data sets (so-called big data) is becoming key for market analysis and competition. Analytics will dramatically shift away from reporting and towards predictive and prescriptive practices, dramatically improving the ability of healthcare providers to help the ill and injured. Even more importantly, it will create the possibility for truly personalized healthcare by allowing providers to impact the biggest determinants of health, including behaviours, genetics and environmental

factors. John L Haughom, MD, senior advisor, Health Catalyst



(10) Printable organs

Today, we are already at a turning point in our ability to 3D "bioprint" organ tissues, a process that involves depositing a "bio-ink" made of cells precisely in layers, resulting in a functional living human tissue for use in the lab. These tissues should be better predictors of drug function than animal models in many cases. In the long-term, this has the potential to pave the way to "printing" human organs, such as kidneys, livers and hearts. By 2020, our goal is to have the technology be broadly used by pharmaceutical companies, resulting in the identification of safer and better drug candidates and fewer failures in clinical trials. Keith Murphy, CEO of Organovo

(11) The 'internet of everywhere'

We are on the verge of the "internet of everywhere". It will be far more democratic: accessible to everyone, rich and poor. The excitement of the internet of things will be a small footnote in history as the internet of everywhere becomes our reality. Do you remember the old movie, Minority Report, with Tom Cruise? Ultra cheap, internet-enabled solar-powered screens that display in HDTV resolution will be on bus stops, in shopping centres, at tables in restaurants – all operating on a centralized advertising model. Gone are the days of the static acetate poster on the wall of a shopping mall. And finally, since these HD monitors have beacons, they will

dynamically change content as your phone passes by, telling the monitor all your preferences. Yobie Benjamin, COO of Avegant

(12) Renewables will power mobile networks

We have become dependent on mobile communications in our daily lives, but the dirty secret is that mobile networks around the globe are notoriously energy inefficient. In fact, we are stuck with outdated mobile network technology that basically performs as poorly as incandescent lightbulbs, with the result that 70% of the energy used is wasted as heat. By 2020, we predict that pioneering innovations in radio engineering will have a positive impact on the world's economy, environment and quality of life. We even foresee a time when advances allow renewable energy to power the mobile industry, helping bridge the digital divide and extend communications to the 1.7 billion people living off-grid. Mattias Astrom, CEO, Eta Devices

(13) Learning on the job will never stop

The skills gap is actually an information gap. The problem is not that workers are unskilled; it is that workers do not know what skills employers need. Technology is already disrupting existing jobs, and creating new jobs that never existed before. In fact, the top 10 in-demand jobs in 2010 did not even exist in 2004. Change is happening so rapidly that 65 percent of today's grade school kids in the U.S. will end up at jobs that have not even been invented yet. How will our education institutions keep up? Today, there is a disconnect between education providers and employers.
In the future, however, technology will enable education and training to respond dynamically to real-time labor market changes. With widespread access to training and courses online and available on-

demand, workers can be informed of skill updates while they work, and will regularly top up their education with the skills they need to remain relevant in the workforce. Alexis Ringwald, Cofounder and CEO, LearnUp

(14) Wastewater is an asset, not a liability

Water is one of our most precious resources, yet our infrastructure is failing. Driven by global population growth and rising water scarcity, the UN reports that 75 percent of the world's available freshwater is already polluted. Under-investment in water management is exacerbating the problem, causing serious impacts on human health and the environment. A key challenge is the high capital cost, and high energy requirements, of current wastewater treatment and management systems.
By 2020 I predict that a new class of distributed systems, powered by advances in our ability to use biotechnology to extract resources, such as energy, from waste, and the dropping cost of industrial automation, will begin to change our approach to managing water globally. Rather than a liability, wastewater will be viewed as an environmental resource, providing energy and clean water to communities and industry, and ushering in a truly sustainable and economical approach to managing our water resources.
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