

Social impact of exponential technologies

Corporate social responsibility 2.0

As strategic discussions increasingly focus on how business can evolve and capitalize on new innovation, it is important to recognize the enhanced role companies should play in the responsible use of disruptive technologies. Their challenge will be finding ways to design and architect models for driving transformative change and positive social impact—both for philanthropic good and for more commercial purposes. Harnessing exponentials for social impact can help build markets, drive adoption, and light a powerful beacon for attracting and retaining top talent. Beyond that, organizations should consider the ethics and morality of applying exponential technologies—beyond traditional risk concerns of security, privacy, regulatory, compliance, safety, and quality.

In the last several editions of *Tech Trends*, we've included a special feature on exponentials, exploring ways that the ever-increasing pace of technological innovation is driving an impending transformative—and potentially disruptive—shift in the existing business landscape. We've framed “exponentials” in two ways. First, we've documented the unprecedented speed and magnitude of advancement in fields blending science and technology—breakthroughs progressing at a pace with or exceeding Moore's Law. Second, we've examined their potential impact, featuring topics with the potential to positively affect billions of lives. Technologies such as 3D printing, artificial intelligence, advanced robotics, virtual and augmented reality, alternative energy systems,

biotechnology, and digital medicine evidence a renaissance of innovation, invention, and discovery.

This year, we've given several of these exponentials their own *Tech Trends* chapters as their mass adoption window has moved into the next 18 to 24 months. At the same time, we're seeing leading organizations harness emerging technologies for social good, while others have begun examining the potential impact exponentials may have on society, education, health care, and the environment.

Pandora's box

Around the globe, an emerging entrepreneur class is accessing, adopting, and experimenting with exponential technologies.

This phenomenon is presenting a wide array of opportunities and risks for market leaders, emerging players, and everyone in between. Organizations across sectors and geographies are now focusing on the potentially disruptive opportunities looming on the horizon. Clearly, “The times they are a-changing.”

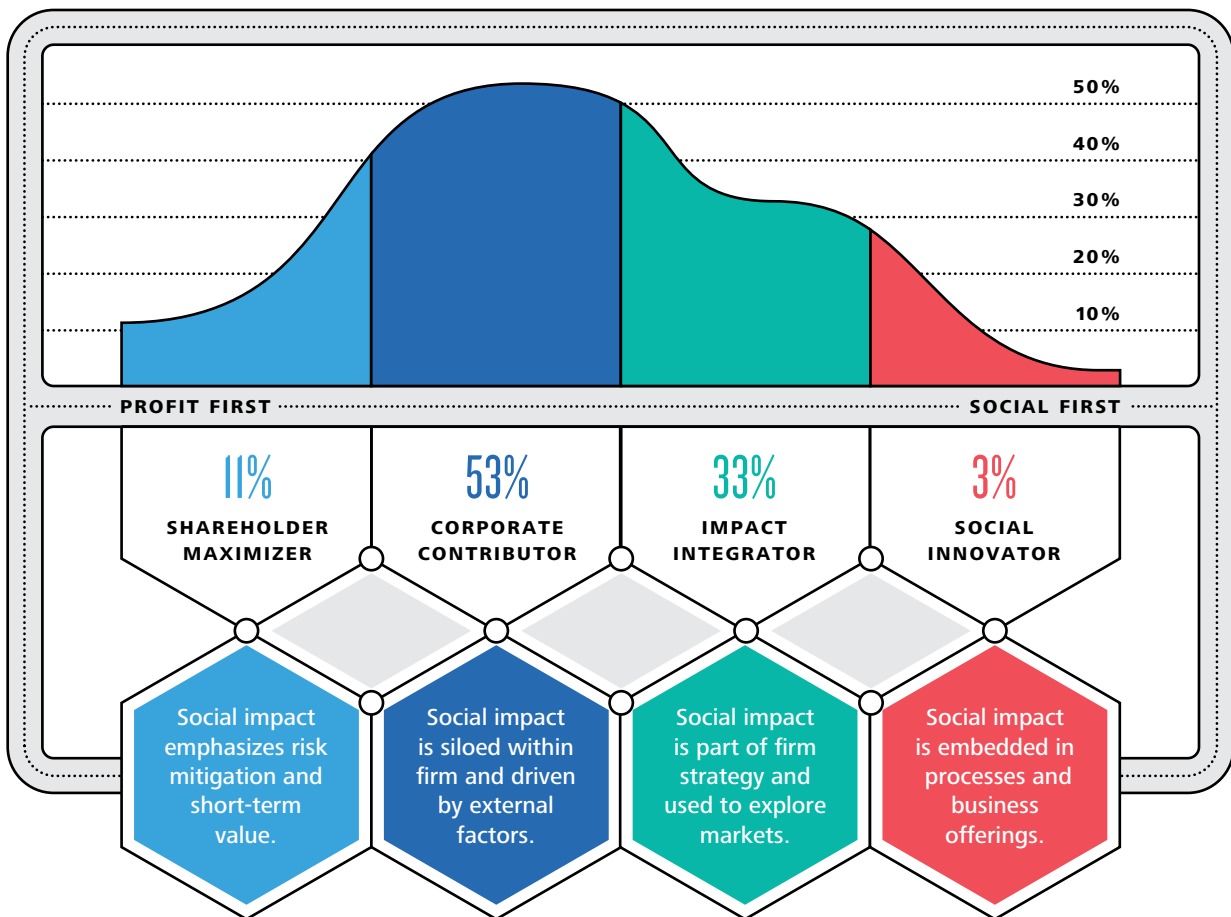
Yet at the same time, these forward-thinking organizations are also encountering opportunities to look beyond the purely

commercial implications of exponentials. The same forces driving innovation and growth in the commercial sector can also drive transformational change on a social level. Humanity’s grandest challenges in education, health care, climate change, and even civil rights can all be viewed through a different lens as disruptive technologies energize creative problem-solving. What responsibility do companies have to expand

Figure 1. Corporate archetypes around social impact

Exponential technologies have the potential to create large-scale business model and social disruption. In order for companies to manage externalities and create value from this disruption, they should examine how they can best proceed with research and development not only responsibly, but as a catalyst for social change.

A Deloitte study examining the social impact practices of the 2014 Fortune 500 global public companies revealed four business archetypes. These archetypes help companies better understand where their social impact strategies stand and how they compare to their peers’, so they can be intentional about maximizing value for their business and society at large



Source: Deloitte Development LLC, *Driving corporate growth through social impact: Four corporate archetypes to maximize your social impact*, 2015, <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/strategy/us-strategy-operations-social-impact-corporate-archetypes.pdf>, accessed December 17, 2015.

their reach beyond their own walls, and to help leverage exponentials to drive greater good in society? Moreover, how will business and society address the ethical and moral questions around unequal access to new innovations and, more broadly, how these new innovations will be used?

“With great power comes great responsibility”

This famous quote has been credited to an array of luminaries, from Stan Lee, the writer of *Spider-Man*, to Franklin D. Roosevelt, and even Winston Churchill; the first literary record of this phrase appears to be attributed to Francois-Marie Arouet, also known as Voltaire.¹ Regardless of its original source, in the context of exponentials, this phrase takes on an entirely new meaning.

Technology is a universal ingredient across exponentials. This puts the CIO and IT in a unique position to help build awareness of the potential social impacts and opportunities of exponential technology initiatives. This can be a natural extension of the CIO’s broader agenda around innovation and risk. But it may also help CIOs define their legacies, promote their personal brands to the CEO and the board, and instill a new sense of purpose in the IT organization.

Dr. Peter Diamandis has said, “The world’s biggest problems are the world’s biggest business opportunities. Want to be a billionaire? Impact a billion people!”² He is right. The technology needed for organizations to catalyze significant positive social change—while at the same time pursuing commercial ambitions—has never been more accessible. The world needs problem-solvers, and customers and employees are becoming increasingly aware of this fact each day. Organizations that identify innovative and creative methods to incorporate a social impact mission into their business strategies will likely be recognized and acknowledged, which could also translate into real growth and longevity.

Over the last 10 years, there has been a noticeable shift in the way public companies think about social impact as a strategic driver of value. Today, some companies are beginning to adopt a social impact mind-set to build differentiated products, explore new markets, secure a sustainable supply chain, attract and retain Millennial talent, and transform contentious regulatory relationships, among other tasks. In short, social impact is slowly evolving from a pure public relations play to an important part of corporate strategy to protect and create value.

A recent Deloitte study of the social impact practices of the Fortune 500³ found that 11 percent of organizations had made minimal investment in social impact programs; another 53 percent had invested modestly in programs focused on charitable donations and volunteer work. The study found that only 33 percent of companies could be considered “impact integrators”: organizations that have made driving the types of change we’re describing here central to their business strategies and goals.

This suggests there is considerable white space for companies to target with programs. The financial services industry, for example, might explore new ways for blockchain to democratize banking, enable micro-transactions, and simplify philanthropic donations. The consumer food industry could potentially leverage biotechnology to change the health benefits profile and affordability of their products. The entertainment industry might partner with educational leaders to leverage advances in augmented and virtual reality to revolutionize learning and education. By supporting the maker movement and exploring new ways to leverage 3D printing, manufacturers could help provide affordable housing and basic necessities to the world’s underserved populations. Hospitals and the health care industry have opportunities to use digital medicine to reinvent and democratize prevention, diagnosis, and treatment.

Social good is good business

Globalization is raising the stakes around social impact. Even companies with a strong market presence are working to expand their reach into additional segments and countries, including second-tier markets and rural areas. Here, grand challenges exist: poverty, inadequate sanitation, water quality, and failures in the social infrastructure of housing, education, and health care. Resource constraints and environmental challenges loom, including energy costs, water quality, and pollution.

In these markets, solving fundamental social needs can lead to commercial opportunities, but it can also challenge business operations. Growing businesses need capable employees, reliable suppliers, a well-governed economy, and consumers with the means and confidence to buy. Dr. Judith Rodin, president of the Rockefeller Foundation, has said, “In much of the world, markets must be built before they can be served. Forward-looking business leaders who embrace this reality make explicit commitments to enter new global markets both as economic opportunity zones as well as community spaces requiring nurturing and support.”⁴ Applying advanced technology can expedite the journey and amplify the effect. From using artificial intelligence and cloud computing to run advanced analytics studies of clean water⁵ to deploying drones to deliver food and medicine to villages isolated after natural disasters,⁶ real progress is being made, to exponential effect.

Purpose, mission, and talent

Social impact initiatives are also helping create talent beacons in the market as employees become more socially conscious. Sound HR and business strategies should consider the expectations of talent and consumer pools as a whole, and with a particular focus on Millennials.

There has been a convergence between “social impact” and “innovation,” largely driven by Millennials, who account for \$1 trillion of current US consumer spending.⁷ As widely reported, Millennials’ decision-making processes are often influenced by a desire to have a larger purpose in life. This has made corporate social responsibility (CSR) an imperative and not an option.

CSR increasingly plays a huge role in shaping brand perception. According to one study of corporate social impact, when companies support social and environmental issues, Millennials respond with increased trust and loyalty, and are more likely to buy those companies’ products.⁸ Even more pointedly, in a recent survey of Millennials, more than 50 percent of 13- to 25-year-old respondents said they would refuse to work for an irresponsible corporation.⁹

But it’s not just about Millennials. A study by the Society for Human Resource Management found that 55 percent of companies with strong sustainability programs had better morale, 43 percent had more efficient business processes and a stronger public image, and 38 percent experienced higher employee loyalty.¹⁰ Social impact crosses generational bounds, and it can be a differentiating play in the war on talent—especially in the hyper-competitive battle for the IT worker of the future.¹¹

Lessons from the front lines

A virtual field trip of dreams

“At Google, innovation follows a natural order in which leading-edge engineering is applied in pursuit of a technology’s potential, not its near-term commercial viability,” says Jonathan Rochelle, product manager for Google Education.

This approach is providing Rochelle with the resources and creative leeway he needs to pursue his latest social impact project: Google Expeditions, a virtual reality platform built for the classroom. While its long-term ambitions are far-reaching, the first iteration takes aim at improving an educational mainstay: the field trip. Rochelle and his team are working with teachers and content partners from around the world to create more than 150 tours that will immerse students in new experiences and learning environments. Students are free to explore distant locales without ever leaving their desks. They can easily follow their teacher’s lead—at least as long as the guided tour holds their interest. Factoids, notes, educational videos, and anything else that will help knowledge stick are also available to help kids dig deeper and learn more. And field trips are only the first frontier. Care to study shark anatomy? Immerse yourself in a virtual viewing tank for five minutes to study one up close. Organic chemistry? Become an explorer of the molecular machinations that make us who we are. Potential lies across the entire academic curriculum.

Expeditions was born during a hackathon in which two engineers blended VR concepts from the Google Cardboard viewer with document-sharing capabilities from the company’s classroom application. The result was an app that made it possible for one leader to guide multiple people on a virtual journey. Their first iteration featured two panoramas: one a tour of the Taj Mahal, and the other a view from space. “When we tried this out

for the first time, we realized we were onto something unique: a virtual reality solution that delivers freedom for students and some basic level of control for teachers,” says Rochelle. “I’ve never seen such immediate buy-in and agreement on the potential for a product. Everyone who tries it immediately gets excited.”

Expedition is still in early days as a pioneer program. Engineers are working to streamline the process for creating immersive panoramas, which currently requires syncing an array of 16 GoPro cameras. Likewise, Rochelle and his team are testing the beta product in classrooms where teachers and students take it for a trial run and provide feedback. “We are not educators, but we want to be sure that educators guide the development of this product,” says Rochelle, who adds that before Expeditions is available more broadly, hundreds of thousands of teachers and students from 10 countries will have tested it.

Expeditions is a feather in the Google VR development team’s cap. But, says Rochelle, it is also proof that VR innovations can move forward without an immediately viable business model. “My goal is to take incredible technologies and make them useful for educators. If they work in that capacity, they will likely eventually work in other capacities, too.”¹²

Set phasers to wellness

As a general rule, unmet consumer need drives innovation. Unfortunately, this rule doesn’t always apply to the health care industry. In an age of tech-enabled individual empowerment, patients often have few opportunities to receive medical care without going to a clinic or hospital—a limitation that can create inefficiencies and drive up prices.

To help address this challenge, in 2012 Qualcomm Life, Inc., a subsidiary



of Qualcomm Incorporated, focused on wireless health solutions. Working through its philanthropic arm, the Qualcomm Foundation, and in collaboration with the XPRIZE Foundation, Qualcomm Life launched the Qualcomm Tricorder XPRIZE, a global competition in which teams compete to develop a portable, wireless device that accurately diagnoses a set of diseases, independent of a health care professional or facility, and provides a positive user experience. At the end of the five-year competition, the team with the best design and diagnostic performance will pocket a cool \$10 million.¹³

According to Rick Valencia, senior vice president and general manager at Qualcomm Life, the decision to support this competition was driven by Qualcomm's commitment to promoting innovation in health care. "Trying to address challenges in an area like diagnostics is not easy. But we strongly believe that mobile technology has a role to play in that effort," he says.

Inspired by a prop and concept from the *Star Trek* series, devices are expected to accurately diagnose 13 health conditions (12 diseases as well as the absence of conditions). They should also continuously monitor vital signs in real time, independent of a health care worker or facility, and in a way that provides a compelling consumer experience. The only design limitation is that the device must weigh under five pounds.

The Qualcomm Tricorder XPRIZE competition is currently underway. An initial field of roughly 300 entrants has been narrowed to seven finalists hailing from North America, Europe, and Asia. The finalists represent a wide array of backgrounds: a medical doctor with a PhD in engineering; two brothers who run their own medical device company; and a group of students from Johns Hopkins University. In the coming months, finalists will deliver at least 30 new prototypes that will be tested for consumer

use. The winning design will be announced in early 2017.¹⁴

Best foot forward

Since 2006, shoe seller TOMS has pioneered new approaches for harnessing the power of business and digital technologies to help others. Through its One for One program, every customer purchase made on TOMS.com helps provide shoes, eye care, water, safe birth, and bullying prevention services to people in need around the world. The company also collaborates with a network of "giving partners"—locally staffed and led social and charitable organizations with a long-term commitment to the regions in which they operate. Through these and other efforts, TOMS has, to date, given away roughly 10 million pairs of shoes and helped restore sight to more than 200,000 people.¹⁵

To grow its global network of giving partners and to enhance the online customer experience, TOMS built an e-commerce platform that supports additional TOMS sites in almost a dozen countries. The platform was designed with a scalable architecture to launch new sites rapidly, allowing TOMS to build online marketplaces that reflect the culture and shopping preferences of local constituencies. It also incorporates, among other features, responsive design capabilities, which enable the site to immediately recognize the type of device a customer is using and automatically adjust format, content, and performance accordingly. This is particularly useful in regions where feature phones dominate.

TOMS sites around the world now deliver a highly visual, personalized customer experience built on relevant content, helpful recommendations, and a faster, easier check-out process. Additionally, the company's business users now have better control over the customer experience, since they have the ability to target promotions, personalize content, customize search results

and recommendations, and update product information across multiple sites on the fly.

Notably, this solution provides a separate platform that small, local merchants who share TOMS' philanthropic vision—and who might not have an e-commerce platform of their own—can use to market products designed and manufactured in their own regions. The “Marketplace” platform, which is fully integrated into the TOMS e-commerce site, today features a wide variety of textiles, jewelry, houseware, and other items produced locally—and now, thanks to TOMS, marketed and sold worldwide.

Open Bionics offers a helping hand

Aware that staggering development costs had put prosthetics beyond the reach of many hand amputees, Joel Gibbard, an engineering major studying robotics, launched a project at his university to develop a low-cost robotic prosthetic. Within a year, he had built a working robotic prosthetic using a 3D printer.

Following graduation, Gibbard accepted a job with a global engineering and technology firm. Yet despite the opportunities this position presented, he couldn't stop thinking about his university project and the amputees everywhere who desperately needed prosthetics. Gibbard soon quit his new job, moved back in with his parents, and used all of his savings to buy a 3D printer.¹⁶

Today, Gibbard is CEO of Open Bionics, a UK startup that is using open-source

3D printing software, robotic sensors, and financial capital from crowdfunding efforts to create a bionic hand that is less costly to produce than some others on the market. Instead of months and hundreds of thousands of dollars, it takes Open Bionics days and thousands of dollars to build a robotic prosthetic, which means that its prosthetics are more accessible to amputees across the developing world. What's more, Open Bionics' prosthetic hands match more expensive prosthetics in terms of functionality, but are lighter and custom-made, and thus often more comfortable for the wearer.

Open Bionics' efforts are attracting attention worldwide—notoriety that has brought in additional funding and sparked potentially beneficial partnerships. Recently, the company took home a \$200,000 prize for a second-place win in Intel's “Make it Wearable” challenge.¹⁷ Likewise, in 2015, Open Bionics was accepted into Disney Accelerator powered by Techstars, a program designed to accelerate the growth of start-up companies from around the world. As part of this program, Gibbard and his team will create prosthetic hands and arms for kids—patterned after designs inspired by their favorite Disney characters.¹⁸

To date, Open Bionics engineers have worked on 10 prototypes, and they are currently developing an eleventh. Though the company's products—all of which are open source—are not currently available for sale, Gibbard estimates they should be commercially available within a year.¹⁹



OUR TAKE

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In the book *Abundance: The Future is Better Than You Think*,²⁰ there is a picture drawn of a future in which all 9 billion people on planet Earth have access to clean water, food, energy, health care, education, and everything else necessary to achieve a first-world standard of living. This feat is achieved thanks to exponential technologies and innovation. Yet questions remain: Will “abundance” be equally distributed? When will it be achieved? Will all nations and their populations, and all segments of society have equal access to this abundance at once? It’s worth pausing for a moment to contemplate these questions and the related social impacts.

“We are arguably heading toward a future in which we will have the knowledge and capabilities to make the “impossible” possible.”

The pace of invention and innovation is accelerating rapidly. The dematerialization, demonetization, and democratization of technology could potentially lead to a new definition of “haves” and “have-nots.” During the next couple of decades, there may well be turbulence during a period of “pre-abundance” in which the impact of exponential technologies will be unevenly distributed, thus resulting in a new paradigm shift as to the notion of human inequality and class division.

Exponential technologies such as artificial intelligence, robotics, and 3D printing will lead to massive transformation in the workforce and job displacement. Add the impact of other exponential technologies, such as infinite computing power, the Internet of Things, and synthetic biology, and we are arguably heading toward a future in which we will have the knowledge and capabilities to make the “impossible” possible. In the early stages of the exponential curve,

there will be a window of time in which the economics of a breakthrough for some innovations can only be afforded by either those who have the knowledge, or those who can afford to purchase what that knowledge produces. Such powerful capabilities may leave some segments of the population behind as other “super-haves” accelerate rapidly.

At what point do these scenarios create animosity, anxiety, envy, and jealousy between those with the knowledge and the means versus those who do not? What roles and responsibilities do governments, business leaders, and society at large have in this precarious pre-abundance period to facilitate the democratized access to these transformative technologies?

As exponentially accelerating technologies transition us toward an era of abundance, we need a new breed of leadership that can monitor and help minimize the potential for this growing divide. This new breed of technologically literate leaders will be needed in order to provide the education and knowledge to reassure and guide societies during a potentially very unstable period of disruptive change.

Our traditional “linear” institutions and leaders, religious and governmental, tend not to support rapid change and often seem wired to preserve the status quo, sometimes even at the expense of the trust of the people they serve. Tomorrow’s leaders will need to navigate these difficult transitions to help build a bridge to abundance. From luminary entrepreneurs to global CEOs to outspoken social visionaries, these leaders will individually and collectively need to rethink and reinvent today’s social contracts and social norms.

Where will these forward-thinking leaders come from? Our history teaches us that these types of leaders are rare, and often underappreciated at first glance. In this coming era of disruption, one thing is for certain: A new generation of “exponential” leadership is needed, and all parts of society will be required to participate.

CYBER IMPLICATIONS

In the current political climate, Oscar Wilde’s adage “No good deed goes unpunished” still resonates. As we see frequently in both the domestic and international arenas, one group’s pursuit of the social good can offend the sensibilities of others, leading to social media outrage, protests, and threatened boycotts.

Unfortunately, the consequences of social, political, or philanthropic activities can extend beyond boycott threats: Organizations identifying themselves with a particular social or political cause may also make themselves beacons for hackers bent on punishing them for their activism. For example, in 2011, French nuclear power generator EDF was fined €1.5 million by a Paris court for hacking into the computers of environmental group Greenpeace. Greenpeace had opposed EDF’s plan to construct a new generation of nuclear reactors in France.²¹

As companies examine opportunities for using technology to promote the common good, they should factor in potential impacts—both positive and negative—of pursuing a particular course of action. They should also consider the full range of cyber threats they face, including “bad actor” events, as well as those involving well-intentioned employees who are oblivious to cybersecurity considerations. Finally, companies can explore opportunities for making their technologies and cyber expertise available to like-minded groups who share their social or philanthropic goals.

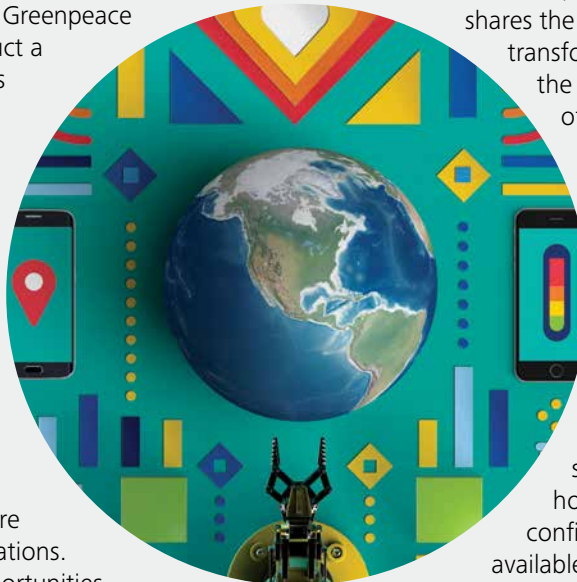
To understand more clearly how cybersecurity could impact your company’s social agenda, consider the following questions:

- **How could getting involved affect your company’s cyber beacon?** While organizations may have a good handle on the cyber threats their core business faces, they may not have as detailed an understanding of the cyber threats they could face as they expand into the arena of social responsibility. How might a company’s involvement with certain causes or organizations potentially attract the attention of hackers? Beyond concerns

over a politically driven reaction by hackers to an official social policy, how might having numerous employees use company systems to engage with social or philanthropic organizations on, for instance, a crowdsourcing platform outside your firewall alter your company’s risk profile? While social engagement likely presents no more risk than any other engagement with external entities, companies should take steps to include these and other scenarios in their existing cybersecurity, cyber privacy, and cyber risk policies.

- **How might sharing technology assets with others impact cyber risk?** By encapsulating assets and services as APIs, a global technology vendor shares the code for a potentially transformational product with the world. Through this act of generosity, the company may change the lives of millions. But it may also offer bad actors a new point of entry into its systems. As the open sourcing of assets for social and other reasons becomes more common, organizations considering this option should thoroughly examine how making previously confidential information widely available could potentially open up new risk avenues. They should then weigh the potential positives against cyber-related negatives to determine if this is the best strategy for achieving its social goals.

- **Cyber expertise as a gift?** Think about it. As discussed in the last two editions of *Tech Trends*, cybersecurity is itself an exponential. As your organization establishes its cybersecurity and cyber risk programs, how could you work with organizations that lack the resources in these areas to develop their own programs? Using your experience and tools to help a nonprofit tackle some of the same cyber risk challenges your own company faces could be one of the most beneficial contributions your company can make.



Where do you start?

Social impact is a big topic, extending far beyond the realm of IT. However, defining the role that exponential technologies play in corporate social impact programs is the responsibility of IT executives, particularly the CIO. Why? Because the convergence of R&D and social investments can lead to adoption of new products and offerings. It can also serve as a backdrop for experimenting with technologies before applying them to core business concerns. Given the sheer number of considerations and opportunities, formulating an actionable social impact plan that lays out a clear vision for the use of exponential technologies can be challenging.

Here are some potential places to start:

- **Frugal innovation:** Business strategies may call for achieving growth by addressing the needs of poor and aspirational market segments, which often requires offering more sustainable, affordable products. Rather than stripping existing products of features, shift your focus to leveraging exponential forces to invent something that is affordable and fills a basic need. For example, GE developed a portable ultrasound machine for China that not only decreased infant mortality rates, but created a new product category that led to widespread adoption.²²
- **Ecosystems:** In their social impact efforts, organizations will likely be partnering not just with competitors, but with NGOs and the public sector. Whereas once businesses and nonprofits viewed each other largely as antagonists, they are increasingly finding opportunities to bring complementary knowledge, experience, and skills to bear on social problems. Meanwhile, government can also play an important role as an anchor buyer, coordinator, and implementation partner for market-based solutions.
- **Mind-set change:** Making the business case for solving social needs requires a change in mind-set and new ways of doing business. Addressing the specific needs of underserved consumers, the social challenges facing local suppliers, and the limits of infrastructure and education requires a sustained commitment to serve a particular market. This might also require longer-term planning horizons, changes in the product development process, new forms of collaboration, and innovative business models.
- **Power to the people:** Challenge your stakeholders to help inform your social impact agenda. Hold company-wide contests to surface ideas from around the globe. Crowdsource concepts from customers, partners, and other interested third parties. Organize hackathons to quickly form teams and refine raw thinking into high-level designs, business cases, and roadmaps. The more people engage in social impact programs, the more beneficial the programs will likely become to everyone involved.
- **Ethics architecture:** Make it the responsibility of teams working with artificial intelligence, robotics, 3D printing, and other exponentials to consider both the ethics and unintended consequences of these technologies. Building risk intelligence across IT is a leading practice, but it needs to evolve beyond security, privacy, safety, quality, and regulatory concerns. It should also include thoughtful exploration of potential social and ethical impacts and, as needed, mitigations for those impacts.

Bottom line

By exploring how disruptive and relatively cheap emerging technologies can be optimized for both social and business gains, business and technology leaders may be able to help solve the world's grandest challenges—and build new markets along the way. Beyond helping to attract dedicated customers, suppliers, and employees, social impact programs also present a unique opportunity for leaders to build a legacy of lasting value for their companies, and potentially for the world.

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