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The Industries of the Future

THE SUMMARY IN BRIEF

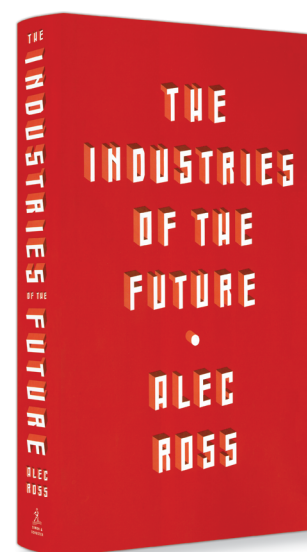
While Alec Ross was working as Senior Advisor for Innovation to the Secretary of State, he traveled to 41 countries, exploring the latest advances coming out of every continent. From startup hubs in Kenya to R&D labs in South Korea, Ross has seen what the future holds.

In *The Industries of the Future*, Ross shows us what changes are coming in the next 10 years, highlighting the best opportunities for progress and explaining why countries thrive or sputter. He examines the specific fields that will most shape our economic future, including robotics, cybersecurity, the commercialization of genomics, the next step for big data and the coming impact of digital technology on money and markets. In each of these realms, Ross addresses the toughest questions: How will we adapt to the changing nature of work? How can the world's rising nations hope to match Silicon Valley in creating their own innovation hotspots?

The Industries of the Future takes the complex topics that many of us know to be important and boils them down into clear, plainspoken language. This is an essential book for understanding how the world works — now and tomorrow — and a must-read for businesspeople in every sector, from every country.

IN THIS SUMMARY, YOU WILL LEARN:

- How robots will transform daily life and business opportunities.
- How digital technologies and big data can improve health and commerce around the globe.
- The dangers of cyberattacks and the growth of the cybersecurity industry.
- How countries can compete and succeed in the industries of the future.



by Alec Ross

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THE COMPLETE SUMMARY: THE INDUSTRIES OF THE FUTURE

by Alec Ross

The author: Alec Ross is one of America's leading experts on innovation. He served for four years as Senior Advisor for Innovation to Secretary of State Hillary Clinton, a role that earned him a Distinguished Honor Award from the State Department. He is currently a Distinguished Visiting Fellow at Johns Hopkins University and serves as an advisor to investors, corporations and government leaders.

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Introduction

The coming era of globalization will unleash a wave of technological, economic and sociological change as consequential as the changes in the 20th century and the changes brought on by the Internet and digitization.

In business areas as far afield as life sciences, finance, warfare and agriculture, if you can imagine an advance, somebody is already working on how to develop and commercialize it.

The near future will see robot suits that allow paraplegics to walk, designer drugs that melt away certain forms of cancer, and computer code being used as both an international currency and a weapon to destroy physical infrastructure halfway around the world. These key industries of the future — robotics, advanced life sciences, the code-ification of money, cybersecurity and big data — are important in their own right but are also symbolic of larger global trends and are symbiotic among each other.

Innovation brings both promise and peril. The same forces that are unleashing unparalleled advances in wealth and welfare may also allow a hacker to steal your identity or hack your home. A computer that can speed up analysis of legal documents can also shrink the number of lawyers in the workforce. The digitization of payments can facilitate commerce or allow for new forms of fraud.

Advances and wealth creation will not accrue evenly. Many people will gain. But many will also be displaced. Unlike the previous wave of digital-led globalization and innovation, which drew enormous numbers of people out of poverty in low-cost labor markets, the next wave will challenge middle classes across the globe, threatening to return many to poverty. The previous wave saw entire

countries and societies lifted up economically. The next wave will take frontier economies and bring them into the economic mainstream while challenging the middle classes in the most developed economies.

The industries of the future will both be created within the current geopolitical structure and transform it. In the 20th century, the dominant divide between political systems and markets was along the axis of left versus right.

In the 21st century, the dominant divide is between those that have open political and economic models and those that are closed. Moreover, innovation doesn't happen in closed environments, and innovative companies will continue to steer clear of countries with regressive policies on gender. We can draw from the wisdom of innovators to prepare both ourselves and our children for what's coming in the next economy — for the economy that begins now. ●

Here Come the Robots

Japan is home to the longest-living citizens on earth and the biggest elderly population of any country — and it's not getting any younger. Today, 25 percent of Japan's population is age 65 or older. By 2020, this is projected to increase to 29 percent and reach 39 percent by 2050. All of those long-living elderly will need caretakers.

Yet Japan's low birthrates mean that what once was a staple of Japanese family life — taking care of one's grandparents and great-grandparents — will no longer be a viable model at the scale the nation needs. Japan's Ministry of Health, Labor and Welfare predicts a need for 4 million eldercare nurses by 2025. Right now there are only 1.49 million in the country.



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Rebecca S. Clement, Publisher; Sarah T. Dayton, Editor in Chief; Ashleigh Imus, Senior Editor; Masiel Tejada, Graphic Designer; A. Imus, Contributing Editor

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This labor shortage will hit service-industry jobs like eldercare with ferocity and will be exacerbated because caretakers have a high job turnover rate due to low pay and high rates of work-related injury from lifting patients.

Enter the robots.

Our future caretakers are being developed in a Japanese factory right now. The robots depicted in the movies and cartoons of the 1960s and 1970s will become the reality of the 2020s. Toyota built a nursing aide named Robina — modeled after Rosie, the cartoon robot nanny and housekeeper in *The Jetsons* — as part of their Partner Robot Family, a line of robots to take care of the world's growing geriatric population. Robina is a “female” robot, 60 kilograms in weight and 1.2 meters tall, that can communicate using words and gestures. She has wide-set eyes, a moptop hairdo and even a flowing white metallic skirt.

In response, Honda has created ASIMO (the Advanced Step in Innovative Mobility robot), a fully functional humanoid that looks like a four-foot-tall astronaut stuck on Earth. ASIMO is sophisticated enough to interpret human emotions, movements and conversation. Equipped with cameras that function as eyes, ASIMO can follow voice commands, shake hands and answer questions with a nod or by voice. He even bows to greet others, demonstrating good Japanese manners. ASIMO can fulfill a range of tasks, from helping the patient get out of bed to holding a conversation. As the populations of developed nations continue to age, they create a big market for those Japanese robots.

Humanizing Robots

Tasks once thought the exclusive domain of humans — the types of jobs that require situational awareness, spatial reasoning and dexterity, contextual understanding and human judgment — are opening up to robots. Almost every major car company is researching and building its own version of a driverless car. Robots are also beginning to play an important role in the operating room.

As the technology continues to improve, there is an ongoing debate about just how radically human life will be transformed by advanced robots and whether robots will ultimately surpass us.

Just as it would have been difficult in the days of dial-up modems to imagine an Internet video service like YouTube streaming over 6 billion hours of video every month, it is difficult for us to imagine today that lifelike robots may walk the streets with us, work in the cubicle next to ours, or take our elderly parents for a walk and then help them with dinner. This is not happening today and it will

not happen tomorrow, but it will happen during most of our lifetimes.

Robots and Jobs

Two Oxford University professors who studied more than 700 detailed occupational types have published a study making the case that over half of U.S. jobs could be at risk of computerization in the next two decades. Forty-seven percent of American jobs are at high risk for robot takeover, and another 19 percent face a medium level of risk.

Those with jobs that are hard to automate — lawyers, for example — may be safe for now, but those with more easily automated white-collar jobs, like paralegals, are at high risk. In the greatest peril are the 60 percent of the U.S. workforce whose main job function is to aggregate and apply information.

The effect of robots on job loss will be highly differentiated by country. The countries that are best positioned are those that are developing and manufacturing robotics for export, that house the headquarters, the engineers and the manufacturing facilities. These are nations like South Korea, Japan and Germany.

There needs to be investment in growing fields like robotics but also a social framework that makes sure those who are losing their jobs are able to stay afloat long enough to pivot to the industries or positions that offer new possibilities. ●

The Future of the Human Machine

Over the past half century, we've witnessed unparalleled advances in the life sciences. Artificial hearts, new wonder drugs, organ transplants and other developments allow people to live longer, healthier lives.

These advances may be dwarfed by the innovations yet to come. In the years ahead, we will live in a world where we'll be able to target cancer cells with true precision, breathe air out of lungs transplanted from farm animals, and deliver medical treatment from the best hospitals in the world to the poorest, most remote corners of the earth.

The announcement of the completion of the first “rough draft” of the human genome was made in June 2000 by President Bill Clinton, and three years later the International Human Genome Sequencing Consortium announced that it had finished the job.

The size of the genomics market was estimated at a little more than \$11 billion in 2013 and is going to grow faster than anyone could imagine.

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Bert Vogelstein is a Johns Hopkins oncology and pathology professor and an expert on cancer and genomics. His latest effort is what he calls a “liquid biopsy.” A blood sample is taken and tested for the presence of even the tiniest amounts of tumor DNA. A tumor detected by Vogelstein’s liquid biopsy can be detected at just 1 percent the size of what is necessary to be detected by an MRI, currently the most reliable tool for finding cancer. The amount can be so small that the cancer is discovered even before any symptoms have developed.

In 2009, Vogelstein’s key partner, Luis Diaz, and some colleagues launched Personal Genome Diagnostics, PGDx. If you’re diagnosed with cancer, PGDx can become your cancer specialist. Your oncologist sends in your tumor sample and a spit vial, allowing your cancer cells and normal cells to be compared. Once PGDx gets your samples, its scientists work their genomic sequencing magic. They clean your samples, scrubbing them down so they’re ready to take a lengthy ride in a PGDx sequencing machine. When the sequencing is done, your DNA’s output is hundreds of gigabytes of information — big data now — waiting to be analyzed.

What sets PGDx apart is its proprietary computer program, which functions as a high-speed detective. It parses out exactly where proteins are mutating. It makes sense of why your cancer is growing. It gives you more information about your tumor than any oncologist can. When things go right, the PGDx team can tell you why you have cancer and which medicines might stop these mutations.

The field of genomics is expanding well beyond cancer prevention and treatment, but there is a dark side to genomics. One of the primary concerns, and one of Luis Diaz’s own worries, is that as genomics grows more sophisticated, it will begin a process of creating designer babies. It is possible today to take a blood sample from a pregnant woman and reassemble the genome of the fetus. Fetal DNA tests have been used in the past to screen for Down syndrome. With advances in genomics, all the genetics of the fetus are now accessible and will force societies around the world to grapple with the issue of genetic selection.

Innovation for Everybody

Much of the innovation in the life sciences coming from China, Europe and the United States is initially benefiting wealthier households and societies. Delivery of medical services will never be equal, but pioneering initiatives to expand access to care across socioeconomic lines are beginning to take hold and improve lives on a huge scale.

The infrastructure that makes this possible is the mobile phone. Six billion of the 7 billion people on earth have mobile phones, more than have access to toilets. One of the most interesting ways mobile telecommunications have been used to address health problems in the developing world comes from a company called Medic Mobile. Twenty-seven year-old Medic Mobile CEO Josh Nesbit worked, as an undergraduate, at St. Gabriel’s Hospital in rural Malawi, one of the poorest countries in the world. He was struck by how far many of the patients had to travel for simple care. A trip to the doctor often meant a 100-mile trek to the hospital.

Later, Josh returned to St. Gabriel’s and set up a program equipping the hospital’s 75 community health workers with mobile phones and training on how to use the phones to allow patients to respond to medical questions and monitor how well patients were adhering to their prescribed course of care. The pilot program ended up saving over 2,000 hours of worker time and doubled the capacity of the hospital’s tuberculosis treatment program.

Today Josh and Medic Mobile’s big project is to try to develop a tool that uses the light and camera on a mobile phone to diagnose malaria and tuberculosis, and for under \$15.

In 10 years, Josh says, “there will be many new types of health workers, all supported by mobile technologies. Health systems will be decentralized, local and preventative.” He adds, “Health equity will exist in many more places, and the biggest gains will come from delivering basic services to the hardest-to-reach communities. Primary health care information will be free for every family, zero-rated by governments and mobile operators. There will be vaccines for malaria, cholera and other deadly diseases, and mobile technologies will play a critical role in distributing them to everyone.”

This is the future of health care in rural areas. For just about any part of the body or any illness, there is an entrepreneur thinking about how mobile technology might be applied to narrow the divide in access to health services. ●

The Code-ification of Money, Markets and Trust

While our genomes are being decoded over the next 20 years, our money will be coded — broken down into 1s and 0s and wrapped within powerful tools for encryption. We’re still only beginning to discover the possibilities that digital currency will open up. But the code-ification

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of money, markets, payments and trust is the next big inflection point in the history of financial services. Understanding what it means for you and your business will be important regardless of whether you are a plumber or the CEO of a Fortune 500 company.

Bitcoin and the Blockchain

Bitcoin, a new transnational currency released in the midst of the financial crisis in 2008–2009, offers a case study for the future of currency as the code-ification of money intensifies. Bitcoin is a “digital currency” — a currency that is stored in code and traded online. It is also a “cryptocurrency,” a term that is often used interchangeably with “digital currency” but signifies that the currency uses cryptographic methods in an attempt to make it secure.

At first glance, Bitcoin looks kind of like PayPal in that it offers a way to pay for goods online, with no physical interaction needed. Bitcoin is more easily thought of as a public ledger system than as a physical currency. If you mine or purchase bitcoins, you don’t ever receive any actual coins or tokens; instead you’re given a slot in Bitcoin’s ledger. Each slot has a public address (a long string of numbers and letters saying where the slot on the ledger is) that can be used to send or receive bitcoins. And ownership — your slot in the ledger — is verified through a secret, cryptographic “private key.”

To use bitcoins in a transaction, you just need to know the public address of your coins and the public address of whomever you’re paying, and then verify your ownership of your coins by entering the private key from your wallet. Cryptographic algorithms ensure that no one else can use your funds without access to the private key, which makes it crucially important for users to keep their private keys private (and, often, stored offline).

What’s to prevent me from copying my coins just as I can every other file on my computer, or counterfeiting new ones that follow the same pattern as the bitcoins already out there, or using two different devices to spend the same coins twice, simultaneously, before anyone can figure it out? How do I know that anyone I’m selling a product to actually has the bitcoins they say they do? And won’t the best hackers in the world be able to break this system wide open?

Bitcoin’s answer to all these questions, and its method for establishing a genuine breakthrough in digital trust, is a cryptographic invention called the blockchain. At its core, the blockchain is the big ledger on which all transactions are logged. And every single transaction going back to the very first Bitcoin payment is recorded on the blockchain, though they’re logged anonymously or

pseudo-anonymously. One of the blockchain’s key characteristics is that it is public, and instead of being stored at one central location, it is distributed to every Bitcoin user.

By making everything public, the blockchain reduces the possibility of fraud drastically, because you can’t counterfeit the existence of property in public view. Fraud is further diminished by the fact that every bitcoin carries its history with it; to try to counterfeit a coin would require counterfeiting a false lineage going back all the way to the beginning of Bitcoin. It would never be accepted by the system, since the millions of copies of the ledger that reside throughout the rest of the Bitcoin network would not have any record of this counterfeit coin or its invented history.

Both the regulation of the blockchain infrastructure and the money supply, through mining, are entirely decentralized and involve no nation-state or central bank. In addition, the blockchain has the potential to make regular transactions — like the online purchases we make every day — much more reliable and much less vulnerable to fraud. Bitcoin at its best could make fraud impossible, unless one’s private key is stolen, and make the thieves easy to find even if a key is stolen. The result could be a major drop in fraud.

Furthermore, as venture capitalist Marc Andreessen describes, there is an enormous space for Bitcoin to fill: “Only about 20 countries around the world have what we would consider to be fully modern banking and payment systems; the other roughly 175 have a long way to go. As a result, many people in many countries are excluded from products and services that we in the West take for granted ... Bitcoin, as a global payment system anyone can use from anywhere at any time, can be a powerful catalyst to extend the benefits of the modern economic system to virtually everyone on the planet.”

The real security threat to Bitcoin is not the security of the blockchain but the infrastructure around it. Bitcoin still needs an enabling ecosystem including trading platforms, payment systems and pricing indexes to function smoothly and create the level of confidence necessary for high-trust transactions. ●

The Weaponization of Code

Malware. Virus. Worm. Trojan horse. Distributed denial-of-service. Cyberattack. The terms for the weaponization of code are by now well known, but we are just beginning to understand their full implications.

It is perhaps ironic that one of the earliest purposes of the Internet, among certain of its developers, was to create

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a decentralized, distributed communications network that could survive a nuclear attack. That same distributed structure has led to a whole new class of possible attacks.

And as more individuals, businesses and governments have been incentivized to move their assets online, the weaponization of code has grown more lucrative and more destructive. The potential for real damage on a personal or systemic level is frightening. Whether motivated by politics or profits or mayhem, the cost of cyberattacks has now eclipsed \$400 billion a year, a number that is larger than the gross domestic product of about 160 of the 196 countries in the world.

Types of Attacks

There are three main types of cyberattacks today: attacks on a network's confidentiality, availability and integrity.

Attacks that compromise confidentiality aim to steal or release secure information like credit card or social security numbers from a given system in an illicit or unauthorized manner. The retailer Target was the victim of a confidentiality attack during the 2013 holiday season. Hackers accessed Target's payments systems and managed to steal the credit and debit card numbers of more than 40 million customers.

The second type of cyberattack hits a network's availability — attacks typically known as denial-of-service (DoS) or distributed denial-of-service (DDoS) attacks. Denial-of-service attacks aim to bring down a network by flooding it with a massive number of requests that render the site inoperable. Distributed denial-of-service attacks are exactly the same except that the attacker has mobilized several systems for the attacks.

Last, cyberattacks can also affect a network's integrity. These attacks are more physical in nature. They alter or destroy computer code, and their aim is normally to cause damage to hardware, infrastructure or real-world systems. Once an integrity attack has taken over a machine, the machine ends up being rendered useless and is added to the waste stream.

In 2011, Secretary of Defense Robert Gates formally declared cyber a domain of warfare, alongside air, land, sea and space, and President Obama declared America's digital infrastructure a "strategic national asset," which created the legal cover for a wide variety of offensive and defensive measures to be enacted at the newly created U.S. Cyber Command, as well as in other parts of the U.S. government. It's a domain that the United States takes as seriously as the more conventional modes of warfare.

Cyberattacking Everything

As the Internet grows, it is expanding not simply to new users but to entirely new devices, well beyond standard computers, tablets and smartphones. The costs of sensors and data storage have recently plummeted — in part due to cloud computing. As a result, the stage is now set for what has become known as the "Internet of Things," where any object has the potential to transmit and receive data, from cars and farm equipment to watches and appliances, even clothing. From 2015 to 2020, the number of wireless connected devices is going to grow from an estimated 16 billion to 40 billion.

There's one huge catch: with the rapid growth of these technologies, we are also creating an almost unimaginable new set of vulnerabilities and openings for cybersecurity hacks. In July 2015, hackers managed to remotely infiltrate and shut down a Jeep Cherokee while it was speeding along the highway. What if, 20 years from now when some variant of the Google car has taken over the highways, someone were to hack the entire network of Google cars? Imagine a highway's worth of connected cars all going haywire at the same time — the potential for a pileup bigger than anything we've ever seen.

The growth of cybersecurity into a large industry is the inevitable result of the weaponization of code. Research reports valued the global cybersecurity market at \$64 billion in 2011 and \$78 billion in 2015; they project it to be at \$120 billion by 2017. The Bureau of Labor Statistics, hardly prone to hyperbole, reports that there will be "a huge jump" in demand for people with information security skills. The industry is going to get very big very fast. ●

Data: The Raw Material of the Information Age

We are at a pretty remarkable inflection point in history. The first time a child is handed a phone or plays his first video game, he begins building a stack of personal data that will grow throughout his lifetime, a stack that can be constantly collated, correlated, codified and sold. Private companies now collect and sell as many as 75,000 individual data points about the average American consumer. And that number is tiny compared with what's to come.

Digitization dialed up the possibilities for data collection in a remarkable way. Ninety percent of the world's digital data has been generated over the last two years. Every year, the amount of digital data grows by 50 percent.

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“Big data” is a catchall phrase used to describe how these large amounts of data can now be used to understand, analyze and forecast trends in real time. The term can be used interchangeably with big data analytics, analytics or deep analytics.

The value derived from big data is partially a function of the amount of data created, but as or even more important is our new ability to use that data in real time to make smarter, more efficient decisions. Big data is further aided by new developments in data visualization that allow humans to see and understand patterns that might not be apparent on a spreadsheet full of numbers. Think about the difference between the years-long analysis of the national census and the real-time analysis required if you want to get out the vote in an ongoing national election. Speed makes entirely new projects possible.

Nine Billion People Will Need to Eat

The World Food Programme reports that one out of every nine people on earth, 805 million people, does not have enough food to live a healthy, active life. As the population grows as expected to more than 9 billion people over the next 30 years, the amount of food produced will need to increase by 70 percent lest the world grow even hungrier. This comes in the midst of climate change, as temperatures rise and potable water becomes an ever scarcer resource (70 percent of freshwater used globally goes toward agriculture).

The best hope for feeding our more populated world comes from the combination of big data and agriculture — precision agriculture. The promise of precision agriculture is that it will gather and evaluate a wealth of real-time data on factors including weather, water and nitrogen levels, air quality and disease — which are not just specific to each farm or acre but specific to each square inch of that farmland. Sensors will line the field and feed dozens of forms of data to the cloud. That data will be combined with data from GPS and weather models. With this information gathered and evaluated, algorithms can generate a precise set of instructions to the farmer about what to do, when and where. As the cost of such equipment goes down, it will be more accessible to farmers in the developing world. This is where its impact may be greatest.

Everybody Will Have a Scandal

The rise of big data has reawakened the world to privacy as a public-policy issue. It is difficult to bring big data technologies and the value of privacy into alignment. The difficulty is brought about by both surveillance and sousveillance. Government intelligence and law

enforcement agencies vacuum up a huge amount of communications data from above through surveillance.

Less discussed, but an even bigger problem for people who are not targets of terrorism or law enforcement investigations, are cell phone cameras and wearable technologies capturing what we do and say “from below” — sousveillance.

Whether or not we may want to respect a stronger version of privacy, it’s possible that we’re now unable to turn back and actually reach that notion of privacy. With the proliferation of sensors, devices and networks sucking up data everywhere, we may be past the point of being able to halt data collection in any meaningful way. Instead, we may have to concentrate on retention and proper use, that is, clearly setting out how long data can be retained and governing how it can be used, whether it can be sold, and the kind of consent required from the person providing the data. ●

The Geography of Future Markets

Let’s talk about what it will take to compete and succeed in the industries of the future and which of today’s societies are positioned for success.

The countries that are going to be able to succeed economically won’t be able to do so by being control freaks. To be successful in the next wave of globalization and innovation, a society must be open in order to exchange new ideas, conduct research free from political interference and pursue creative projects, even if they fail. Innovation requires this stripe of openness. It cannot see outside markets as enemy territory.

Following Estonia’s independence with the collapse of the Soviet Union, its economy was left reeling. Its currency was stripped of any value. Shops were empty and food was rationed. The gas shortage was so bad that the tattered government planned to evacuate the capital of Tallinn to the countryside. Industrial production dropped in 1992 by more than 30 percent, a higher decline than America suffered during the Great Depression. Inflation skyrocketed to over 1,000 percent, and fuel costs soared by 10,000 percent.

Led by the then 32-year-old historian Mart Laar, elected prime minister in 1992, the new Estonian government wasted no time charting a new course. Laar’s first step was to stabilize the economy. Because it couldn’t yet print money and had no effective mechanism to raise cash, the government cut expenses, particularly to traditionally insulated sectors. In ending subsidies to state-owned

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companies, Prime Minister Laar announced that companies must “start working or die out.”

After the economy had been stabilized — inflation had dropped from 1,000 percent in 1992 to 29 percent in 1995 — Estonia opened its doors to the world economy. It reduced trade tariffs and ended all export restrictions, turning the small country into a trading hub. The government also reached out to foreign investors. The citizenship law was amended to provide equal civil protection to resident aliens. Estonia passed laws to ensure that foreigners could purchase land.

As it developed its own government, it began putting its services online from the outset. In 2000 Internet access was legally enshrined as a human right by parliament. Estonia quickly became a center for global investment. This investment allowed Estonia to upgrade its technological and industrial base, and laid the ground for an innovation economy.

The strategy was one of near-radical openness combined with an orderly and disciplined framework for how and when to open up the economy. The result is that Estonia’s GDP of over \$25,000 per capita is 15 times what it was at the fall of the Soviet Union and ranks number one among the 15 former Soviet republics. The real success of Estonia is reflected not only in these statistics but also in its place as one of the world’s leading centers of innovation. Estonia has not produced a centi-billion-dollar company like Google, but it has achieved some notable successes, including Skype.

Half of the World

Going forward, a crucial factor in countries’ success will be their ability to empower their own citizens — and this means all of their citizens. Too often countries still focus on only half — their male population — and ignore or abuse women, even as they hold so much potential.

It does not matter how many men have degrees from MIT, for example, if 90 percent of Pakistani women are victims of domestic violence and only 40 percent are literate. The states and societies that do the most for women are those that will be best positioned to compete and succeed in the industries of the future.

Treating women well is not just the right thing to do; it makes economic sense. Women are half of every nation’s workforce — or potential workforce. To be a prosperous and competitive country requires access to the best-educated pool of workers. If a country is cutting off half of its potential workforce, it is taking itself out of the game.

According to the World Bank, 93 percent of Middle Eastern and North African countries have restrictions on the kinds of jobs that women can have. As long as these regions remain regressive, most American and European investors and executives will avoid them and pivot toward sub-Saharan Africa, Asia and promising parts of Latin America. Put simply, nations that empower women reap the benefits.

When leaders wonder what they can do to position their societies for the industries of the future, they need to open up and resist control-freak tendencies. The 21st century is a terrible time to be a control freak; future growth depends on empowering people.

Conclusion

What attributes do today’s kids need for tomorrow’s economy? In the same way that entrepreneurs, businesses and investors who engaged in China and India 10 to 20 years ago were able to build big businesses, people who can look around the world and see and understand the opportunity in the next wave of high-growth markets are those who will realize the greatest gains. Multicultural fluency is increasingly important in a business world that is growing more global.

Others say that foreign language skills are only part of the equation. Many believe that today’s kids must also become fluent in a technical, programming or scientific language. If big data, genomics, cyber and robotics are among the high-growth industries of the future, then the people who will make their livings in those industries need to be fluent in the coding languages behind them.

For most of the world’s 7.2 billion people, innovation and globalization have created opportunity the likes of which has never before existed. These changes mean new opportunities for all of us — for businesses, governments, investors, parents, students and children. ●

RECOMMENDED READING LIST

If you liked *The Industries of the Future* you’ll also like:

1. **Peers Inc** by **Robin Chase**. A co-founder of Zipcar, Robin Chase introduces the collaborative economy in which companies and governments are using the Internet’s ability to facilitate collaboration.
2. **Leadership 2030** by **Georg Vielmetter, Yvonne Sell**. The authors present six converging megatrends that will reshape businesses by the year 2030.
3. **Flash Foresight** by **John David Mann, Daniel Burrus**. The authors provide an easy-to-implement blueprint for enabling you to see the invisible and do the impossible.