

FOR INQUIRING MINDS, MAY 25, 2012

THE FOLLOWING ARTICLE FROM DISCOVER MAGAZINE OF APRIL 2012 BY PETER DIAMANDIS AND STEVEN KOTLER PRESENTS A MORE POSITIVE VIEW OF THE FUTURE THAN WE HAVE EXPRESSED IN OUR DISCUSSIONS. THE ORIGINAL ARTICLE AND ITS GRAPHS ARE IN COLOR AND COULD NOT BE REPRODUCED IN BLACK AND WHITE, SO ARE PARTLY COPIED OR SUMMARIZED HERE---- GEORGE BAIL

AGE OF ABUNDANCE

Technology is driving us toward an era of exhilarating freedom, economic opportunity and the profound gift of health.

It is a blizzard of bad news out there: an ongoing economic crisis, a burgeoning education crisis, health care turmoil, energy poverty, water scarcity - to name but a few of our fears. So pervasive is our sense of doom and gloom that anyone telling a different story can rarely be heard. But there is a very different story worth hearing.

Currently, thanks to the exponential growth rate of technology combined with three powerful emerging trends, we are teetering on the edge of a much better tomorrow. Imagine a world where everyone has access to clean water, nutritious food, affordable housing, personalized education, top-tier medical care, nonpolluting and ubiquitous energy. Imagine a world of abundance.

Sound too good to be true? According to some compelling trends and metrics, elements of the transformation are underway. Over the past 20 years, wireless technology and the internet have become ubiquitous, affordable, and available to everyone. Africa has skipped a technological generation, bypassing the telephone landlines that stripe our American cities for the wireless way. Mobile phone penetration in Africa is growing exponentially, from 2 percent in 2000 to 28 percent in 2009 to an expected 70 percent in 2013. Folks with no education and little to eat have gained access to cellular connectivity unheard of just three decades ago. Soon the vast majority of humanity will be enmeshed in the same World Wide web of instantaneous, low-cost communication and information. We are now living in a world of information and communication abundance.

In a similar fashion, computers, networks and sensors, artificial intelligence, robotics, biotechnology, 3 dimensional printing, nanotechnology, human machine interfaces and many other tools are also advancing exponentially. In the near future these technologies will enable most of the world to experience what only affluent societies have access to today. Even better, the new tools are not the only agents of change in play.

There are three additional forces at work, each with significant abundance producing potential. The first of these is the newfound power of the do-it-yourself (DIY) innovator. DIYers have already proven themselves capable of launching a computer revolution, and

now their reach extends considerably further. In the past decade, DIYers (working either in small teams or collectively via crowd sourcing have made major contributions to fields like genetics, robotics, proteomics, autonomous vehicles, even space exploration, fields that were once the sole province of large corporations or governments.

The same technologies that allowed the rise of the DIY innovator have also created wealth much faster than ever before. People like Jeff Skoll (the former president of eBay) Elom Musk (co-founder of PayPal) and Bill Gates (Microsoft) became billionaires by reinventing industries before the age of 35. Maintaining their taste for the big and bold, they are now turning their attention and their considerable resources to global betterment. This new breed of technophilanthropist is a force for abundance as well.

But the most significant change of the next decade should be the dramatic increase in the worldwide connectivity via the internet. The online community is expected to grow from two billion users in 2010 to 5 billion by 2020. Three billion new minds are about to join the global brain. What will they dream? What will they discover? What will they desire? These are brains that the rest of society has never had access to before. Their collective and creative boost should unleash the most powerful and abundant boost of all.

THE WORLD WIDE RATE OF TECHNOLOGICAL INNOVATION HAS INCREASED IN STEP WITH THE EXPONENTIAL GROWTH OF THE HUMAN POPULATION

POPULATION	INNOVATION	DATE
5.8 BILLION	GENOME PROJECT	2000 AD
5.3 BILLION	PC'S	
5.1 BILLION	INTERNET	
4.6 BILLION	MAN LANDS ON THE MOON	
	NUCLEAR ENERGY	
3.5 BILLION	DNA DISCOVERED	
3.0 BILLION	HIGH SPEED COMPUTER	
2.5 BILLION	TELEVISION	1920 AD
	AIRPLANE	
	AUTOMOBILE	
2.0 BILLION	TELEPHONE	
	RAILROADS`	
1.5 BILLION	INDUSTRIAL REVOLUTION``	1800 AD
.5 BILLION	PEAK OF GREECE	400 BC
	MATHEMATICS	
	WRITING	
	FI RST CITIES	
	PLOW INVENTED	
	POTTERY	
1 MILLION	AGRICULTURAL REVOLUTION	9000 BC

SERVICES ONCE RESERVED FOR THE WEALTHY ARE AVAILABLE TO THE MASSES VIRTUALLY FOR FREE. ADJUSTED FOR INFLATION, NEARLY \$1 MILLION WORTH OF FEATURES NOW COME WITH SOME SMART PHONES, FOR EXAMPLE:

	COST THEN	ADJUSTED
Video Player (Toshiba v—8000)	1981 \$1,245 >	\$3,103
Encyclopedia (Compton's CD Encyclopedia}	1989 \$750 >	\$1,370
Video Camera (RCA CC010)	1981 \$1,000 >	\$2,617
GPS TI NAVSTAR)	1982 \$119,900 >	\$279,366
Video Conferencing (Compression Labs VC)	1982 \$250,000 >	\$250,000
Digital Voice Recorder (SONY PCM)	1978 \$2,500 >	\$8,687
5 megapixel camera (Canon RC-701)	1986 \$3,000 >	\$6,201
	TOTAL VALUE	\$900,000

DURING THE PAST HUNDRED YEARS , THE COST OF ELECTRICITY (MEASURED IN CONSTANT DOLLARS PER KILLOWATT HOUR) HAS DECREASED MARKEDLY EVEN AS TOTAL WORLD ENERGY CONSUMPTION HAS INCREASED.

1900 \$2.50 1920 45c 1940 48c 1960 40c 1980 10c 2000 10c

GENETICALLY ENGINEERED CROPS ARE THE FASTEST ADOPTED NEW TECHNOLOGY IN THE HISTORY OF AGRICULTURE. BY 2015 BIOTECH RICE COULD HELP FEED 1 BILLION POOR PEOPLE IN ASIA ALONE

PROJECTIONS INDICATE THAT THE NUMBER OF SMARTPHONES IN IN USE WORLDWIDE WILL SKYROCKET. LONDON ECONOMISTS FOUND THAT ADDING 10 PHONES PER HUNDRED PEOPLE BOOSTS A DEVELOPING COUNTRY'S GDP BY 0.6%

IT IS ESTIMATED THAT BY 2015, AFRICA WILL HAVE 127,500,000 SMARTPHONES AND 722,500,000 NON-SMARTPHONES

FOLLOWING ARE EXAMPLES OF FUTURE ABUNDANCE FROM OTHER ARTICLES:

In Kenya, Rwanda and Burundi, a new approach to small-scale farming has spread to more than 100,000 families in just four years. An organization called One Acre Fund brings struggling farmers together to establish a market community and offers them a unique investment package of seeds, fertilizer, training and market access. To provide a hedge against drought or disease, One Acre's "market bundle" includes crop insurance. Ninety-nine percent of the

farmers repay their loans, and many double their income per planted acre. Could this sort of integrated development be a model for the rest of Africa?

Powering the Planet

From PBS documentart *Earths Operating Manual* April 22, 2012

Get an eye-opening look at some of the world's most important case studies in smart energy decisions. In Spain and Morocco, large-scale solar farms and individual photovoltaic panels atop tents in the Sahara are beginning to bring the sun's vast potential down to Earth. In Brazil, abundant natural resources (sun, rain and sugar cane) are transformed into efficient, sustainable biofuel. In Samsø, Denmark, and West Texas, citizens have taken sustainability, and economic realities, into their own hands by becoming stakeholders in wind turbines. In China, a full-throttle approach to multiple sustainable energy technologies is giving rise to a "new empire of clean tech." Great nations and small communities alike are finding sustainable solutions that provide for people and protect the Earth.

Harvard and M.I.T. Team Up to Offer Free Online Courses

By TAMAR LEWIN NEW YORK TIMES MAY 2, 2012

In what is shaping up as an academic Battle of the Titans — one that offers vast new learning opportunities for students around the world — Harvard and the Massachusetts Institute of Technology on Wednesday announced a new nonprofit partnership, known as edX, to offer free online courses from both universities.

Harvard's involvement follows M.I.T.'s announcement in December that it was starting an open online learning project, MITx. Its first course, Circuits and Electronics, began in March, enrolling about 120,000 students, some 10,000 of whom made it through the recent midterm exam. Those who complete the course will get a certificate of mastery and a grade, but no official credit. Similarly, edX courses will offer a certificate but not credit.

But Harvard and M.I.T. have a rival — they are not the only elite universities planning to offer free massively open online courses, or MOOCs, as they are known. This month, Stanford, Princeton, the University of Pennsylvania and the University of Michigan announced their partnership with a new commercial company, Coursera, with \$16 million in venture capital.

Meanwhile, Sebastian Thrun, the Stanford professor who made headlines last fall when 160,000 students signed up for his Artificial Intelligence course, has attracted more than 200,000 students to the six courses offered at his new company, Udacity.

The technology for online education, with video lesson segments, embedded quizzes, immediate feedback and student-paced learning, is evolving so quickly that those in the new ventures say the offerings are still experimental.

EdX, which is expected to offer its first five courses this fall, will include not only engineering courses, in which computer grading is relatively simple, but also humanities courses, in which essays might be graded through crowd-sourcing, or assessed with natural-language software. Coursera will also offer free humanities courses in which grading will be done by peers.

ONE LAST THOUGHT

For over two hundred years most types of work have been accomplished with steadily increasing efficiency, requiring fewer workers for the same output. This is a major contributor to today's high unemployment. Sooner or later, in the U.S., a shorter work week will spread the work required over more workers. This has already occurred in many other advanced countries.

More free time will become available to take advantage of the free online educational opportunities. Continuing education through life may become a norm for just about anyone willing to make the effort - a crowning achievement of the Age of Abundance.