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Experts Predict More Digital Innovation by 2030 Aimed at Enhancing Democracy

A majority expect significant reforms aimed at correcting problems in democratic institutions and representation will take place in the next decade. Many say this will result in positive outcomes for the public good; others are less convinced

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For this project, Pew Research Center worked with Elon University's Imagining the Internet Center, which helped conceive the research and collect and analyze the data.

How we did this

This is the 11th "Future of the Internet" canvassing Pew Research Center and the Imagining the Internet Center have conducted together to get expert views about important digital issues. In this case the questions focused on the future of democracy, the problems digital technology has created and possible solutions to those problems. This is a nonscientific canvassing based on a non-random sample, so the results represent only the individuals who responded to the query and are not projectable to any other population.

Pew Research Center and Elon University's Imagining the Internet Center built a database of experts to canvass from several sources, including professionals and policy people from government bodies, technology businesses, think tanks and networks of interested networks of academics and technology innovators. The expert predictions reported here about the impact of digital technologies on key aspects of democracy and democratic representation and social and civic innovation came in response to a set of questions in an online canvassing conducted between July 3 and Aug. 5, 2019. In all, 697 technology innovators, developers, business and policy leaders, researchers and activists responded to at least one part of the battery of questions that are covered in this report. More on the methodology underlying this canvassing and the participants can be found here.

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A large share of experts and analysts worry that people's technology use will mostly weaken core aspects of democracy and democratic representation in the coming decade. Yet they also foresee significant social and civic innovation between now and 2030 to try to address emerging issues.

In this new report, technology experts who shared serious concerns for democracy in a recent Pew Research Center canvassing weigh in with their views about the likely changes and reforms that might occur in the coming years.

Overall, 697 technology innovators, developers, business and policy leaders, researchers and activists responded to the following query:

> ***Social and civic innovation and its impact on the new difficulties of the digital age:*** *As the Industrial Revolution swept through societies, people eventually took steps to mitigate abuses and harms that emerged. For instance, new laws were enacted to make workplaces safer and protect children; standards were created for product safety and effectiveness; new kinds of organizations came into being to help workers (e.g., labor unions) and make urban life more meaningful (e.g., settlement houses, Boys/Girls Clubs); new educational institutions were created (e.g., trade schools); household roles in families were reconfigured.*
>
> *Today's "techlash" illuminates the issues that have surfaced in the digital era. We seek your insights as to whether and how reforms to ease these problems and others might unfold.*
>
> ***The question:*** *Will significant social and civic innovation occur between now and 2030? By "social and civic innovation," we mean the creation of things like new technology tools, legal protections, social norms, new or reconfigured groups and communities, educational efforts and other strategies to address digital-age challenges.*

Some **84%** of these respondents say there will be *significant social and civic innovation* between now and 2030, while **16%** say there will *not be significant social and civic innovation* in the timeframe.

Asked a follow-up question about whether humans' use of technology will lead to or prevent significant social and civic innovation, **69%** of these expert respondents said they expect that technology use will *help significantly mitigate problems*, **20%** predicted that technology use will effectively *prevent significant mitigation of problems* and **11%** responded that it is likely that technology use will *have no effect on social and civic innovation*.

This is a nonscientific canvassing of experts, based on a non-random sample. The results represent only the opinions of individuals who responded to the query and are not projectable to any other population. The methodology underlying this canvassing is elaborated here. The bulk of this report covers these experts' written answers explaining their responses.

Respondents in this canvassing sound three broad themes about the changing technology landscape and how it will impact citizens' political and social activities.

First, they predict that overall connectivity between people and their devices will increase as more digital applications emerge that allow people to create, share and observe information. This trend could accelerate as people employ smart agents and bots to interact with other people or other people's avatars. These experts say persistent and expanded human connectivity will affect the way people engage with each other as citizens and influence how they work to build groups aimed at impacting policy and politics. Some argue this will change the way people interact with democratic institutions.

Second, the experts responding here foresee a sharp increase in connected devices – for instance, wearables, household appliances, cars – that could connect people even more deeply with their environments. Indeed, some believe the added aspects of connectivity will extend as the environment itself becomes "smart" – as buildings, streets, plots of land and even bodies of water become loaded with sensors that feed data into analytics systems. This will impact the level of knowledge that people have about themselves and their environment. That, in turn, could drive policy change, as evidence-based insights about the world proliferate.

Third, most of these experts think the explosion of data generated by people, gadgetry and environmental sensors will affect the level of social and civic innovation in several potential directions. They argue that the existence of the growing trove of data – and people's knowledge about its collection – will focus more attention on privacy issues and possibly affect people's

norms and behaviors. In addition, some say the way the data is analyzed will draw more scrutiny of the performance of algorithms and artificial intelligence systems, especially around issues related to whether the outcomes of data use are fair and explainable.

Two comments illustrate how these trends fit together and could prompt social and civic change.

Melissa Michelson, a professor of political science at Menlo College and author of "Mobilizing Inclusion: Redefining Citizenship Through Get-Out-the-Vote Campaigns," wrote, "I expect that by 2030 we will see increased pushback against the negatives of the digital age in the form of new technologies, more fact-checking and more skepticism by everyday Americans. What I see happening already is that people are more cynical but also more likely to engage in various forms of political participation, both on- and offline. There is an increasing recognition of the need for citizens to be savvy consumers of online information, and increased efforts by educators to arm their students with the critical tools they need to separate truth from fact. There is increasing pressure on social media companies to flag or remove information that is unreliable or inappropriate. Younger people are much better able to critically analyze online information in this way, and older people will age out of the system. Meanwhile, more and more tools are becoming available for helping everyone push back against disinformation."

Alexander B. Howard, independent writer, digital governance expert and open-government advocate, said, "I expect to see improvements to access to information through mobile computing devices, wireless broadband internet connections, open data from private and public sector sources and mature gestural and vocal interfaces. Virtual assistants driven by artificial intelligence and personal data will anticipate and augment the information needs of individuals, along with the descendants of today's rudimentary chatbots. That which can be automated, will be. That in turn means access and equity and checking algorithmic discrimination in the provision of services or information will be a civil rights issue, along with the civil liberties challenges associated with increased data collection. Partisan polarization and increasing economic inequality may be mitigated by significant legislative changes, but dislocation and job loss from increased automation, when combined with environmental degradation driven by climate change, will put a premium on enacting reforms to the scale of the inbound challenges in the near term. Corporate influence on national governments will continue to present significant challenges to that occurring. Increasingly sophisticated disinformation that pollutes civic information ecosystems may be mitigated by the systematic development of more trust in validated sources, though illiberal political movements will create difficult conditions for the development of nuanced interventions that don't simply result in censorship of independent media and press freedoms."

Sorting through these predictions, several key types of innovations recurred across the experts' answers in this canvassing. Here below is a rundown in three tables of 10 of the most commonly mentioned areas of reforms where these experts expect to see innovations. The lists are a catalog – not a consensus – of the range of anticipated advances that respondents in this canvassing propose will be likely by 2030. These statements generally represent themes found in this study. Many do not represent any sort of predominant point of view of the experts canvassed.

Experts expect there may be social and civic innovation by 2030 in social media, privacy issues and struggles against misinformation

AREA AND DESCRIPTION	EXAMPLES OF ANTICIPATED INNOVATIONS
Social media Some experts foresee a reckoning coming for social platform companies and leaders that could lead to large-scale changes.	▪ Regulation will hold social media companies liable for users' data privacy and safety. ▪ The social platform companies of 2020 will be broken up or die out. ▪ New platforms that do not rely on surveillance capitalism and targeted advertising will evolve. ▪ A greater focus on honesty and accuracy on social media will emerge. ▪ Social media platforms that focus on partisan interests will be developed.
Privacy issues Actions will be taken to better protect people's privacy online.	▪ Regulation will be enacted to enforce digital privacy and punish abusers. ▪ Public norms will change to focus more on protecting privacy online, and media forensics will be applied to tracking privacy infringement. ▪ There will be greater utilization of smart contracts and privacy-by-design technology. ▪ Cyberinsurance will be created to cover people who are victims of cybercrime, and there will be more-effective technology tools for privacy protection. ▪ Users of free tools will be automatically informed and given choices when they are faced with a situation in which their personal information is the price of access. ▪ Government-sponsored tools will be created to protect privacy. ▪ The right to be forgotten will be embraced. ▪ There will be less targeted advertising.
Misinformation Due to growing concerns about the accuracy of information encountered online, efforts are being made to identify and address misinformation.	▪ There will be more education focused on digital literacy. ▪ Sites and apps will have methods to instantaneously fact-check information. ▪ Greater societal pressure will demand more accuracy and truth. ▪ Social norms will change so that skepticism is the starting point of information searching. ▪ There will be better tools to help people fact-check information found online, and trusted groups of verifiers will form to assess information quality. ▪ There will be more face-to-face meetings to confirm information.

Source: Non-scientific canvassing of technology experts conducted July 3-Aug. 5, 2019. N=697.
"Experts Predict More Digital Innovation by 2030 Aimed at Enhancing Democracy"

PEW RESEARCH CENTER and ELON UNIVERSITY'S IMAGINING THE INTERNET CENTER, 2020

Experts expect there may be social and civic innovation by 2030 in politics, social connectivity, health and artificial intelligence

AREA AND DESCRIPTION	EXAMPLES OF ANTICIPATED INNOVATIONS
Political/government reform Democratic activity and government policymaking will open to more citizen engagement, and public activism will grow.	▪ Online voting systems will make voting more accessible; new online tools will allow citizens to voice their opinions directly to government. ▪ The ways in which public funds are spent and campaigns and lobbying take place will become more transparent. ▪ Policy changes will begin to be driven by digital civic engagement, as constituents are enabled to directly voice concerns. ▪ Multinational forums will tackle global issues via digital treaties and stakeholder initiatives. ▪ Online court systems/virtual juries will be created to decide civil cases. ▪ A wide range of deliberative processes and hearings can be open on online platforms. ▪ Some communities will embrace volunteerism in lieu of taxes.
Social connectivity A number of innovations will help connect people and bring them together for a common purpose.	▪ Like-minded people from around the world will more-effectively advocate for causes. ▪ People will form online social/financial support networks. ▪ Crowdfunding/small-dollar fundraising will continue to grow. ▪ Local communities will connect through more-accessible information and resources online. ▪ Local big data will be used to improve community living. ▪ Virtual collaborations will become more commonplace. ▪ Technology will identify available aid and coordinate getting it to those who need it. ▪ Open source software, data and code will proliferate, helping ensure more-equal access to online resources and government processes.
Healthier living Innovations will address physical and mental health; major change is coming for the health care sector.	▪ Users will focus more on monitoring and limiting their screen time, and overall health monitoring will scale. ▪ Tech-free leisure/vacations will become common. ▪ Health communications will be improved. ▪ Gene editing will go mainstream. ▪ Individualized gene-based cancer treatments will be created. ▪ Health care will more and more be seen as a human right. ▪ Telemedicine and online counseling will increase. ▪ Social norms will create more acceptance of mental illness and support for treatments.
Artificial intelligence Artificial intelligence (AI) will continue to improve and be applied to improve human lives online and offline.	▪ Virtual assistants and avatars will anticipate and address individuals' wants and needs. ▪ AI will help identify and thwart misinformation, and it will be used to create misinformation. A prime battleground will be deepfake videos. ▪ Ethical AI will arise. ▪ AI will increasingly be used to address health issues. ▪ AI will be built to passively monitor tech platforms to identify if manipulation is occurring. ▪ It will improve the quality of information available to those who govern; they will depend upon it for policy decisions.

Source: Non-scientific canvassing of technology experts conducted July 3-Aug. 5, 2019. N=697.
"Experts Predict More Digital Innovation by 2030 Aimed at Enhancing Democracy"

PEW RESEARCH CENTER and ELON UNIVERSITY'S IMAGINING THE INTERNET CENTER, 2020

Experts expect there may be social and civic innovation by 2030 in education, labor and jobs and environmental issues

AREA AND DESCRIPTION	EXAMPLES OF ANTICIPATED INNOVATIONS
Education reform Education systems will evolve in response to many multilayered societal changes.	▪ Schools will focus on science, technology, engineering and math (STEM) skills and STEAM (adding "arts" to STEM). ▪ People will be taught digital literacy from the earliest days of their lives. ▪ There will be even greater access to knowledge online. ▪ Lesson plans will be individualized, aimed to serve each persons' needs. ▪ More people will be educated online/remotely rather than in traditional school settings. ▪ There will be improved access to education for at-risk and marginalized groups. ▪ Ethics, compassion, diversity and moral behavior will play a larger role in curricula.
Labor and jobs Business practices, individuals' work lives and the larger economy will substantially change by 2030.	▪ Market capitalism will be transformed. ▪ Autonomous technologies will take over more jobs and skills. ▪ Work hours and "work week" expectations will change. ▪ Work will be more specialized. ▪ In order to keep up and stay employed, workers will need lifelong education. ▪ Universal basic income will arise. ▪ Commons-based economic models will emerge. ▪ Better work-life balance will be possible. ▪ Technology workers and gig economy workers will unionize, and digital tools will improve worker organization. ▪ Workers will hold their employers accountable for harmful activities. ▪ Money will be limited or abolished at least for some transactions. ▪ Cooperative business initiatives will arise; this might reduce inequities and job displacement.
Environmental issues Climate change and other environmental issues will inspire innovation out of necessity.	▪ Climate science will improve. ▪ New tools will address environmental issues, all forms of environmental degradation. ▪ There will be more environment-related entrepreneurship and voluntarism. ▪ A "Green New Deal" will be struck. ▪ Greater awareness of the environmental impact of technology will arise and be addressed. ▪ New social and civic policies will be more environmentally conscious.

Source: Non-scientific canvassing of technology experts conducted July 3-Aug. 5, 2019. N=697.
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Here are some of the thoughtful expert answers about the issues they think will dominate debates about the future of democracy and some reforms that could emerge in the coming decade:

Ethan Zuckerman, director of MIT's Center for Civic Media and co-founder of Global Voices, said, "Over the next 10 years, I hope to see a wave of new platforms consciously designed to evoke different civic behaviors. We need mass innovation in design of social tools that help us bridge fragmentation and polarization, bring diversity into our media landscapes and help find common ground between disparate groups. With these as conscious design goals, technology could be a

powerful positive force for civic change. If we don't take this challenge seriously and assume that we're stuck with mass-market tools, we won't see positive civic outcomes from technological tools."

Esther Dyson, internet pioneer, journalist, entrepreneur and executive founder of Way to Wellville, wrote, "If tech doesn't contribute to solving some of the problems it creates, we are doomed. Used well, it can enable us to do many good things more broadly and more cheaply: education, connecting people in real life (Meetup, all kinds of matching/finding platforms), and so on. But we need to recognize the motivations behind these services and make sure that metabolism/money does not overwhelm human connection."

Jonathan Grudin, principal researcher for Microsoft, asked, "Social and civic activity will continue to change in response to technology use, but will it change its trajectory? … Can our fundamental human need for close community be restored or will we become more isolated, anxious and susceptible to manipulation? Social and civic innovation will be driven by people, with technology delivering and perhaps amplifying or obstructing social consensus."

David Weinberger, senior researcher at Harvard's Berkman Klein Center for Internet & Society, said, "I see no reason to think that the current situation will change: Tech will cause problems that require innovative solutions and tech will be part of those solutions. Machine learning (ML) is right now an example of this, and given the pace of tech development, ML has at least another 10 years of serious innovation ahead of it. ML's ability to discern patterns in areas we formerly – pridefully – thought were Free-Will Zones and thus beyond prediction makes it both a source of unwanted control and a tool for detecting hidden effects of bias and for designing more equitable systems. For example, right now most of our focus is, understandably, on preventing ML from amplifying existing biases, but it can also be a tool for measuring and adjusting outcomes to avoid those biases. (I don't imagine that we will ever be able to relax our vigilance over ML's outcomes.)"

These experts were also asked to comment about the likely degree of change and innovation that would occur by 2030 in these areas related to democracy and democratic representation:

1. *Modulate the power of large tech companies*
2. *Lead to ethical advances in uses of algorithms*
3. *Improve the economic stability of the news media*
4. *Improve trust in democratic institutions*
5. *Establish social media platforms where beneficial self-expression, connection and fact-based information are dominant*

6. *Enable political activities that lead to progress in solving major policy problems*
7. *Establish an acceptable balance between personal privacy and public safety*
8. *Reduce worker vulnerabilities associated with technological disruptions*
9. *Improve physical health*
10. *Mitigate mental and emotional health issues tied to digital life.*

The open-ended answers of the experts in this canvassing on each of these aspects of democratic life are woven into the text in the remainder of the report. In many cases, these experts' answers address several issues in one extended response – for instance, by talking about their predictions for innovations that improve people's physical well-being alongside their predictions about the future of journalism. For the sake of continuity and coherence, we grouped many of these multiple-subject responses into a single section of the report, rather than spreading them among multiple topics. Some of the key experts' answers had this comprehensive sweep:

Doc Searls, internet pioneer and former editor-in-chief of Linux Journal, predicted that the internet will become more divided and business models will change, writing, "Don't expect social media or its leading platforms to last. Their business model – tracking-based advertising – is morally corrupt and actually doesn't work very well, either for advertisers or ads' target populations. It's best just at paying intermediaries. We will find far better ways to connect demand and supply than robotic algorithm-driven behavioral targeting based on surveillance. The most positive changes will be in the marketplace once new technical means for connecting customers and companies are in place and better signaling takes place across new channels. The least-positive changes will be politics and governance, but only because they will improve more slowly under digital conditions. As for news, whole new institutions are likely to emerge, as old-fashioned print and broadcast-based systems get replaced by streaming, podcasting and who knows what else over the net. What won't change is people's tendency toward gossip, tribalism driven by gossip and the ability of anybody to inform anybody else about anything, including wrongly. The only places where news won't skew fake will be localities in the natural world. That's where the digital and the physical connect best. Also expect the internet to break into pieces, with the U.S., Europe and China becoming increasingly isolated by different value systems and governance approaches toward networks and what runs on them."

Robert Epstein, senior research psychologist at the American Institute for Behavioral Research and Technology, said, "The big tech companies, left to their own devices (so to speak), have already had a net negative effect on societies worldwide. At the moment, the three big threats these companies pose – aggressive surveillance, arbitrary suppression of content (the censorship problem), and the subtle manipulation of thoughts, behaviors, votes, purchases, attitudes and

beliefs – are unchecked worldwide, and even former associates of Google and Facebook have warned about how such companies undermine democracy and 'hijack the mind.' The reason I'm optimistic about technology long-term is because I have successfully built and deployed two systems that passively monitor what big tech companies are showing people online, and I expect to build a much larger system in 2020 and ultimately to assist others in building a worldwide ecology of such systems. I'm also developing smart algorithms that will ultimately be able to identify online manipulations – biased search results, biased search suggestions, biased newsfeeds, platform-generated targeted messages, platform-engineered virality, shadow-banning, email suppression, etc. – in real time. Tech evolves too quickly to be managed by laws and regulations, but monitoring systems *are* tech, and they can and will be used to curtail the destructive and dangerous powers of companies like Google and Facebook on an ongoing basis. My seminar paper on monitoring systems, 'Taming Big Tech,' can be viewed here: https://is.gd/K4caTW."

danah boyd, principal researcher at Microsoft Research, founder of Data & Society, wrote, "Technology will be used by those who are thoughtful about social innovation, but it won't actually serve as the driving factor. When we talk about the opportunities for social innovation, we have to culturally contextualize ourselves. I'm going to start with the U.S.; technology in the U.S. is caught up in American late-stage (or financialized) capitalism where profitability isn't the goal; perpetual return on investment is. Given this, the tools that we're seeing developed by corporations reinforce capitalist agendas. Innovation will require pushing past this capitalist infrastructure to achieve the social benefits and civic innovation that will work in the United States. China is a whole other ball of wax. If you want to go there, follow up with me. But pay attention to Taobao centers. We haven't hit peak awful yet. I have every confidence that social and civic innovation can be beneficial in the long run (with a caveat that I think that climate change dynamics might ruin all of that), but no matter what, I don't think we're going to see significant positive change by 2030. I think things are going to get much worse before they start to get better. I should also note that I don't think that many players have taken responsibility for what's unfolding. Yes, tech companies are starting to see that things might be a problem, but that's only on the surface. News media does not at all acknowledge its role in amplifying discord (or its financialized dynamics). The major financiers of this economy don't take any responsibility for what's unfolding. Etc."

Barry Chudakov, principal at Sertain Research, said, "We are in the midst of a remarkable social and civic experiment: democracy by device. The total installed base of Internet of Things-connected devices is projected to amount to 75.44 billion worldwide by 2025. Our devices are ubiquitous vectors of data. Our social and civic innovation has not kept pace. 'Techlash' is a groan of realization: As data assumes an ever-greater role in our day-to-day lives, imperatives emerge. Foremost among these is factfulness. Data summations will become like the atomic clock; we set

our communal watches by them. Success in social and civic innovation will become data-driven and dependent. Tools presenting radical transparency will enable democracies to come through the meme wars and infowars that widespread device usage engenders. New groups and systems will emerge to demand (in Ray Dalio's words) radical truthfulness, which will depend on radical transparency. We must all see how information is presented to us, who is presenting it and have certainty that it is true or false. With this transparency and a commitment to truth and fact over innuendo, accusation and smear, democracy will survive. Technology's greatest contribution to social and civic innovation in the next decade will be to provide accurate, user-friendly context and honest assessment of issues, problems and potential solutions – while at the same time maintaining ethical artificial intelligence and data protocols. We are facing greater accelerations of climate change, social mobility, pollution, immigration and resource issues. Our problems have gone from complicated to wicked. We need clear answers and discussions that are cogent, relevant and true to facts. Technology must guard against becoming a platform to enable targeted chaos, that is, using technology as a means to obfuscate and manipulate. We are all now living in Sim City: The digital world is showing us a sim, or digital mirror, of each aspect of reality. The most successful social and civic innovation I expect to see by 2030 is a massive restructuring of our educational systems based on new and emerging mirror digital worlds. We will then need to expand our information presentations to include verifiable factfulness that ensures any digital presentation faithfully and accurately matches the physical realities. … Just as medicine went from bloodletting and leeches and lobotomies to open-heart surgery and artificial limbs, technology will begin to modernize information flows around core issues: urgent need, future implications, accurate assessment. Technology can play a crucial role to move humanity from blame fantasies to focused attention and working solutions."

Jennifer Jarratt, co-principal of Leading Futurists LLC, wrote, "The development of new social technologies will provoke social change, some beneficial, some not. By 2030 we will have data we've never had before to enable us to influence people in new ways. I don't agree with the assumptions being made in the section where we are asked to rank items. Society, and people, aren't likely to become more idealistic or support 'good outcomes,' although they'll go along with change if it seems to benefit their own lives. And with new technologies come new crimes and criminals – opportunities for all! I think we can become much more efficient at managing the everyday business of governing a complex society and at least in theory, we could have an uprising of willingness to rebuild society in a new model that works with the digital age. We might have to have a revolution first to get us there."

Stowe Boyd, consulting futurist expert in technological evolution and the future of work, responded, "Technological change is an accelerant and acts on the social ills like pouring gasoline on a fire. In an uncontrolled hyper-capitalist society, the explosion in technologies over the past 30

years has only widened inequality, concentrated wealth and led to greater social division. And it is speeding up with the rise of artificial intelligence, which like globalization has destabilized Western industrial economies while admittedly pulling hundreds of millions elsewhere out of poverty. And the boiling exhaust of this set of forces is pushing the planet into a climate catastrophe. The world is as unready for hundreds of millions of climate refugees as it was for the plague. However, some variant of social media will likely form the context for the rise of a global movement to stop the madness – which I call the Human Spring – which will be more like Occupy or the Yellow Vests than traditional politics. I anticipate a grassroots movement – characterized by general strikes, political action, protest and widespread disruption of the economy – that will confront the economic and political system of the West. Lead by the young, ultimately this will lead to large-scale political reforms, such as universal health care, direct democracy, a new set of rights for individuals and a large set of checks on the power of corporations and political parties. For example, eliminating corporate contributions to political campaigns, countering monopolies and effectively accounting for economic externalities, like carbon."

Beth Noveck, director of NYU's Governance Lab and its MacArthur Foundation Research Network on Opening Governance, said, "While we worry with very good reason about the impact of new technology on the future of work, especially the dislocation of workers and decrease in wages as a result of automation, there are also hopeful advances in the use of new technology to improve working conditions, rendering work safer and more humane. In some cases, new technologies like robotics are eliminating repetitive, dreary assembly line tasks. In some cases, automation is helping to perform dangerous work that endangers worker health. In some cases, artificial intelligence technologies are making it possible to match workers to new education and employment opportunities that are best suited to them and making it easier for them to find work. In some cases, machine learning tools are able to monitor workplace conditions to improve worker safety. However, these positive benefits will scarcely be realized without the right policies to encourage invest in and use of such tools instead of simply the use of new technology to reduce labor costs. The future is by no means certain, but the potential is there. … We will also see proliferating experiments with new kinds of tools to improve workplace conditions and worker safety. Where I am less optimistic is about the power of civil and social tech per se to upend the power of big tech companies or subvert the role of capital in our political and economic institutions. I think we will need far-reaching legislative and policy action to address inequality, the causes of which will not be solved by technology."

Brad Templeton, internet pioneer, futurist and activist, a former president of the Electronic Frontier Foundation, wrote, "Imagining that there would be no innovation would be a remarkably stark view; the question remains about whether it will be enough. The greatest barrier is that legal and democratic institutions are deliberately resistant to change, so much so that improvements

may only come outside them. Since there is now high awareness of these issues, I expect substantial effort on them. Effort will be more successful in private areas where innovation is more popular. Normally would be optimistic about success. Counter to that optimism is we now have parties actively fighting against success in some of these areas, so it's a question of who will win, not just is winning possible."

Gina Glantz, political strategist and founder of GenderAvenger, said, "Watching the exponential growth of small-dollar fundraising on both sides of the aisle could well be an encouraging model for journalism, especially local journalism. The Guardian and Wikipedia have shown it is possible to create public enthusiasm and support. In a world where there is universal health care, the ability to develop technology to improve individual health through the use of a variety of tools is certainly a possibility."

1. The innovations these experts predict by 2030

Americans and many around the world are not terribly satisfied with the state of democracy and the institutions that undergird it. Experts who were canvassed about the relationship between people's technology use and democracy also expressed serious concerns about how things will unfold in the next decade.

At the same time, the experts responding to questions about civic and social innovations also foresee scores of innovations between now and 2030 that they think might ease some problems. This chapter covers some of the key open-ended answers they offered, organized in 10 broad themes. It includes comments made by an array of respondents, regardless of their responses to our main question about the impact of technology on innovation by 2030.

Social media: Experts see a reckoning coming for social platform companies and leaders that will lead to large-scale changes

A portion of the experts in this canvassing suggest there will be changes in the overall environment of social media during the next decade. Some say there will be a reckoning for technology companies and their leaders that might produce major revisions to their platforms. Some expect serious efforts to break up such firms, and some predict the rise of new platforms designed to make their users' best interests paramount.

Sam Adams, a 24-year veteran of IBM now working as a senior research scientist in artificial intelligence for RTI International, architecting national-scale knowledge graphs for global good, said, "I do expect new social platforms to emerge that focus on privacy and 'fake-free' information, or at least they will claim to be so. Proving that to a jaded public will be a challenge. Resisting the temptation to exploit all that data will be extremely hard. And how to pay for it all? If it is subscriber-paid, then only the wealthy will be able to afford it. But at the end of the decade, humans will still be humans, and both greed and generosity, love and hate, truth and lies, will likely still exist in the same proportions as they do today."

Jim Hendler, Tetherless World professor, Rensselaer Polytechnic Institute, responded, "Just as we were taught 'Don't believe everything you read in the paper,' the next generations are already learning to take social media with a grain of salt. If we can create some commonsense legislation on local, national and/or international levels, society will adapt to the changes. Don't get me wrong, there will be social upheaval and significant change – but the techlash we are seeing today is the leading edge not of a new Luddite-revolution, but of positive changes that can result if we maintain traditional social ethics during the time of change. It won't be easy, but human society has proven to be resilient to change for a long time – I think, or perhaps hope, that civil and social

innovation will help us through the current technological change. Perhaps I should note that while I am an optimist about handling these technologies, there are other factors at work, ranging from climate change [to] the growth of authoritarian governments and social inequalities, that worry me far more."

Janet Salmons, consultant with Vision2Lead, said, "Positive change will only happen if users, consumers, buyers, voters insist on it. If they have the digital literacy needed to discern positive change from new bells and whistles that do nothing to solve the problems discussed in this survey. I am hopeful but not entirely optimistic that they will. Will members-only, perhaps subscription-based 'online communities' reemerge instead of 'post and we'll sell your data' forms of social media? I hope so, but at this point a giant investment would be needed to counter the mega-billions of companies like Facebook! I think we'd benefit from cooperative, nonprofit or nongovernmental organization leadership in this sphere."

Kenneth R. Fleischmann, an associate professor at the School of Information at the University of Texas, Austin, wrote, "I am confident that new platforms will evolve which may better handle provenance [of information]. How popular these platforms will be is hard to estimate. I think that just as traditional media (radio, TV, print) is highly polarized, social media will become increasingly polarized; perhaps not just people with shared beliefs forming distinct friend and follower networks within the same social networking sites, but instead the emergence of specific politically polarized social networking sites, further increasing the encroachment of politics in our everyday lives. I am pessimistic about the degree to which privacy and worker autonomy will be respected. We are headed toward an increasingly panoptic society, as represented by the Chinese government's emerging social credit scale."

Alex Halavais, an associate professor of critical data studies, Arizona State University, wrote, "It is always hard to bet against entrenched power, but the current conflicts give me hope. There is an increased recognition of the value of good journalism, and that means a flight to quality. It's true that digital subscriptions to the 'big three' newspapers in the U.S. do not yet mark a sea change, but an interest in these, along with a number of smaller investigative news and data organizations suggest a directional change. I suspect people will be willing to pay for a Facebook replacement that allows for more pro-social outcomes. I am less optimistic about the future battles that will attempt to balance safety with privacy. There are already regulatory rumblings about once again attempting to control cryptographic structures, but there is no turning back from good end-to-end encryption at this stage. As people leave the more easily monitored platforms and turn to more secure spaces for interaction (as well as seeking, for example, trustworthy Internet of Things structures), there will be an ever-increasing set of regulatory tensions that will recapitulate the crypto wars of the last century."

Caroline Figueres, a strategic consultant based in Europe, said, "Extreme bad behaviour from governments and private companies – GAFAs [Google, Apple, Facebook, Amazon] and the like in China – will create a social and civic innovation to compensate and/or to contribute to an innovation jump. I hope for development of human cooperative brain networks."

William L. Schrader, founder of PSINet and internet pioneer, now with Logixedge, said, "Logic dictates that educated people are willing to learn from one another, allow other reasonable men to [differ] in their opinions and remain tolerant of one another. The social norms of the past century of opening doors for the informed will be translated into new social media. How? People will talk via social media, listen and hear and debate. They may go to private conversations so that the 'noise' doesn't overtake the conversation. But people are people. Technology is here to solve the needs of markets. Otherwise, technology withers. We may see the backlash against Twitter and Facebook intensify, and they may be replaced by new and more balanced (no one fake may apply)."

Byron Reese, CEO, publisher, futurist and author of "The Fourth Age: Smart Robots, Conscious Computers and the Future of Humanity," commented, "Our first attempts at building community online have had both good and bad outcomes. We know them all. But would we have expected otherwise? We are new at digital communities and are inventing them as we move forward. Of course we aren't going to get it right the first time. But the key question is whether these technologies help us form social bonds or not. Anyone who has posted a question in a forum and received an answer from a stranger knows firsthand that they bring us together. Wikipedia taught us that strangers will work together for a common good. The open source movement and Creative Commons showed that people will labor for free for the benefit of strangers. We haven't mastered using the internet for social and civic innovation, but it is more than a fair bet that we will."

Serge Marelli, an IT professional based in Luxembourg who works on and with the net, wrote, "I believe some social platforms may be created where truth and factual news is more prevalent than 'fake news.' I do not believe a majority of people will use these platforms. It is easier to believe in the lies than face the truth."

Warren Yoder, longtime director of the Public Policy Center of Mississippi, now an executive coach, responded, "Much social and civic innovation is possible if the GAAF platform monopolies (Google, Amazon, Apple, Facebook) are broken up or regulated appropriately. I believe that will happen, and I hope it will happen in appropriate ways. Done right, it will release a torrent of innovation, including social and civic changes. I trust that the general level of competence is growing among digital citizens. So, I am modestly hopeful we can sort out the helpful from the harmful changes for a net positive gain."

Rich Salz, senior architect at Akamai Technologies, wrote, "A handful of legislators in one (U.S.) or more (EU) countries will impose regulations on the tech giants. I do not know what impact that will have."

Privacy issues: Actions will be taken to better protect people's privacy online

Privacy concerns have become an increasingly hot-button topic in politics. A number of these experts suggest ways these concerns might be addressed in the coming decade.

Tracey Follows, futurist and founder of Futuremade, wrote, "Online advertising regulation will get tougher for advertisers; data privacy and protection will become one of the biggest issues there is, and potentially it will be the wealthiest in society who are able to pay for tools and technologies to protect their privacy whilst the poorer have to exchange their data and sacrifice their privacy in return for access to information and education. As far as traditional media is concerned, it is my belief that we will see the emergence of a new category or industry of 'media forensics' where experts will trace your privacy infringements through your data trails and seek compensation on your behalf. Media will need to insure themselves against such investigations and a whole new industry will grow and thrive."

Loren DeJonge Schulman, deputy director of studies and senior fellow at the Center for a New American Security, previously senior adviser to national security adviser Susan Rice, said, "Privacy norms are the potential 'positive' change I see least likely to come to fruition, because there is such a substantial divide in belief and practice – and not just generationally. Mental health seems like an area ripe for real improvement. Digital technologies have both enabled treatment and also encouraged an openness about challenges and opportunities that did not exist before."

Randall Mayes, technology analyst, writer and futurist, commented, "To address the issue of income equality and privacy rights, a technology solution is a … more advanced version of a blockchain such as Etherium which utilizes smart contracts will compensate citizens for the use of their data – genomes, buying patterns, interests, etc. Whether or not citizens have an expectation of privacy by voluntarily using a technology is a legal issue and part of a social contract. For privacy issues, legislation and fines with lots of zeros should have a positive effect. For the issue of cybercrime, what is not covered in legislation could be addressed by cyberinsurance."

Prateek Raj, an assistant professor in strategy, Indian Institute of Management, Bangalore, an economics expert, wrote, "Over the coming years, we can expect a greater debate in civic, academic and political spaces about how digital life is changing our society. We lived in a relatively unregulated digital world until now. It was great until the public realized that a few companies wield too much power today in our lives. We will see significant changes in areas like privacy, data

protection, algorithm and architecture design guidelines, and platform accountability, etc. which should reduce the pervasiveness of misinformation, hate and visceral content over the internet. These steps will also reduce the power wielded by digital giants. Beyond these immediate effects, it is difficult to say if these social innovations will create a more participative and healthy society. These broader effects are driven by deeper underlying factors, like history, diversity, cohesiveness and social capital, and also political climate and institutions. In other words, just as digital world is shaping the physical world, physical world shapes our digital world as well."

Sarah Scheffler, a computer science doctoral student at Boston University, commented, "Privacy will be solved one way or another. Either law and public opinion will place protections that are good enough to satisfy most of the populace, or privacy as a concept will change as a matter of values. Not sure which, but either way it'll be different. (I'm hoping for the first one.) Eventually, companies will realize that some algorithmic bias arises from a lack of information/accuracy about a subpopulation. They will realize that they can make more money by properly serving the subpopulation, gather more data about them, and voila, algorithmic bias gone. Then there will remain biases due to differences in true base rates, and those we will argue about for decades."

Frederico Links, a journalist, governance researcher, trainer, activist and editor of Insight Namibia, said, "The issues of democracy and human rights – privacy and data protections, etc. – will probably be significantly resolved one way or another over coming years. On issues of mental health and labour disruptions and other long-standing social issues, I'm not too certain whether significant headway will be made between now and 2030. There will be pockets of success, and valuable insights will emerge to deal with such issues beyond the next decade or so. Digital and socioeconomic divides, whatever and wherever they are, are still too great for me to be optimistic about their overcoming between now and 2030. We'll probably win some and lose some."

Misinformation: Due to growing concerns about the accuracy of information encountered online, efforts will be made to identify and address misinformation

As people worry about false and misleading information and its place in their online feeds and societal discourse, a number of these experts believe steps will be taken to address this issue. Some think change will come from better educating the public about digital and technology literacy; others expect digital tools to be a mainstay of the campaign against weaponized information.

Daniel Berleant, author of "The Human Race to the Future," wrote, "People will become more aware of attempts to manipulate them in the digital sphere. This will partially mitigate the problem. Organized efforts to support this will develop in response to realization about the extent and danger of manipulation. These efforts will take root in countries with traditions of freedom.

However, totalitarian countries will increasingly veer toward more manipulation and control rather than less, because their bosses, whose powers will be enhanced by technology, will increasingly be able to suppress the compensatory mechanisms free and healthy societies will develop. Educational institutions should teach people how to recognize manipulations and manipulative techniques when they occur. No one wants to be manipulated and that will help free societies develop defenses against such destructive forces."

Don Davis, a statistics and mathematics teacher at Lakeland Community College, wrote, "The term 'fake news' is the elemental social and civic irony of our time. Soon, we will be able to fact-check speeches, news conferences, articles and opinion columns in real time so that deceivers, miscommunicators and propagandists will no longer be able to blur the lines between facts and misdirection."

Peng Hwa Ang, a professor at the School of Communication and Information at Nanyang Technological University, Singapore, wrote, "I tend toward the social-construction-of-technology school of thought. This means that it is not only technology that is determinative. I expect that the innovations will include non-technological ideas but then also those using technology. For example, some work I have seen suggests that it is possible to counter fake news if there can be a trusted group of verifiers composed of sincere fact-seekers from the two opposing camps who are prepared to meet face-to-face to discuss or to confirm facts. There is social capital, there is technology and there is face-to-face encounter."

Ray Schroeder, associate vice chancellor of online learning at the University of Illinois, Springfield, said, "We are already seeing the advent of sophisticated fact-checking, image validating and information assurance initiatives. These will continue to expand to assure that people can rely upon the established media, social media and websites are legitimate. People will demand accuracy and value in their consumption of information. This will come in formal and informal conduits. Truth and veracity will be honored and strengthened following the current difficult period of exploitation of facts. The public deserves and will demand no less."

Filippo Menczer, grantee in the Knight Foundation's Democracy Project and professor of informatics and computer science, Indiana University, said, "Social and civic innovations to protect information quality and speech must emerge. This will force us to revisit the current absolutist interpretation of the First Amendment in the U.S. Speech amplified by technology (e.g., social bots and fake accounts) can suppress human speech and therefore cannot be unlimited. As the legal framework will evolve to protect legitimate speech, tools will be developed to help disclose information sources and uncover information manipulation."

Political and government reform: Democratic activity and government policymaking will open to more citizen engagement, and public activism will grow

From greater civic engagement to the possibility of new digital voting systems, a number of these experts predict in the next 10 years there will be changes in how the public is able to interact and engage. Many expect activism to play a large role in the coming years, including activities in international forums and activism within multinational and multi-stakeholder groups.

Mark Maben, a general manager at Seton Hall University, wrote, "I expect to see innovations that give the common American a greater ability to influence many of the institutions that impact daily life. Technology will make governments and corporations more responsive to the people, even if it is just the result of politicians and executives acting out of self-interest."

Douglas Rushkoff, media theorist, author and professor of media at City University of New York, said, "The primary means of social and civic innovation will occur as people go offline and reconnect with their local communities. So, I don't see so much positive change occurring from the top down, through policies and regulation – even though it would be nice to try. I do think government and corporations can be pressured to respond to widespread, bottom-up social activism and widespread changes in citizen and consumer behavior."

Lee McKnight, an associate professor at Syracuse University School of Information Studies, commented, "The UN and World Economic Forum's recently announced collaboration, which does have its limitations, is as much as anything an admission by the 'techlashed' Davos elite that they have to humbly try to do more to accept their own limitations, and recognize the roles and contributions of many other actors, and especially civic innovators whose motivations extend beyond being able to afford to hang in Davos. … I know new approaches to civic engagement are bearing fruit and will continue to do so, again because I am close enough to the scene to see the positive indicators that change is underway and cannot be stopped. I know for example that social and civic innovations will improve education and training including on information security awareness across cities, communities, regions and states. … Thomas Jefferson's aphorism 'Do well by doing good' is timely and trendy in a way it hasn't been for centuries. Because that ethos for technology entrepreneurs is increasingly recognized as the only way many people will expect firms offering technology innovations to approach them: humbly and with a broader social mission and accounting not just as a corporate social responsibility afterthought, but as a core value of the products and companies themselves."

Osvaldo Larancuent, a professor based in the Dominican Republic with expertise in the governance of cyberspace, responded, "How might the success in social and civic innovation come to pass, and what kinds of new groups, systems and tools will be created? New tools will be available to improve social and civic participation through innovation. By now, only 50% of the global population has access to digital platforms to participate in democracy. But this number will improve as many governments will reduce the digital divide. As we have seen in recent years, different civic groups and hacktivists have stressed the need for governments to hear the needs and wants of populations through digital but general-purpose tools. So, there are opportunities for people to use more-specialized tools to improve democratic participation and to channel responses from politicians and democratic institutions to citizens. And the skills and competences of people will improve as more knowledge will be available to reach well-being by society in general."

Edson Prestes, a professor of computer science, Federal University of Rio Grande do Sul, Brazil, wrote, "In democratic countries, I believe technology use will contribute to social and civic innovation. People will become more aware about the social implications coming from technology and demand effective actions from governmental bodies to address them. In my view, technology will be used as a way to empower people and demand effective solutions from the government. On the other hand, in authoritarian countries, I expect exactly the opposite. … My main concern is always associated to places where democracy is incipient or even does not exist. In these countries, I do not see a bright future. Maybe technology will be used to undermine human rights creating a dystopian scenario."

Benjamin Shestakofsky, University of Pennsylvania, a researcher focused on the impact of digital life on labor and employment, wrote, "By 2030, new technological tools may emerge that allow voters to fact-check political speech in real time. New apps may also facilitate processes of direct democracy by making it easier for voters to participate in participatory budgeting processes. Of course, technology may also prevent the emergence of social and civic innovation. For example, the emergence of deepfakes may undercut collective belief in the 'truth' of public figures' speech. I am hopeful that legislators and regulators will work to mitigate the vulnerabilities associated with technological disruption in the workplace. Many potential solutions are readily available, but at the moment remain politically fraught. The threats posed by digital labor platforms that undermine labor standards can be mitigated by implementing laws and regulations that guarantee all workers a fair wage and access to health care and other benefits already available to full-time employees. Societies can also mitigate the disparate impact of algorithmic decision-making systems on the most vulnerable workers by updating and enforcing existing anti-discrimination legislation. Given ongoing political gridlock at the federal level, much-needed policy interventions are most likely to arise at the state and local levels."

Miguel Alcaine, International Telecommunication Union area representative for Central America, commented, "Social and civic innovation will succeed based on social and civic networks oriented to interact with governments, particularly local, and a new social contract that will filter society principles toward a more human goal-oriented society. Still, technology is the easy factor in the success formula."

Tomslin Samme-Nlar, a consultant in technology security and policy based in Cameroon, wrote, "The kind of innovation I expect to see are new educational systems and methods of educating citizens of their digital rights. I also expect to see new legislative and normative tools that protect netizens and even nation-states in cyberspace."

Mary Alice McCarthy, senior policy analyst at the Higher Education Initiative, New America, said, "My preferred answer would have been 'I hope so, but it depends.' What it depends on is the creation of a bipartisan consensus among leaders from both parties – as well leaders from the business community, labor and other civil society groups – that protecting citizens from misinformation, surveillance, invasions of privacy, etc., are essential for maintaining our democracy and more important than either winning the next election or maximizing short-term gains/profits."

David Wilkins, instructor of computer science at the University of Oregon, commented, "To take one example: e-courts are proving useful, relatively inexpensive and very much broaden access to courts, especially in areas like family law (divorce, child-custody issues), providing far broader access to those who otherwise would face significant issues (child care, absence from work, attorney costs) to solve these issues."

Chrissy Zellman, a manager of digital and interactive strategy in the health care industry, commented, "We are in a place where guardrails are needed, and actions need to be more real time. Tech can evolve quickly, and we need to be faster in how we adapt. Information needs to be accurate and parameters around governance/ethics need to be in place by these large tech organizations for the systems to be socially and civically acceptable."

John Paschoud, elected politician of the Lewisham Council (a London borough), wrote, "Much political and social/community discussion of and decisions on issues are inherently based on physical geography, and often highly localised. Therefore, it's to be hoped that new online (or technology-enabled) media for resolving issues must recognise geography, and effectively parallel traditional means (such as local assembly meetings of areas representing about 10,000 voting citizens). It will not help for a resident of California to influence public transport policy in London (although the Californian may have good ideas for London, which it is useful to share). Similarly,

online identities of those participating should be transparent and linked to real-world people. When decision-making is widened (beyond just elected representatives), then all those participating need to be accountable – as they would expect elected representatives to be."

A vice dean for research at the public policy institute of a technological university based in Southern Europe said, "Technology will foster social and civic innovations by creating new ways for more-convenient voting and new ways to provide public services and enhance direct democracy."

A researcher based in North America predicted a list of specific likely outcomes, writing, "Statistically selected citizen panels with voting rights; children's complete right to privacy to age 25; complete transparency of political funding; virtual citizen juries of peer mediators who protect defendants from overcrowded justice systems, unnecessary jail time, lazy or biased judges, and unfair, unaffordable bail; citizen online training to be certified to participate in juries, community committees; certified volunteer hours in lieu of taxes; special court and mediation panels for all ages of the public."

Social connectivity: A number of innovations will help connect people and bring them together for a common purpose

Many of these experts maintain that people are able to connect easily regardless of geographic distance in the current moment, and they expect that the power of this reality will increase in the future. The internet has opened doors for people to learn of issues faced by others around the world or around the corner. No longer restricted by proximity, people can provide emotional support, financial aid, political advocacy and much more for others around the world without leaving their own home. Experts expect that social innovations in this realm will continue to bring people together.

Joshua New, senior policy analyst at the Center for Data Innovation at the Information Technology and Innovation Foundation, said, "Connected and data-driven technologies can dramatically reduce barriers to social and civic innovation, such as challenges related to accessing human capital, network building, fundraising and advocacy. One particularly likely result of this will be the creation of significantly more decentralized social and civic innovations. Whereas the social and civic innovations of the past have relied on local communities, technology can allow for the connection of people with similar needs across local, state and even national boundaries."

Alejandro Pisanty, a professor at UNAM, the National University of Mexico, an activist in multi-stakeholder internet governance, wrote, "Here, as in everything else, technology alone will not do the job. A commons-oriented management of shared resources is one of the political

components that will be needed. The internet provides an example, including many failures, of how to manage globally a resource that started as a sort of commons but quickly enabled property rights to arise. They coexist, even if roughly. I expect to see a differentiated approach. From a developing or middle development country point of view, there is room for spontaneous, issue-oriented, temporary campaigns that may give rise to broader social movements and even parties that will better represent and solve problems. Technology's contribution is limited; it only works as an enabler, at best. We are wasting valuable time for humankind when we focus on technology and platforms, or even in privacy and control over data, and not on conduct, a whole chain of conduct from the active subject of a possible manipulation to the harms suffered by others and society as a consequence of manipulation and other abuses. It's not that tech is not important; it is that we overlook what goes on around it."

Louisa Heinrich, a futurist and consultant expert in data and the Internet of Things, wrote, "The history of the internet seems to indicate that where there is a majority of users who understand the technology they are engaging with and are motivated altruistically, peaceful, supportive and healthy communities can be built. The population of the internet has grown exponentially since the early days of Slashdot, but civic responsibility in the digital world is both possible and effective. It is symbiotic with a sense of civic responsibility in the real world and the satisfaction that engenders. None of this will happen unless the people who believe in their causes and neighbourhoods – online and offline – come together and activate."

Artur Serra, deputy director of i2CQT Foundation and research director of Citilab in Catalonia, Spain, responded, "In spite of the real danger of 'techlash,' I do see a lot of success in social and civic innovation across the world. Four billion people are now connected to the same infrastructure, the internet, that we the science and technology community put in place just decades ago. This is creating the conditions for an explosion of open creativity and innovation never seen before. A huge wave of labs of all kinds (living labs, fablabs, social labs, edulabs, innovation spaces, even policy labs) is emerging as the new kind of groups and communities of the digital era. We are moving from the net to the lab. On the 2030 horizon, many of these labs will gather and agree in generating the first universal innovation ecosystems in regions and countries. https://www.ecsite.eu/activities-and-services/news-and-publications/digital-spokes/issue-45."

A research scientist and co-author of a study on intelligent future internet infrastructure said, "Technology provides multiple tools for engaging citizens among them and can be used to create new communities for virtually every possible objective: from sharing hobbies to attaining objectives that lead to an improvement in the welfare of different communities. Besides that, technology and expert groups continuously attempt to attract users to their field so

they can contribute or become interested in topics where typically citizenship does not excel (as in the legal or technologic fields of knowledge). It is highly likely that such trends will continue."

Moira de Roche, an entrepreneur based in Africa, commented, "The reality is that we do not know the impact in the next decade, because some futurists propose that the world will be totally different in five years, because of the exponential change brought by Fourth Industrial Revolution technologies. What we can be sure of is that, used responsibly, digital technologies will and must enable social and civic innovation. We will see more virtual collaboration give rise to new tools being developed and embraced 'on the fly.' We will see more and more people grouped by interest rather than a physical location. We need to accept that as innovations occur, they will as quickly become redundant."

Arzak Khan, director of the Internet Policy Observatory-Pakistan, said, "The growing use of technology and connecting the missing billions will result in more innovation in technology, ultimately bringing social change in the form of new groups and tools that bring transparency and accountability. Civic innovation will occur mostly in the political, economic and human-rights domains."

June Parris, a member of the Internet Society chapter in Barbados, wrote, "For those who have access to technology their access to social and civic innovation will increase. They will see ways that this can benefit them; these will include marketing. I see an influx of this – use of social media for financial purposes. Not all are looking to improve financially, social groups and charities are also using innovative tools. I personally see new groups emerging daily and ease of access to join these groups. Several tools are in use and more are being created. I see that this will improve and spread widely in the future."

Garth Graham, a longtime leader of Telecommunities Canada, predicted that "innovation in the creation and sustainability of social institutions acts predominantly at the local level." He wrote, "In the Internet of Things, for those capacities to emerge in smart cities, communities need the capacity to own and analyse the data created that models what they are experiencing. Local data needs to be seen as a common, pool resource. Where that occurs, communities will have the capacity to learn or innovate their way forward. So far, smart city systems are being set up to appropriate and commercialize individual and community data. So far, communities are not waking up to the realization that a capacity they need is being stolen from them before they have it."

Healthier living: Innovations will address physical and mental health; major change is coming for the health care sector

Many experts predicted significant medical advancements in the next decade. They expect innovations in every realm of physical and mental health. They foresee change coming for the health care industry and health care professionals, and they expect advances in the ways in which individuals are able to care for themselves.

Jason Hong, a professor at the Human-Computer Interaction Institute at Carnegie Mellon University, said, "Health care is an area that will likely see many innovations. There are already multiple research prototypes underway looking at monitoring of one's physical and mental health. Some of my colleagues (and myself as well) are also looking at social behaviors, and how those behaviors not only impact one's health but also how innovations spread through one's social network. I'm highly optimistic on this front, given that the problems are clearly there, the sensing technology is feasible, and the interventions should work (based on what has been done in the past using less sophisticated interventions or based on existing theory)."

Rey Junco, director of research at CIRCLE in the Tisch College of Civic Life at Tufts University, predicted, "Social and civic innovation will substantially mitigate mental and emotional health problems tied to digital life. Two technologies in particular that are promoted in public conversations as causing mental and emotional harm are social media and smartphones. However, both of these technologies grew out of and thrived because of the human need for connection. Social media were developed at a time when people were feeling especially disconnected to their communities, families and friends – likely due to not just increased geographic mobility, but also economic pressures and global stressors (such as protracted war in the Middle East). … Smartphones were developed shortly thereafter and again provided an easier method for individuals to stay connected to their peer networks and to access the social media they had already integrated into their lives as virtual community spaces. The visibility of communication online and through the use of smartphones has highlighted, more publicly, difficulties in interpersonal interactions that existed well before the advent of these technologies. Plus, some of the uses of these technologies have promoted unhealthy habits, especially by people who were predisposed to have psychological and physical health issues. For instance, a person who was depressed could go online to engage with others and feel more connected. However, another person with similar depressive symptomology could use social technologies to further a more negative view of themselves and their life circumstances, for instance. We have seen a shift toward trying to mitigate the impact of less-healthy forms of technology use. For instance, smartphone operating system developers have started to include controls for limiting a user's screen time. Additionally, cellphone developers are starting to add models that have less, rather than more, 'distracting' features – such as a phone that can only send and receive calls and text

messages. We will likely continue to see more innovation in this space as we continue to home in on which approaches to technology positively or negatively impact mental and physical well-being."

Brian Southwell, director of the Science in the Public Sphere Program, RTI International, said, "Our core human needs have not changed. Although some people are likely more materially comfortable than ever before, we also are facing important disruptions in the physical environment that will cause sufficient discomfort to prompt people to demand policy responses. Because of the physical discomforts we will face, there will be a market for social and civic innovation, suggesting people will capitalize on the opportunity to create and offer social and civic innovations. Workers will continue to be vulnerable in coming years despite social and civic innovations. We are likely to make some gains in personal health, are likely to face some collective concerns in terms of environmental health and are not likely to cope with the alienation and despair that is a part of a life lived largely online. In the latter case, there is a disconnect between the long period of evolution that honed our humanity and the short period of rapid technology change we are facing. Social media platforms that offer human connection and relationships will grow as they offer something people want and need."

Charlie Firestone, executive director of the Communications and Society Program and vice president at the Aspen Institute, wrote, "Increased time watching screens will initially have a detrimental effect on personal health. But advances in medical technologies, along with improved communications involving health, will lead to advances in personal health by the end of the decade."

Shane Kerr, lead engineer for NS1 internet domain security, said, "I am fairly confident that the improvements in medical technology, like CRISPR-Cas9 and other gene editing, and related technologies like AI, will result in vastly improved medical care for humankind. Things like the malaria vaccine and golden rice improve the lives of the poorest basically for free."

Denise N. Rall, an academic researcher of popular culture at Southern Cross University, New South Wales, Australia, commented, "The only area in which I would envision substantial innovation is around health systems – such as individualised gene cancer treatments and other treatments for those able to afford them. World population growth and the scarcity of natural resources will dominate the next decade. Unless Google and other tech companies can substantially reduce population, we are stuck in an untenable position to support the world's economies that are fixed on growth and the inevitable fact that growth will no longer be possible."

Matt Moore, innovation manager for Disruptor's Handbook, Sydney, Australia, responded, "Humans are still going to be human. There will be opportunities to improve the quality of human life – especially in the domain of health and the management of chronic diseases. I see most opportunity for improvement in domains that are not dependent on 'improving' human behaviour. Hopefully we are not going to go backwards, but we seem unlikely to improve much more. I see a bleak future for news media and bright future for education. No one knows what will happen to the tech giants – although all of them were around 10 years ago so they are likely to remain around in some form. We may even be able to reclaim some of our privacy back. A big change of the next 10 years is that the internet will finally disappear into the world of technological (and physical) infrastructure. There will be content, data, applications, actions. But we won't see the internet. Perhaps another big change will be the proliferation of usable translation tools. Although the punchline to Douglas Adams' Babel Fish story should be remembered here."

Susan Ariel Aaronson, a research professor of international affairs at George Washington University and fellow at the Centre for International Governance Innovation, wrote, "Innovators and governments are investing substantially in health. Consequently, we will see lots of innovation, and because health is seen as a human right by many, there will be significant regulation to ensure that these rights are respected. But I deeply worry about governance in the developing world, where governments and individuals will be consumers of data-driven services such as AI, and without such sectors they won't effectively know how to govern them. Governance of data could be particularly weak in nations without a strong feedback loop and lots of expertise and public trust in governance. Data is a development issue."

Heywood Sloane, entrepreneur and banking and securities consultant, said, "I'm very optimistic about changes to health care. Telemedicine, security and health monitoring, along with mobility and logistics are all evolving in ways that create safe, healthy behaviors and independence for the entire population as it ages. I am less sanguine about where and how data security and content integrity will play out. It will likely require a movement from the grassroots up to take control. Given an adequate set of tools, that is quite possible. There will be pressure from governments and large corporations in opposition to that. But change can occur. After all, Quakers stood up against slavery in their meetings. Samuel Gompers and unions stood up to robber barons. Move On and #MeToo are standing up today. Add in some trusted tools to organise, and people will respond."

Valerie Bock of VCB Consulting, former technical services lead at Q2 Learning, responded, "Some of the most important innovations currently underway are changes in social norms with regard to mental illness. People have been sharing their own experiences with mental illness on social media in unprecedented numbers, breaking a silence which was difficult to overcome when

most interpersonal communications were face-to-face. There are hundreds of online meetings for 12-step groups, allowing people to seek, find and offer support irrespective of time of day or geographical location. The ability to turn to friends who are not personally present for support and to share resources for improving mental health has changed this landscape for many and is likely to continue to do so. Some counseling services have also become available in a technology-mediated format. I expect this sector to grow, increasing availability of mental health services to those whose work hours and/or geographic locations have made them inaccessible previously."

Eric Vance, director of the Laboratory for Interdisciplinary Statistical Analysis, University of Colorado, Boulder, commented, "We'll have a growing awareness of the importance of 'unplugging' or limiting screen time for children and adults. Maybe we'll use technology (social media) to advertise more face-to-face meetups and outdoor activities without screens."

Sam Adams, a 24-year veteran of IBM now working as a senior research scientist in artificial intelligence for RTI International, architecting national-scale knowledge graphs for global good, wrote, "We are already seeing the emergence of 'tech-free' camps and vacation packages. Experiencing life 'offline' will become a generational goal, much like the Millennial generation introduced ride sharing and home sharing. Ironically, it will be technology that enables this trend, and premiums will be paid for uninterrupted time to focus or to simply enjoy being alive. This may also indicate a new kind of disparity between economic strata, with the more-wealthy affording privacy, peace and quiet while the lower strata remain fodder for 24/7 social media aggregators and botnets."

Artificial intelligence: AI will continue to improve and be applied to improve human lives online and offline

Algorithms have been improving and advancing for years. The experts in this canvassing don't see that momentum changing. Addressing issues both on and offline, many experts expect AI to make improvements in people's lives.

Susan Etlinger, industry analyst, the Altimeter Group, responded, "We need to let go of techno-solutionism – the notion that the problems caused by technology can only be solved by more technology. Yes, we are already seeing useful technology tools (adversarial machine learning techniques to identify bias, or artificial intelligence systems of record for interpretability and accountability, for example), but we also need to incorporate transparent and deliberative decision-making, and, in some cases, actual structural change such as regulation to ensure that we are addressing not just the symptoms but the root causes of inequality. In this respect, there is as much value to considering how social and civic innovation can inform our use of technology as there is the other way around. There are a couple of issues with artificial intelligence in particular

that are reasonably tractable from a technology perspective: (1) reducing unwanted bias in datasets, data models and algorithms, and (2) improving interpretability of those algorithms. For the first, it is possible to add data to an image dataset to make it more reflective of human diversity (for an example, see the 'Gender Shades' research authored by Joy Buolamwini and Timnit Gebru). For the second, there is a great deal of research being conducted on methods to improve interpretability of algorithms without reducing their performance. These are both good things; first, because algorithms that perform similarly on different groups are less likely to perpetuate harmful outcomes specifically related to accuracy (for example, incorrectly identifying someone as a criminal suspect), and second, because interpretability provides a level of transparency that aids decision-making and, potentially, promotes trustworthiness. But it's important not to equate bias reduction with fairness. The technology can only take us so far, and it is up to us to construct or adapt our human rights and justice frameworks to ensure that we are using the technology in a trustworthy and humane manner."

Sam Lehman-Wilzig, a professor of communications at Bar-Ilan University specializing in Israeli politics and the impact of technological evolution, said, "The biggest advance will be the use of artificial intelligence to fight disinformation, deepfakes and the like. There will be an AI 'arms' race between those spreading disinformation and those fighting/preventing it. Overall, I see the latter gaining the upper hand."

Devin Fidler, futures strategist and founder of Rethinkery Labs, commented, "It is certain that new organizational technologies are being catalyzed and will have a substantial impact over the next decade. Importantly, this includes the emergence of 'software defined organizations' that focus on combining the resources available on digital platforms to create value. Ironically, the deployment of these tools could very possibly be sooner than the first widespread deployment of self-driving vehicles. For example, imagine a machine learning-based system designed to *autonomously* 1) identify real estate that is most likely to be undervalued and 2) determine what interventions are most likely to increase value, and then 3) use work platforms to autonomously identify and deploy builders who have demonstrated themselves to be the best available for these particular renovations before finally 4) again using machine learning to maximize selling price. The exploration of this kind of 'closed loop' autonomous or software-defined company is the focus of much of our current work at Rethinkery. There is nothing about the example above that is not at least technically feasible *today*. The implications here could be both very positive and very negative. You could imagine, for example, a machine learning system that learns through feedback to greatly amplify media that perpetuates fear and uncertainty about a particular asset, currency or region in order to benefit from the volatility created (a short trade, for example), at the expense of stability of the system as a whole. You could even argue that a version of this phenomenon is essentially what we are already seeing play out in our democratic political systems. There is much

more to come. These new organizational technologies are now in the process of moving *en masse* from basic R&D to the deployment phase. Like all design processes, this process will be shaped by the values and stakeholders that the system is built around. At a minimum, it is profoundly important to identify and design around the destabilizing negative externalities that these new organizational technologies create if we are to avoid the possibility of crashing the social 'operating system' as a whole."

Faisal A. Nasr, an advocate, research scientist, futurist and professor, wrote, "Modulating the power of large technology companies is inherent in the legislative and regulatory reform that could take place, possibly prodded on by emerging social and civic innovation. Ethical advances in uses of algorithms can stand a chance through a reformed legal structure and global governance system to deter unethical practices. Improving the economic stability of the news media is a complex issue that involves the functioning and balance among three branches of government and degree of power of the private sector, all critical issues which could enhance the trust in democratic institutions, lead to the creation of social media platforms and [strengthen] self-expression. However, mitigating mental and emotional health problems tied to digital life is a monumental educational process, and social and civic innovation can only have a very small impact."

A computing science professor emeritus from a top U.S. technological university responded, "I am an expert in artificial intelligence (AI), not in future social/legal policy formation or enforcement. In any case, the problem with applying AI technology will not be with the technology but with the legislative sector. For example, in the area of health, in the U.S. the poor on food stamps (SNAP) are able to use their stamps to eat foods that lead to diabetes at ever-earlier ages, but how can laws decide which of the many thousands of food products should be banned from SNAP, due to offering low-quality nutrition? The problem here is not about the use of technology – an AI machine-learning algorithm could assign a quality score to various foods, based on data mining of health and food use outcomes. But who would decide what data gets mined and what criteria are used by such an algorithm? The makers of all those junk foods would lobby fiercely against any such laws."

Education reform: Education systems will evolve in response to many multilayered societal changes

As society shifts under the influence of technology, a number of the experts in this canvassing foresee education changing in response. Some expectations include a greater focus on science, technology, engineering and math (STEM) subjects and a greater focus on digital literacy programs in the standard curriculum. Others believe that education systems will make greater shifts toward being digitally based.

Frank Feather, president of AI-Future, predicted, "Education systems will be reformed to include full orientation of the benefits and risks of digital technology applications in the curriculum. Simultaneously, education will increasingly be done remotely. Mass education is obsolete; individualized learning will evolve in all subjects. All students will become STEM-educated and will understand the positive benefits and negative harms of technology. Technology will also decentralize the workplace. In society at large, online social networks will be the predominant form of interaction and creation of socio-political movements as needed."

Catherine Steiner-Adair, a psychologist, researcher and author, said, "The capacity to create social and civic innovation with tech begins early in life, in the ways that children are educated and cared for, and then throughout their education. I am in schools around the U.S. and abroad every week, working with hundreds of teachers, parents and students from ages 4-18, looking at the impact of tech on their lives. Not enough children are getting the educational experiences they need to have the tools to be thought/design leaders in the domains of social and civic innovation. We need to completely rethink the Core Curriculum in order to prepare the rising generations for the world they are going to inherit 2030. Education is critical! Stop putting kids in front of screens all day in school, and then again for homework. We must make major changes in what we teach, how students learn (project-based learning) and how kids are assessed (mastery portfolios, competency and formative assessment). STEAM (adding arts to STEM) is critically important, but so is ethics, compassion, a sense of stewardship for each other and the planet. We should teach tech ethics, tech literacy, tech politics, tech health and wellness, the politics and economics of the tech industry – along with SEL [social and emotional learning] and DEI [diversity, equity and inclusion] and cultural competency to every student – and address the decline in empathy, attention, self-regulation and the capacity for solitude and the spikes in online hate, anxiety and subclinical issues."

Eileen Ruddin, co-founder and board chair of LearnLaunch, said, "I have spent the last seven years supporting the use of technology to close opportunity and achievement gaps in education, by founding and growing the LearnLaunch education innovation ecosystem (www.learnlaunch.org). It's not just me – there are groups engaging young people, getting them to create and make, awarding them new credentials (e.g., LRNG, now part of Southern New Hampshire University). … Workforce development will begin to use technology platforms to make it more possible for working adults to get more education and so on. Human nature will not be changed by social and civic innovation. Social and civic innovation that builds communities with norms that value critical thinking and respect for others will be the most needed. Political mechanisms can work to address transition issues, whether they be for individual workers or communities. They can address distribution of income. Additional privacy regulations can be enacted."

Don Davis, a statistics and mathematics teacher at Lakeland Community College, wrote, "There will be two primary innovations in the next 10 years that will fundamentally change our society. First, education will finally catch up with technology to provide new teaching methods, new ways to access students and [drive] a new modern STEM-based curriculum. Next, the proliferation of firearms in the U.S. will encourage parents to keep their children safe at home so that students will be schooled at home, but thankfully because of technology, will not be home-schooled."

Thierry Gaudin, co-founder and president of the France 2100 Foundation, commented, "One of the major changes is free access to knowledge and know-how, which should reshape education and training, allowing access to technology and science. Maybe the concept of 'intellectual property' will not survive."

Ian O'Byrne, an assistant professor of education at the College of Charleston, responded, "Multiple factors are needed to enact positive change in civic and social innovation as it relates to technology and discourse systems. The first is education. We need individuals who understand and value digital texts and tools, problematize them and envision a better possible future. They need to instill this in future generations. This also requires that, collectively, we all examine the role and purpose of these digital texts and tools in our daily practices and actively choose to make better, possibly tougher decisions."

Labor and jobs: Business practices, individuals' work lives and the larger economy will substantially change by 2030

In light of growing technological developments and shifting sentiments toward capitalism, some experts suggest that innovations will likely occur on the labor front and overall jobs market. From shorter work weeks to technological displacement, they predict an array of changes are possible over the next 10 years.

Ray Schroeder, associate vice chancellor of online learning at the University of Illinois, Springfield, wrote, "Dramatic shifts in employment and education are likely to take place in the coming decade. Work weeks will diminish. Work will be specialized. Technology will impact most every field, and the demand for continuous upskilling and lifelong continuing education will rise to meet the demands of a well-prepared and well-educated workforce. Social and civic innovation will take place in preparing people to meet the needs of business and industry. New education models such as just-in-time AI-enhanced adaptive learning will emerge, as will truly personalized learning. These will grow in the context of broad social structures that emerge both within and outside formal education as we know it. They will be responsive to the needs and desires of the public at large for education and training to become affordable or free. These changes will result in

access to robust and individualized learning opportunities that will serve both the personal and professional interests of individuals and the economy."

Isaac Mao, director of Sharism Lab, said, "The real social and civic innovations should be disruptive by departing from today's commercial and capitalism-driven architecture. E.g., people should understand how a system works and how to participate, how to share and how to get incentives without worrying about centralized secret chambers or tyrannies. Many social and civic applications today relying on big tech won't be sustainable. However, the tendency of chasing and sharing junk information would not be easily stopped by any means, unless we reconstruct a lot of social norms and rules, including the changes in the education system."

Mary Griffiths, an ssociate professor at the University of Adelaide, Australia, an expert in digital citizenship and e-government, said, "Digital transformation can be as generative of new workforces as it is destructive of the older forms of industrialisation. The challenge is not to exploit, and mindlessly discard things of value to participants. Consider these examples: a) Former taxi-firm 'employees' become car-hire 'contractors' to a technology platform. What is the further innovation required? Regulatory legislation to protect against any loss of previous rights. b) Health records move online with access to third-party agencies, solely with the object of wholistic health care. What is the further innovation required? Digital stewardship and policing legislation. c) A government wants to develop an area. Innovate by seeing the physical landscape through and with the shared digital infrastructure. Journalists are experimenting with new business models to support public interest journalism. I'm fairly optimistic that – given the urge to know and tell the story on government – some innovations will be successful."

Kevin Carson, an independent scholar on issues of post-capitalist and post-state transition, commented, "Policies like universal basic income, modern monetary theory and the commons-based economic models are being developed in the various municipalist movements. In the area of the internet and social media itself, I believe the reform we're headed toward is not so much the 20th century industrial age antitrust model of breaking up 'Death Star' corporate platforms, so much as forced opening of protocols and elimination of intellectual property barriers to interoperability and piggybacking on legacy platforms and importing contact lists without permission. We'll be transforming Gmail, Twitter, Facebook, et al., into mastodon-like ecosystems to host our own self-governed instances, and Jack Dorsey and Mark Zuckerberg can howl in impotent rage. I also think the internet will facilitate networked radical labor organization focused on direct action, disrupting nodes in the corporate supply and distribution chain and hitting vulnerabilities in just-in-time distribution models, etc."

Sarah Scheffler, a computer science doctoral student at Boston University, responded, "Nothing will be done directly about technological unemployment. Eventually, we will either make it much easier for people to em/immigrate to find jobs, establish some kind of universal income, or abolish money entirely in a fully automated society. Probably not for another 100+ years. But since the Boomers are about to retire, we don't have to worry about this for at least a few decades because we'll need as much productivity as we can to support the population."

Robert Cannon, senior counsel for a U.S. government agency and founder of Cybertelecom, a not-for-profit educational project focused on internet law and policy, wrote, "We are moving into a new economy unlike the last one. The industrial economy and the agrarian economy were based on labor. The information economy will not be. We are already seeing massive job loss – along with new job growth at the nascent time of the new economy and firms move in to create and capture arbitrage and surplus (but significant job growth in minimum-wage jobs with middle-class wages melting away). … What will the new economy be based on? Don't know. Current capitalist notions of economies assume that money flows in ecosystems. Try to imagine an ecosystem that works for the information economy. Will we go the way of 'Star Trek' and not have currency or salaries? Doubtful – Gene Roddenberry was wrong about human nature. Will society segregate along economic classes as suggested in 'Blade Runner'? Maybe."

Jeanne Dietsch, a New Hampshire state senator and pioneer innovator of affordable robotics, said, "Regarding job displacement, it all depends on whether user interfaces empower content professionals in each field to increase innovation or the technology remains bound to techies, out of the hands of those with the ability to dream new uses that create new industries"

Ibon Zugasti, futurist, strategist and director with Prospektiker, wrote, "Social innovation platforms related to employment such as cooperative business initiatives will help reduce inequalities due to replacement of jobs by technology."

Paola Ricaurte, a fellow at Harvard's Berkman Klein Center for Internet & Society, predicted, "There will be more labor demands from workers in the technology industry. Awareness of the environmental impact of technology will grow, and technology companies will be required to abandon programmed obsolescence."

Environmental issues: Climate change and other environmental issues will inspire innovation out of necessity

Several of these experts suggest that climate change and other environmental issues will inspire innovation out of necessity. They say digital technologies are likely to help effect change.

Jamais Cascio, a distinguished fellow at the Institute for the Future, wrote, "As Samuel Johnson said, 'When a man knows he is to be hanged in a fortnight, it concentrates his mind wonderfully.' Imminence of danger can substantially increase the attention given to developing innovative solutions. The apparent acceleration of climate disruption and disaster is likely to be a useful motivator for groups seeking better political mechanisms. The new ideas won't necessarily be the right ones, but they will be innovative and disruptive. It's clear that existing institutions and norms aren't letting us succeed, so we're likely going to see experimentation (sometimes desperate experimentation) with new approaches in a fearful drive to avoid catastrophe. Similarly, the growing risks associated with ethically blind or limited technologies will push for greater adoption of programs like the 'Ethical OS' model. We'll probably see multiple examples of technological failures and misbehaviors associated with incomplete ethical approaches over the 2020s, sometimes with truly awful consequences. Especially as complex technologies get used for climate remediation, we'll want to make sure that the solutions don't cause more problems than they resolve."

David Bray, executive director for the People-Centered Internet Coalition, wrote, "I believe we are arriving at multiple simultaneous breaking points. The most obvious is of course the climate crisis, but also consider the mounting levels of inequality, of pollution and of despicable charlatanry exhibited by those in positions of power. These simply cannot go on if we are to survive as a civilization. Since civilization is resilient, the odds are that we develop tools to support a saner society and bring those tools to bear. I'm not prescient enough to enumerate them, but it seems that the single most useful technology would be one that clearly distinguishes verifiable truth from agitprop in an unavoidable and unambiguous way. This is a necessary but not sufficient condition for making progress on any of the key issues we face."

Miles Fidelman, founder of the Center for Civic Networking and principal at Protocol Technologies Group, responded, "At best, we will see new forms of collaboration among large numbers of people toward beneficial ends. The most obvious example is the changing nature of responses to largescale natural disasters. Perhaps we will see this spirit of volunteer and entrepreneurial cooperation emerge to address such pressing issues as climate change (e.g., maybe, the Green New Deal will be crowdsourced)."

Thierry Gaudin, co-founder and president of the France 2100 Foundation, said, "An important part of social and civic innovation will come through art and culture. The 20th century has, through TV, propagated a soap culture. It is likely that new communication will make people more conscious of their environment, their role in nature-care and their opportunity to communicate with animals, plants and other forms of life."

Additional innovations expected by experts

Beyond making predictions on these categories, these experts suggested dozens of other innovations they think might occur in the next 10 years. The following responses include additional types of social or civic innovation some expect could be likely by 2030.

Stephen Downes, senior research officer for digital technologies with the National Research Council of Canada, wrote about individual empowerment: "We are seeing a retrenchment against globalization, but this trend will have reversed by 2030 as a result of increasing (and increasingly apparent) interdependence as a single information economy. The cost of physical goods will continue to trend toward zero as productivity increases, and people will be valued less for their labour and more for their individuality and creativity. People will do more for themselves and depend less on centralized services. Those centralized services that will remain will become more like infrastructure, largely reliant on public support and therefore social (rather than private) control. While people will manage their own information, they will also surrender most of their privacy in return for more-effective services, greater security and reduced corruption. Illegal wealth will be harder to create and harder to hide. This will make it much easier for societies to support health, education and social welfare. When borders no longer restrict the flow of goods, information and capital, people will demand an equivalent right for themselves. The right to mobility will be vigorously contested, and it will be the major civil right to be achieved in the 21st century. By the end of the 21st century, hoarding – whether of land, goods, people or capital – will be viewed as socially repugnant. By 2030, the first signs of this transition in social values will be evident."

Paul Jones, founder and director of ibiblio and a professor of information science at the University of North Carolina, Chapel Hill, wrote of an array of changes to norms and activities: "Hardly anyone is called a 'bookworm' anymore. So, it will be with connective technologies. Both the panic and the utopianism will become subdued as we normalize and socialize our uses of technologies. But we will seek and require rules, standards and oversights. Individual health monitoring will be commonplace. There will be fewer visits for health checkups as that data will be gathered on an ongoing basis allowing for individual health trends to be identified and deviations tracked and treated. Socially in the near term, tech platforms will ask to be regulated just as AT&T asked for the FCC to be created. In the near term, this will actually slow innovation and secure the places of the dominant players – as it did with AT&T. In the longer run – I hope by 2030 – the innovation cycle will come back into play. My bet is in the biological fields – not limited to health care. Interplanetary exploration will accelerate, with private efforts like SpaceX and Blue Origin being more of a future template than national efforts such as NASA. Vint Cerf is right: The interplanetary internet, even if we are communicating with robots and devices, will be standard.

Social movements will form complex accommodations to individual tendencies, with better behavior becoming normalized despite our present seeming chaos."

Joshua Hatch, a journalist who covers technology issues, said, "Technology use will be a significant driver to civic and civil innovation out of necessity; it will be the pressure that will force it to happen. How effective such innovation will be, though, is harder to answer. I suspect it will be a game of whack-a-mole where every 'innovation' simply seeks to remedy a problem that has surfaced. So, what might happen? I can see more technology education in the classroom; I can envision civic groups that look to aid people with limited capability or access; I can see new laws around accessibility. One area that will be difficult to address, though, thanks in part to the First Amendment, is disinformation. And this worries me, because it has the potential to be incredibly destructive and we are limited in how we can mitigate the problem."

Craig Watkins, a professor at the University of Texas, Austin, wrote, "We are seeing the rise of social and civic innovation, especially among what I call 'young creatives.' They are at the vanguard of a new movement, an era in 'civic innovation.' Young creatives are designing tech tools to train, educate and connect activists around the world. They are pioneering whole new ways to engage in civic expression and storytelling, using data, graphics and video to build whole new forms of civic engagement and political communication. They have turned tech platforms – think smartphones, YouTube, Twitter – into the 'people's channel,' fostering whole new methods for generating awareness about various issues, educating the public and mobilizing communities to take action. The new forms of activism among 'young creatives' suggests that rather than diminish civic engagement, their adoption of tech platforms points to an expansion of what counts as civic engagement. We are already seeing pressure applied to tech companies to design tech in ways that address users' physical and mental health. For example, there is a rise in demand to design tech to better manage how much time we spend with our smartphones, use social media or experience emotional pain from tech engagement. These are concerns that have only come about as a result of growing public pressure and advocacy. The tech companies have long operated under the assumption to drive up usage by keeping people tethered to their platforms. This was their competitive edge. In the not too distant future their competitive edge may be precisely the opposite: designing tech that empowers more efficient engagement with their platforms. Increased public pressure and scrutiny will demand this type of approach to design and product development."

Deb Socia, executive director of Next Century Cities, predicted change in individualized and customized education, writing, "Social and civic innovation are likely. The question I have is whether it will be enabled by or will happen in response to issues that arise from the tech sector. Will we see greater personal data protections? If so, how will it happen? Will it be because the tech

giants make the decision to do so, or will it be mandated? My belief is that there will be changes in how children and adults are educated, with a rise in training programs that support the increased availability of trained staff who can work in cybersecurity, artificial intelligence, networking and application creation. There will be a move toward more work from home, resulting in the need for more creative ways to collaborate, communicate and socialize. We will see significant changes in the way we manage and receive health care, with telehealth opportunities changing the need for more local specialists and increasing the need for differently trained local medical professionals who can manage the online health care process. Transportation will be transformed by the opportunity to leverage technology. We will require new innovations that will support the new ways we live, learn, work and play."

David Bernstein, a retired market-research and new-product-development professional, said, "It is my hope that the new generation of citizens will view these challenges as opportunities for innovation. The growth of technology is likely to accelerate some current fledgling innovations in climate science, work-life balance and income disparity."

E. Melanie DuPuis, chair and professor of environmental studies and science at Pace University, focused on starting at the global level of innovation: "Liberalism needs some healthy rethinking. It is incapable of dealing with global migrations. We have had Great Migrations before. And in all those cases, people would have rather stayed home, not disrupted their lives. But they felt left with no choice. Social and civic innovation will have to start at the global level, beginning with a serious rethinking of development policy. People need to have good choices for livable lives where they live now. What successful sustainable equitable development will look like, I don't know. But without global agreements beyond the U.S. and the World Economic Forum we will not overcome the civic problems we have today."

David Greenfield, founder and medical director of the Center for Internet and Technology Addiction, University of Connecticut School of Medicine, said he expects "equal digital fairness through widespread, accessible high-speed access, ample education and prevention on digital wellness and internet addiction, teaching of sustainable and mindfulness tech and screen use, some government regulation and private/public/industry partnerships on digital wellness."

Miguel Moreno, a professor of philosophy at the University of Granada, Spain, an expert in ethics, epistemology and technology, commented, "I hope to see progress in social mobilization aimed at preventing environmental catastrophes and health problems in urban and working or professional environments. I have confidence in ambitious regulatory initiatives aimed at guaranteeing the privacy of users and consumers, in order to prevent abuses in accessing personal data from large companies and technological or e-commerce platforms. I have confidence in the

development of new instruments to demand transparency and accountability from institutions and political leaders, as an important way to prevent corruption on a large scale. But the main social trend at the global level seems to be in favour of undemocratic governments, probably as a result of many global challenges, which have not been satisfactorily addressed through credible multilateral organisations and bodies."

Christopher G. Caine, president and founder of Mercator XXI, a professional services firm helping clients engage the global economy, observed, "As our understanding and use of technology evolves, new models will emerge from people seeking a better daily life and greater harmony among their community. These new models will produce new social and civic innovations and 'authorities.'"

David J. Krieger, director of the Institute for Communication and Leadership, based in Switzerland, wrote, "Datafication, that is, the modelling of the world in data and the application of descriptive, predictive, preventive and prescriptive analytics to this data, will transform all areas of society. Decisions not only in business, but also in health care, education, research and politics will be made no longer on the basis of intuition, experience, emotion or personal expertise, but on the basis of evidence. Many decisions in all these areas will be automated. 2030 may not see this implemented everywhere, but the tendency will be apparent. Personalized products and services in all areas will eliminate the economy of attention which is the basis of traditional media thus enabling new forms of social communication free from the distortions of traditional markets."

Richard Forno, assistant director of the Center for Cybersecurity at the University of Maryland, Baltimore County, wrote, "Emerging uses of technology and evolving social expectations will certainly impact social/civic innovation. Technology development/use will always evolve faster than policy, too. However, I believe we're approaching a tipping point where society may realize that some good-faith attempts to place boundaries on technology use – especially in areas like disinformation, threats, bullying, etc. – is necessary. Of course, this is harder to do in liberal Western societies that have legal protections over things like free speech – but I think this will be the next example of a tech+society crisis point."

Terri Horton, workforce futurist at FuturePath LLC, wrote "Access to people across all ranks of society, whether emerging economies or traditionally disenfranchised populations, will facilitate innovation."

A notable share of experts is skeptical about the power and impact of civic and social innovations, especially in the next decade

While impending innovations may hold promising changes in the future, they also may not. Many experts express skepticism about what effects these innovations may have or if any meaningful innovations will even occur in the next decade.

danah boyd, principal researcher at Microsoft Research and founder of Data & Society, wrote, "We haven't hit peak awful yet. I have every confidence that social and civic innovation can be beneficial in the long run (with a caveat that I think that climate change dynamics might ruin all of that). But no matter what, I don't think we're going to see significant positive change by 2030. I think things are going to get much worse before they start to get better. I should also note that I don't think that many players have taken responsibility for what's unfolding. Yes, tech companies are starting to see that things might be a problem, but that's only on the surface. News media does not at all acknowledge its role in amplifying discord (or its financialized dynamics). The major financiers of this economy don't take any responsibility for what's unfolding. Etc."

Marc Rotenberg, executive director of the Electronic Privacy Information Center, said, "Important progress is already underway on data protection (GDPR) [General Data Protection Regulation in the European Union] and algorithmic accountability (OECD AI Principles). And as I write these words, there is news of a record-setting $5 billion fine against Facebook by the Federal Trade Commission. But I am much less confident that there will be an effective political response to save journalism or labor. These institutions have been severely weakened and the absence of [collective] action is not encouraging. Journalism is already dependent on Google for its continued survival, which means that its prospects for solving its key challenge has been lost."

Srinivasan Ramani, Internet Hall of Fame member and pioneer of the internet in India, commented, "We need to recognize that the basis of our economy is economic freedom, including one of exploiting technology for corporate ends. Since modern technology requires large teams to work together to innovate, most innovation is not necessarily committed to social good. Very often it is committed to the next quarter's profit. So, progress towards society's good is very often uncertain. It depends upon individuals' commitments, academics using their resources and privileges (without enthusiastic endorsements from their authorities, and so on."

Jonathan Morgan, senior design researcher, Wikimedia Foundation, rendered a nuanced verdict: "There's reason to hope that the current 'techlash' is part of a broader concern about the harm caused by commercial technological platforms and the economy that has grown up around those platforms. We're most likely to see regulation around data privacy, and perhaps some regulation around safety (in terms of increased obligations on the part of platforms to report on or

intercede in incidents where people are likely to be harmed by others through the platform). I'm pretty pessimistic that we can actually change the economic model of our modern technology ecosystem. That model rests on collecting data about people, finding new ways to profit from that data, and in general manipulating them unconsciously to make them act in ways that economically benefit technology companies. Those companies lose power every time someone doesn't use their services – whether because they are opting to use a different service, or because they are opting out of a whole platform sector (e.g., quitting social media). Those companies will do everything they can to avoid losing power. Innovation requires redistribution of power (in the form of opportunity and choice) to individual citizens, groups of citizens, governments and other/newer market actors."

Anita Salem, a research associate at the Graduate School of Business and Public Policy, Naval Postgraduate School, said, "'Put a fork' in the dream of an open and democratic technocracy – it's dead. The corporations are in control now and they will stymie any social and civic innovation that truly supports the average citizen. Profit rules all, and smaller companies that may begin to innovate in the social arena will be bought up and their products will either be buried or turned toward increasing corporate control. We'll see human-machine hybrids; genetically engineered humans and animals; displacement of human workers because of increased automation; and greater class, educational and racial divisions. New tools will focus on distracting humans from their meaningless lives and increasing business productivity. Climate change and the younger generations may force a redirect, however. If we wake up to the reality of climate change, we may see a 'moon shot' approach to addressing the results of climate change, including innovations in reducing/removing plastics in our waste stream; renewable energy and storage innovations; materials low in environmental impact; regreening of our cities and forests; medicines for asthma, smoke inhalation and sun exposure; and water and waste recycling. We will also see new societal controls, for example immigration policies; travel restrictions; power and water rationing; building and community segregation; limits on free speech and other rights used by the disaffected."

James S. O'Rourke IV, a University of Notre Dame professor whose research specialty is reputation management, said, "In thinking about whether social and civic innovation will successfully result in changes that improve people's physical condition and mental well-being, or result in improved economic circumstances for a majority, we have to consider what we know about the diffusion of innovation. William Gibson, in the late 20th century, wrote: 'The future is here. It's just not evenly distributed.' The problem with innovation and its power to change society and the lives of most citizens is that the best of it diffuses slowly and in response to economic, not social, incentives. A further complication is that most people have been shown to react to fear far more quickly and completely than they will ever respond to their hopes and dreams. Benjamin

Franklin famously said: 'Those who would give up essential liberty to purchase a little temporary safety, deserve neither liberty nor safety.' Those in control of the development and deployment of technology will see to it that mastery of its benefits will go to people who are much like themselves and who are in agreement with their own world view. True democracy allows people to exercise their free will through informed choice. At the moment, control of such choice is in the hands of a very few. The vast majority must simply wait to be told of their options, their future, their fate."

Eduardo Villanueva-Mansilla, an ssociate professor of communications at Pontificia Universidad Catolica, Peru, and editor of the Journal of Community Informatics, said, "I don't see how it may happen, mostly because of the combined pressures of a global economy pushing toward more integration between national and global economies and the threat of the climate emergency. However, there should be some room for optimism."

Jaime McCauley, an associate professor of sociology at Coastal Carolina University and expert in social movements and social change, wrote, "I am most optimistic about innovation leading to improvement in physical health because we already invest so much time, energy, money and tech into health care. I am least optimistic about worker protections. We have been on a trajectory of weakening workers' rights and protections for decades now. Most young people don't remember a 'social contract' in place where companies provided stable wages and strong benefits for workers. We encourage individualistic and competitive thinking that inhibits largescale labor organizing that lead to positive social change in the past. At the end of the day, tech is used in a way that reflects cultural attitudes. Could workers use tech to innovate and organize for stronger workplace protections? Absolutely. But in an overall cultural climate that encourages 'every man for himself' thinking and belittles collective action, maybe not. Though, movements like Occupy Wall Street show this type of organizing is possible – and aided by tech – and may make a difference if sustained."

Cliff Zukin, a professor of public policy and political science at Rutgers University, responded, "The relevant question to me is whether tech innovation will lead to progress in global warming, which is the biggest threat to societies and the planet. And I fear that battle has already been lost. The political system on a global scale did not develop quickly enough, and I fear we have more down than up ahead of us. The logic for the optimism/repairs advances isn't clear to me. One thing that is clear to me is that money and the profit motive drive things. There is a reason that the rich have gotten richer and that the distribution of wealth has become more concentrated at the top in the U.S. and most other societies. I think one has to expect this will continue to be the case rather than 'the public good' somehow becoming a stronger value."

Michael Muller, a researcher for a top global technology company focused on human aspects of data science and ethics and values in applications of artificial intelligence, said, "There are chances for substantial change. However, much of the positive social changes in the past century have come from social and civic organizations such as *organized* labor and civic organizations such as Charter 77. These types of organizations – i.e., this component of people power – are much weakened under current technology and political practices. I fear that this segment of civic society may not be strong enough to lead in the challenges that we are facing."

Ebenezer Baldwin Bowles, founder of CornDancer.com, said, "We are snared in a cyber paradox: Yes, we shall create and innovate with code and device, write laws and algorithms intended to protect and defend, come together 'online' with enthusiasm and determination – or desperation – to form altruistic and civic-minded groups in pursuit of the common good. … But all to little or no avail. There is no good outcome for the smallholder in the coming Decade of Consolidation. The major players through corporate and legislative strangleholds and unbridled economic power shall counter every proactive, positive step forward into the light of a World Wide Web with an equal or stronger pushback into the dark places of subservience or mute indifference, where sly misinformation or outright oppression flow second-by-second o'er the wires of smart little devices to keep the masses in check."

Rich Salz, senior architect at Akamai Technologies, responded, "It wasn't until I nearly completed the questions that I realized how depressed this makes me. Capitalism in the U.S. rules. Little will be done, and what there is will be ineffectual and/or tied up in the courts. The alternative – China, or even the India model – is worse."

Vince Carducci, researcher of new uses of communication to mobilize civil society and dean at the College of Creative Studies, commented, "The subsumption of individual identity under big data will likely continue as technology proliferates under so-called platform/surveillance capitalism. Guy Debord's critique of spectacle society will expand in more granular form with technologies of self-monitoring and self-control within social media. A bleak outlook to be sure. But you asked."

Torben Riise, CEO at ExecuTeam Inc., observed, "Technologies, including digital-based, represent potentials for change but are in and of themselves not agents of change – nor are they ethically charged as good or bad. To live up to the potential, society needs to be ready, willing and able, and in applying technology in any area, the good or bad is in the hand of the user. As such, technology may not reach their potential by 2030 (yet still contribute to important changes) because: 1) at any given time, society is not yet ready to accept what new technologies can deliver; a good example is self-driving cars; 2) the gap between those who can afford the technology output

and those who cannot not will not close – certainly not at a global level; this will in particular be obvious in medical technology; 3) those who can use new technologies to the benefit of society – the 'establishment' – are less progressive than those who are not at a decision-making level (young people), despite their superior skill and preparedness. There are many reasons for these problems, but one most often overlooked ones is that the 'establishment' has over the past 25 years proven that it is not capable of solving the problems it has created because it does not involve all stakeholders in issues that affect them. One example is the absence of young people in the discussion about modernizing education."

Laura Sallstrom, an international public policy analyst, wrote, "Democratic institutions and the mechanisms that support them are most at risk. I do not see a clear way out of the problem of disinformation and misinformation in technology platforms. When video can be manipulated and you can't even believe what your own eyes show you to be true, what hope do you have that actual facts will support democratic decision-making? We cannot retool fast enough to lift up the lower-income portions of the labor force. Technology is moving too quickly, and too often we define progress as greater efficiency in labor or more technology. We need to redefine 'progress' to include employment. There are clearly technology solutions being developed to address individual user privacy, and the debate has been expanded to such an extent that there is a possibility to see a successful outcome here. It is impossible to eliminate bias altogether in algorithms or anything that originates with humans. The focus on ethics has however been very helpful and may shift the needle."

David Bernstein, a retired market-research and new-product-development professional, said, "It seems unlikely that social and civic innovations are likely to resolve some issues that have plagued individuals for many decades. While work-life balance may improve, it seems unlikely that innovations will not continue to disrupt our lives. We don't like change, and when our financial and environmental security is threatened our physical and emotional health suffers."

Deb Socia, executive director of Next Century Cities, commented, "Though I am generally optimistic about the potential for successful social and civic innovation, I am worried that some issues will not be positively impacted. In particular, I do not trust that technology will improve the opportunity for people to discern truth from fiction in the news they consume. I do not believe that the changes will improve our ability to receive unbiased local news. I do think that we could mitigate these concerns if we had the will and fortitude to do so. However, I have not seen evidence that this will be addressed in a meaningful way."

Ian Peter, a pioneering internet rights activist, responded, "There is no doubt at all that big data-gathering has the potential to allow significant improvements in areas such as medical research –

so it's not all bad! However, the unregulated surveillance economy regards personal data as a commodity to be shared for profit, and large industry players using a transboundary network cannot be easily regulated by over 190 nation states acting unilaterally. This dilemma allows for unregulated monopoly behaviour which may regard ethical behaviour as secondary to corporate profitability."

Dan Gillmor, technology writer and director at the Knight Center for Digital Media Entrepreneurship, Arizona State University, commented, "This will cut both ways, but it's difficult at the moment to imagine how reformers can win against the overwhelming power of centralized control. As Zeynep Tufekci observed in her recent book, power learns."

Andrew Nachison, chief marketing officer for the National Community Reinvestment Coalition, observed, "I don't see tech per se as 'the answer' to our woes. We need a new regime to pay for local journalism, and advocacy to popularize new visions will help us get there. But what we really need are more reporters on the ground, in the field, interviewing people face-to-face, and investigating corruption and human needs. Tech is incidental to presence. AI and advancing capabilities with data will enhance biotech and the search for genetic insights, new cures and treatments; and gradual improvements in medical records tech should empower individuals as well as medical professionals to make better decisions, coordinate care and improve outcomes. But will tech bring more fresh local produce to communities that lack it? Or pervasive mobile broadband to rural areas and towns so the people who live in them can access financial, medical and other services as well as people who live in San Francisco? Will tech repair and replace crumbling bridges, or revive underinvested communities that are fading as wealth and people accumulate in just a handful of booming metropolises? Will tech wipe out the discrimination in work, banking, housing and commerce that tech now enables with unprecedented efficiency? Markets and capitalism are failing. People and policymakers will have to force these things. Tech may help us rally, share knowledge and activate citizens and policymakers, but antigovernment zealots and people paid to preserve the status quo will also use tech to fight us every step of the way. The fundamental question we need to answer isn't about tech, it's about people. Who will lead us to a better world?"

Ian O'Byrne, an assistant professor of education at the College of Charleston, wrote, "I see this as a balancing act as well. I think net positives will occur, but these will be counteracted by bad actors in online, offline and unseen spaces. Ultimately, we are regularly naive when we consider the power and equality that may be wrought by technology, yet not conscientious enough to ensure this comes to fruition. Technological, social and civic innovation will be led by educators as they increasingly recognize and educate, advocate and empower youth as they engage in digital social spaces. Developers and entrepreneurs will create new platforms and tools to make this easier to

utilize. Even with these gains, developers and corporations will seek to maintain market advantage, collect/sell data on users and obfuscate when exposed. Users will in turn continue to move to affinity spaces and siloed discussion spaces where they interact with individuals with similar beliefs. The same (and new, worse) dangers will continue to exist."

Carol Chetkovich, a professor emeritus of public policy at Mills College, said, "I find it puzzling and somewhat disturbing that we seem to be looking so hard for technical changes that will somehow help us repair our condition, when it seems that we're in pretty serious need of an intellectual + spiritual evolution. Technology is very important as a set of tools to get certain things done (e.g., hack-resistant but widely accessible voting processes) but the tool doesn't *drive* the performance; it just facilitates it (or perhaps inhibits negative interference with the performance). There are areas in which technical fixes are very important (e.g., in doing less environmental damage), but it's harder to see a technical fix for problems in the working of our democracy. Again, the idea of 'innovation' solving our problems seems incorrect to me. We desperately need a reorientation, in which we all become more invested in collective outcomes and collaborative processes, but it's hard to see what kind of innovation would produce that (though the shift itself would be revolutionary). If I'm pressed to imagine a social or civic innovation, I might think of something like political problem-solving using the citizen jury model (and civic dialogue in general). The citizen jury model would be innovative in the sense of being outside our norm, but not innovative in the sense of being brand new."

Richard Lachmann, a professor of political sociology at the State University of New York, Albany, said, "The institutions and social settings that make innovation likely – political parties, unions, churches, etc. – have weakened greatly in the last half century. That is why I think it is unlikely that social and civic innovation will occur in the next 10 years. The factors we can measure do not point to innovation. The only hope for innovation is that eruptions of powerful social movements are unpredictable. We need to place our hope in the possibility that humans can surprise by coming together to meet the environmental and other dangers we all face."

Polina Kolozaridi, a sociologist based at the National Research University of Economics, Moscow, expert in the politics of Russia, wrote, "I am quite skeptical toward the term of 'social and civic innovation.' It supposes some linear development of something called world as well as technology. It is from my point of view rather like a bricolage or mixture of norms and practices. The word 'success' is also very uncertain here. I am sure that different social groups will be further and further from each other, losing any common ground. Of course, different technologies will help them to make boundaries. … When it comes to health and education, as inequality deepens, new technologies in both these spheres will also make the situation worse (less and less equal)."

A futurist based in North America observed, “The imperatives of capitalism have driven the tech industry toward increasingly addictive technologies that swallow vast amounts of people’s time and attention. Without regulation making such systems illegal or a robust alternative to capitalism which takes its place, this will not change.”

The quotes above hardly cover all the complexities society will face in the coming years. The coming chapters of this report explore more of them and outline how these experts expect innovations may unfold or be thwarted. The following sections share experts’ views about the power dynamics that affect the possibility of change, the ways in which pressing problems will interact with tech-specific issues, the historical trends that help explain current conditions and the inherent problems or cross-currents that would-be innovators face.

2. Tech is (just) a tool

Many of these experts pointed out that technology is neither inherently helpful nor harmful. It is simply a tool. They said the real effects of technology depend upon how it is wielded. It can be used to inspire and catalyze change just as easily as it can be used in ways that are detrimental to society. Technology's influence in the world is highly dependent upon extraneous factors. These factors can be much more important than tech evolution itself in determining what the future holds.

A pioneering technology editor and reporter for one of the world's foremost global news organizations wrote, "I don't believe technology will be the driver for good or bad in social and civil innovation. It can be a catalyst because it has always been a strong factor in organizing people and resources, as we saw early on with 'flash mobs' and have seen used to deleterious effect in the disinformation operations of Russian agents that sought to influence the 2016 U.S. presidential election. I believe the social and civic innovation that can rein in excesses of surveillance capitalism, of Big Brother tech such as the abuse of facial recognition and other biometrics for social control, can only come from moral leadership. Tech is a tool. Artificial intelligence and genetic engineering are technologies. How we choose to use these tools, the ethical choices we as human societies make along the way, will define us."

This section includes a broad selection of comments about digital technologies as a tool for social and civic innovation. They are organized under four subthemes: Factors other than technology per se will determine digital technologies' effects; technology can be used as a tool for good; technology can be used as a tool for ill; and deeper human/social forces are shaping the future of democracy.

Factors other than technology will determine digital technologies' effects

Tools are made to be used. How they are used, who uses them and what they are used for determines their impact. Some of these analysts referred to the impact of revolutionary technologies of the past and the ways they were used to affect change.

David Bray, executive director for the People-Centered Internet Coalition, commented, "The benefits or harms are determined by how we humans choose to use tools and technologies. Fire can be used to cook a meal and thus be helpful. Fire can also be used to harm or destroy. Rocks can help build shelter. Rocks can also be used to injure someone. So, the bigger questions worth asking involve how we humans, both individually and in communities, choose to use technologies. Ideally, we will use them to uplift individuals. Also, tech doesn't operate in a vacuum. Human laws and narratives also influence outcomes. Our tool use is connected to our use of narratives, laws

and technologies to distribute power. Starting with the beginning of history, we used fire and stone tools to make the transition from a nomadic lifestyle to one where we began to settle and plant crops. Our use of tools help give rise to civilization, including the advancement of writing, development of calendars for crops, and the start of navigation of the seas. …

"While some civilizations generated social order through sheer physical force imposed upon other humans, compelling obedience, other civilizations generated social order through an initial system of laws that sought to protect communities from the greed, envy, or other hurtful elements of others. Such a system of laws was not developed for purely altruistic reasons. The same system of laws solidified the power of rulers and included different forms of taxation over the labor of their subjects. Laws and the legal process of humans distributed power, and in several cases of early civilizations, solidified the power of community members to compel or oblige other humans to perform certain actions. Laws and the legal process also enabled humans to coexist more peacefully in larger groupings insofar that the distribution of power did not motivate any part of the community to revert to sheer physical force to change this distribution.

"As human communities grew, so did their use of tools and development of more advanced tools such as metal tools and weapons, bows and arrows, and later both gunpowder and flintlock firearms. Such tools as technological developments had the effect of expanding civilizations and disrupting the distribution of power within societies. … Certain technological developments, like railroads or radio, allowed certain individuals to aggregate power or allowed the distribution of communications across communities that challenged the distribution of power. For some civilizations, these technologies helped highlight discrimination against groups of humans in societies and prompt civil rights laws. The same technologies however also allowed a mob mentality that failed to uplift humanity in ways that were intended, such as Nazi Germany's use of 'People's Radio' sets leading up to and during World War II that created dangerous echo chambers of thought during that dangerous time period."

Mutale Nkonde, adviser on artificial intelligence, Data & Society, and fellow, Harvard's Berkman Klein Center for Internet and Society, "Technology alone is a tool. The inability for algorithmic-driven tools to understand the social context means they do not have the capacity to drive civic innovation without significant human intervention."

Jeanne Dietsch, a New Hampshire state senator and pioneer innovator of affordable robotics, wrote, "Technological innovation creates tools that are used to achieve the ends of those who create and/or can access it. The values of those people, the relative power of people seeking democracy vs. oligarchy, will determine how technology is used. This question asks us to make

political and economic projections. I do not believe that anyone can accurately do that. We are in the midst of a chaotic equation and the butterfly effect may determine the outcome."

Robert Cannon, senior counsel for a major U.S. government agency and founder of Cybertelecom, a not-for-profit educational project focused on internet law and policy, said, "I can observe, as I did previously, that people want to have scapegoats and will accuse technology of horrors – when in fact it is PEOPLE who have the need for the scapegoat – while the tech just marches on – and in fact has been very positive."

Srinivasan Ramani, Internet Hall of Fame member and pioneer of the internet in India, wrote, "I do not believe that we can simplify the issues by asking if technology would be bad or good. The horrors perpetrated upon millions of people in the name of a science, 'eugenics' for furthering social objectives is very well documented. The good or bad is not in technology. It is in us."

Marius Oosthuizen, board member for the Association of Professional Futurists, Johannesburg, South Africa, observed, "Technology is value-neutral. However, in the adoption or implementation of technology, enormous value assumptions and value judgements are made. These are then entrenched and systematised, institutionalised and embedded in social norms over time. Technology will be curtailed, rolled back and counteracted with innovations that society finds unbearable or undesirable. This will take the form of peer-to-peer review systems, accountability and transparency systems, and the development of 'ethical algorithms' that seek to systematise societal values and norms, appropriate to particular communities. There will not be a one-size-fits-all solution, but rather enclaves of evolutionary and counter-evolutionary technology adaptation and adoption towards more socially desirable ends."

Hans J. Scholl, a professor in The Information School at the University of Washington, commented, "Technology has always been a building block of humankind's evolution and change. The challenge with the internet (and sitting on top of that, social media, AI, [the Internet of Things], blockchain, etc.) is that the rate of change is increasing. Within 30 years, the internet has helped accelerate 'globalization' in a breathtaking fashion. Borders and boundaries have become at least redefined. The economic impacts are felt not only globally, but quite strongly also locally. And they are felt more quickly, and the changes happen more quickly and more deeply. This presents unprecedented challenges for decision makers in both the private and public sectors. For democratic governments, all three branches have to find smarter and more agile ways to act upon and direct developments into agreed upon directions. Democratic smart governance and democratic smart government are keys to coping with the rapid changes. Among other important elements of smart governance, the compliance with agreed-upon 'principles' rather than rigid and precise 'rules' will be key."

John Leslie King, a professor of information science at the University of Michigan, wrote, "People know how to leverage communication technologies. Not surprisingly, they leverage them for their own ends. There will be surprises and what appear to be setbacks, but the net effect over time will be lots of experimentation that will affect things on the margin."

Arthur Asa Berger, a professor emeritus of communications at San Francisco State University, responded, "Innovation is a two-edged sword: It can be used for negative purposes (new viruses, for example) or positive purposes (diagnose medical problems using smartphones.) The development of Twitter is now used as a propaganda tool by the president – a negative innovation as I see things. The internet can also be used to create flash mobs for protesters of the political order or champions of it. So, a good deal depends on the ingenuity of those using innovations for their own purposes."

Andrew Lippman, senior research scientist and associate director at MIT's Media Lab, wrote, "There are social reforms that would be good, such as changing Section 230 of the Communications Act that relieves 'platform' companies of responsibility for what is done on those fora. While the law might have been a good idea when it was passed, it needs updating and better application. If a company processes the information that is contributed or selectively distributes it, then they are not a simple platform, they are exerting editorial control. Also, there are technologies that can protect privacy and personal data if we choose to use them. We have not done so in the past, but one never knows. Working against this is the network effect – large companies such as Facebook have a potentially overwhelming advantage. Society may change its attitude toward that as well."

Paul Lindner, a technologist who has worked for several leading innovative technology companies, commented, "Technology both harms and helps. To predict its outcome, we need to answer Shoshana Zuboff's questions of 'who knows, who decides and who decides who decides.' If the answer for this is the citizenry then yes, technology can have a positive impact. If it's a smaller set of actors, then technology will increasingly be used as a form of control. Andrew Feenberg states it well: 'What human beings are and will become is decided in the shape of our tools no less than in the action of statesmen and political movements. The design of technology is thus an ontological decision fraught with political consequences. The exclusion of the vast majority from participation in this decision is profoundly undemocratic.'"

Lawrence Wilkinson, chairman at Heminge & Condell and founding president of Global Business Network, the pioneering scenario-planning futures group, predicted, "I expect a Hegelian dance between tech as a contributor/enabler of change and tech (and tech companies) as a preventer of change."

Michael Pilos, chief marketing officer at FirePro, London, said, "I am betting on humans using the tools at their disposal in creative and (mostly) constructive ways. Surely some people can use the web to damage humanity and/or themselves, but 99.9% of humans use it to learn, love, share and communicate. I am bullish on humans and the logical learning curve!"

Kevin Gross, an independent technology consultant, commented, "Technology has the potential to assist social and civic innovation, but such innovation is often perceived as a threat to those that control the technology who will work to dampen such uses of their technology."

Roger E.A. Farmer, research director for the National Institute of Economic and Social Research, London, professor of economics at the University of Warwick, and author of "Prosperity for All," wrote, "Like all technologies, social media advances have the power to create great good but also great evil. The manipulation of the internet in China by the Chinese government is an example of the use of technology by an autocratic state to suppress individual freedoms. In the U.S. the technology is controlled not by the government, but by a small number of private individuals. Concentration of the ability to shape culture is a powerful tool that can shape the social fabric."

Frank Kaufmann, president of the Twelve Gates Foundation, responded, "All tools that support and enhance natural human capacities and human qualities can do no other than enhance the chance for improvement. The dangers lie in unethical, impoverished tech geniuses with no sound basis for the power their capacities afford, and subsequently, the lack of ethics then gets replicated in tech structures. Protection against these real dangers cannot come purely from tech but can be enhanced by using tech constructively."

Glenn Grossman, a consultant of banking analytics at FICO, observed, "Technology is a tool. People will harness it for needs. I can see contributions to improve our social norms along with possible harmful actions. Look what China is doing with its social norms score. I don't agree, but technology is looking to help them with this score. It can also lead to changes like a revolution if the score is used improperly."

Predrag Tosic, a researcher of multi-agent systems and artificial intelligence and faculty at Whitworth University, said, "There is already a fairly broad consensus that rapid rise of genetics, AI and other technologies raises new complex ethical and other challenges, which require broad debate over new social norms, laws and regulations. Example: If a self-driving car kills a pedestrian, who is to be held accountable? I expect public debate, and then new legislation and the rise of new social norms to mature and progress along those lines. A major concern: Technology and its multifaceted impact on our lives are traveling at a much faster pace in recent decades than

the response by policymakers and legislatures. Again, broad public awareness and debate of emerging moral, legal and other issues are the key."

Puruesh Chaudhary, a futurist based in Pakistan, said, "Communities of interest are more likely to benefit from social and civic innovation. The scale, however, will only be possible if there's significant national consciousness around the interest. These interests as we've seen evolve are mostly around different cultures, traditions, beliefs and norms."

Daniel Rogers, expert on disinformation and co-founder, Global Disinformation Initiative, wrote, "The problems catalyzing 'techlash' won't be solved by technology. Perhaps there will be places where technology will help, or be used to implement solutions, but fundamentally these problems will be solved by policy, diplomacy and civil society interventions. I remain cautiously optimistic that human resiliency will prevail before these problems destroy our ability to solve them, but only time will tell for sure. Some examples of the kind of interventions we could hope for would be strong privacy regulation at the federal level, antitrust actions against large tech platform players, strong diplomatic interventions in the areas of cybersecurity and counter-disinformation, and civil society interventions within the tech community around issues such as content moderation and platform governance standards."

Regulation could play a key role in determining tech's effects

Several experts suggest that regulation of tech and tech companies will play a significant role in determining technology's effects.

Warren Yoder, longtime director of the Public Policy Center of Mississippi, now an executive coach, responded, "In the West the GAAF platform monopolies (Google, Apple, Amazon, Facebook – Netflix is no longer in the list) have grown to a size they are stifling innovation without adding significant social value. But the EU and U.S. governments are finally addressing the issue. While it is too soon to be certain, I expect action to breakup or regulate them to have a positive effect, allowing new social and civic innovation."

Michael Muller, a researcher for a top global technology company focused on human aspects of data science and ethics and values in applications of artificial intelligence, said, "I hope that the democracies can develop a major tech effort to identify malicious tech activity and to counter that malicious tech activity swiftly and effectively. Of course, I would prefer to see this done as an international effort – perhaps as a form of mutual defense, like NATO or the UN. I suspect that it will require separate funding and governance bodies in the U.S., EU and probably the UK, as well as the struggling Asian democracies and of course Australia and New Zealand. Perhaps these

regional efforts can nonetheless meet and exchange innovations through an international body. 'A harm to one is a harm to all.'"

Kenneth R. Fleischmann, an associate professor at the School of Information at the University of Texas, Austin, wrote, "We will have to find ways to regulate social media use; they will need to build trade associations to self-regulate, or else governments will need to step in. Individuals may not need to respect laws and boundaries, but companies do need to be based somewhere, and if they do not comply, countries can block them. Given the complex and contentious nature of 'truth,' however, it will be easy to portray regulation as biased censorship; thus, provenance will be key, and the key thing will not be to determine the 'truth' of content, but instead the authentic identities of those who post the content."

James Gannon, a cybersecurity and internet governance expert based in Europe, said, "I think that in 2030 the journey will still be ongoing, as defined in the Tunis Agreement laws apply online as well as offline. However, this is an untenable position for governments to take in the modern era, where the internet is borderless (I do not believe there will be a Balkanisation of the internet or fragmentation of it). NGOs and civil Society have yet to come up with a common position to move forward on these strategic-level topics. I think that progress on tactical issues will drive society to more common positions and thus over the next decade progress will be made."

Emmanuel Edet, a legal adviser at the National Information Technology Development Agency, Nigeria, wrote, "I think the social norms for the use of the internet and other technology will improve basically because of the human need to survive. It will come through consensus building and government exercising its primary role of citizen protection."

Sharon Sputz, executive director of strategic programs at the Columbia University Data Science Institute, responded, "New laws and policies will be needed to protect citizens from the misuse of technology. One example is around ensuring the use of machine learning systems do not have bias or unfair outcomes."

James Hochschwender, futurist and consultant with Expansion Consulting, said, "Some success in social and civic innovation will be achieved by 2030, but that success will require legislation and enforcement thereof to protect citizens rights over transparent data sharing with full rights to opt out of the same, as is being done in Europe already to a much greater degree than in the U.S. Also, it will require two other things in order to be positive innovation: 1) the elimination of digital monopoly and oligarchies through application of effective antitrust legislation; 2) a massive effort to educate inclusively the entire population about positive and negative uses of the internet and 5G technologies and corresponding digital tools. And finally,

social and civic innovation will require substantial reduction of corporate and deep-pockets lobbying that has excessive influence of legislative branches of government."

However, some experts are concerned about what regulation might look like and if it will be a step in the right direction.

Bill Dutton, a professor of media and information policy at Michigan State University, said, "The focus on harms noted in your questions are one aspect of a growing dystopian perspective on the internet that is essentially top led, and not driven by users of the internet as much as by the press, politicians and academia. Unfortunately, the focus on potential harms will foster a great deal of inappropriate regulatory responses that will slow technological and social innovation in significant ways."

Clifford Lynch, director of the Coalition for Networked Information, commented, "I believe (or at least hope) that over the next decade we will see a number of efforts – regulatory, legislative, legal, and in evolving social norms – that attempt to deal with at least some of the problems of the current networked digital environment. These problems are hard, and right now we don't really know what the right solutions are in most cases. We have train wrecks like GDPR and the 'right to be forgotten' in Europe, for example; well-intentioned but horribly flawed. One very fruitful approach is to move away from regulating data collection towards punishing bad uses of data. It's also important to note that while you can regulate relatively 'good' actors (for example, most commercial entities), when we are dealing with adversarial or criminal behaviors (for example information warfare campaigns) this is not going to be very effective. And you'll see a technology arms race that at least currently seems very asymmetric, with advantage to the aggressors rather than the defenders."

Jeremy Foote, a computational social scientist and professor at Northwestern University, responded, "So far, institutions of many different kinds have been fairly responsive and creative in dealing with troubling aspects of technology. Examples include journalists who have brought attention to [National Security Agency] abuses to institutional responses by Facebook and Twitter seeking to identify and reduce the influence of disinformation campaigns. Our current responses are often blunt, like the GDPR, and have unintended consequences, but they are a signal of institutions which are willing and able to respond. Platforms and communities have also shown a surprising ability to police themselves. Tools (including automated tools) to moderate conversations are getting better and allowing for the reduction of some of the worst problems. I would not be surprised to see the emergence of public institutions that are more technologically savvy, and which do things like identifying bias in algorithms or enforce technological transparency."

Jean Russell, co-director at Commons Engine, focused on building tools and capacity for a commons-based economy, wrote, "I hope regulation becomes a last resort, but yes, I do think we will continue forming coalitions/unions/cooperatives for human dignity for our digital world. I also believe we are growing the awareness and tools to better assert rights for privacy, dignity and freedom."

Social and civic innovations, including changes in norms, may be key in shaping technology

While this study posed to experts the question of how humans' uses of technology will influence innovation, several of the experts in this canvassing suggested that the process moves in the other direction: that is, innovation influences technology. They said future innovations will include tools made in reaction to social and civic needs and in response to the problems caused by people's current uses of digital technologies.

Ibon Zugasti, futurist, strategist and director at Prospektiker, wrote, "Social innovation platforms will contribute to faster and better technology development."

Nick Tredennick, an engineer, technology innovator and administrator, vice president of Jonetix Corporation, commented, "Social and cultural norms that have developed over the centuries are the framework with which technological progress operates. It's the difference between the carrier and the signal. Social and cultural norms are the carrier and technology progress is the signal; they should not be mixed."

Stephan G. Humer, a lecturer expert in digital life at Hochschule Fresenius University of Applied Sciences, Berlin, commented, "The ingenuity and creativity of unexpected actors has always been stronger than the unintended side effects of technical development. I see no sign that the negative aspects will prevail in the case of digitisation. So far, the internet has brought more positive than negative aspects, and this has come mainly from inspired users and improved institutions."

Charis Thompson, a professor of sociology at the London School of Economics and member of the World Economic Forum's Global Technology Council on Technology, Values and Policy, said, "Technology and social innovation always go together (see arguments in my books 'Making Parents' and 'Good Science'). Some [possible] reforms will be foreclosed and others will be opened up, so the options for this question – help mitigate, make worse or no effect – left out an important option."

James Sigaru Wahu, an assistant professor of media, culture and communication at New York University and fellow at Harvard's Berkman Klein Center, wrote, "Most people still place technology use at the center of the conversation. This is evidenced in the framing of the question. The issue shouldn't be whether tech use will hamper social and civic innovation but rather how social and civic innovation will curtail overreliance on technology while democratizing and unbiasing technologies and their use."

A postdoctoral scholar studying the relationship between governance, public policy and computer systems said, "Technology is constituted of society, reflecting the needs and prevailing ideas present during its development. It also creates needs for social and civic innovation, which create needs for technological innovation in a virtuous cycle. Society creates tools which solve perceived problems and then adapts around those tools to make them useful as perceptions of the true problems change and mature. There is a lag between when the technologies are created and brought into the world and when new norms are developed and broadly understood enough to gain normative force. For example, as the ability to circulate information has been democratized, the monopoly of journalists on creating broadly disseminated media has broken, giving way to a world where everyone can create on an equal footing. But this has caused a breakdown in the norms around information dissemination: In the past, journalists would attempt to convey the truth, even if that effort had a particular political or social bent or bias. Today, anyone can disseminate any information, true or not. As a result, those used to truth in journalistic products can be surprised by 'fake news' – misleading information dressed in the trappings of traditional journalism. However, those who understand the fluidity of new media also understand that there is a higher burden placed on speakers for establishing the veracity of their claims, and also understand how to cross-check those claims with the world as understood or with other tools such as search engines or social validation. Risks balance benefits here, too."

Technology could be used as a tool for good

These experts shared many ideas as to how technology will or should be used for the betterment of humanity, from improving education to enhancing people's social lives. Some emphasized the need to do a better job of harnessing technology for good, expressing concern that the alternative is unthinkable.

Mike Roberts, Internet Hall of Fame member and pioneer CEO of ICANN, confidently predicted, "We are in a technology-fueled Age of Innovation. 'Technology got us into this mess and technology will get us out of it.'"

John Battelle, co-founder and CEO of Recount Media and editor-in-chief and CEO, NewCo, commented, "Technology is how we communicate. So, if we are to make any progress, we'll use

technology. And I'm an optimist, so while my response in a previous survey question as to the likely near-future of democracy equivocated, the lens of history will mark the next 10 years as fundamental to overall progress across a historical timeframe."

Ben Shneiderman, a distinguished professor of computer science and founder of the Human Computer Interaction Lab at the University of Maryland, said, "Social and civic innovation through community, consumer, business and other grassroots organizations will emerge, even as platform owners and government agencies make related efforts to control and regulate malicious actors. Additional sources of innovation could be professional societies, academic researchers, journalists and community leaders. Engaged citizens and residents can use social media tools to gather support, promote causes and point out problems. I see many opportunities for improvement."

Bryan Alexander, a futurist and consultant at the intersection of technology and learning, wrote, "Technology remains a tool for social organization and it will keep playing that role as we organize flash mobs through mixed reality and hack AIs to plan demonstrations. The techlash can go in a variety of directions, including an anti-AI movement a la Frank Herbert's 'Dune.' But the digital world has progressed too far for most to withdraw completely. Few are willing to go full Unabomber. Instead, people will loudly retreat from one digital platform and move to another or write about how much they despise Silicon Valley on a shiny new iPad or show their fine handwritten letter over Instagram."

Michael R. Nelson, senior fellow and director of Technology and International Affairs program at the Carnegie Endowment for International Peace, commented, "Digital technologies are empowering local and state governments with tools and information that previously were only available to large national government agencies and offices. In many countries, that has meant that the number of employees working for national governments has shrunk as programs previously run by national governments are put under the control of institutions that are closer to the citizen. In some cases, functions that were previously run by governments are being run by private companies. In some cases, decentralization and privatization has made room for more experimentation and innovation, lower costs and more customized services for citizens. Local and state governments are sharing best practices and lesson learned – often using online collaboration tools and video conferencing."

Jeff Jarvis, Craig Newmark Graduate School of Journalism at City University of New York, wrote, "It would be a mistake to connect all these questions to internet technology alone, both because technological determinism would be misplaced and because there are so many other factors at work (and because predictions are meaningless). The question, again, is not about

technology's impact on people but on people's use of technology. Will we be able to come together as social and political entities to negotiate reversal of climate change, retraining of the workforce facing change, reducing the anxiety we put especially your children through and so on? Those are nearly eternal questions. The internet is just one new factor in a complex mess of considerations."

Adam Powell, senior fellow at the USC Annenberg Center on Communication Leadership and Policy, wrote, "Historically we have mastered technologies – gunpowder, nuclear – so I am optimistic we can do this, too. Yes, I believe innovation can make significant positive changes – except for the industry itself, because there is so little incentive to do so. Maybe DuckDuckGo and Firefox can show the way."

Matt Larsen, CEO at Vistabeam, said, "I am hopeful that technology can help some groups find more common ground. It will be a difficult challenge to overcome many of the potential negative issues, but there is a lot of potential process improvement for social and civic groups that utilize technology."

Alan Inouye, senior director of public policy and government, American Library Association, said, "Today, there are nearly infinite opportunities to provide input – if you only have the time. I foresee a time when we'll have agents (use of artificial intelligence technology) that provide this input or make requests on our behalf. You're having a discussion with your travel partner and you are queried about a comment to Trip Advisor. You say yes and it is generated automatically. Ditto if you are discussing the state of STEM learning and you are advised that senator has a bill – would you care to send a comment to her office? If you reply yes, it is done automatically on your behalf. The next level agent takes these actions automatically based on your preferences."

Deirdre Williams, an independent internet activist based in the Caribbean, commented, "Use of technology will stimulate change not so much as a tool in itself but as a reminder of what we need to guard ourselves against. It is possible that there may be a revulsion against positive uses of the technology as there was against the peaceful use of nuclear energy to generate electricity; climate change may force us to reconsider the nuclear option and it may eventually 'accentuate the positive' about the use of ICT [internet and communications technology] well. Failure to take advantage of the positive possibilities of ICT will make the pendulum swing more slowly."

Janet Salmons, a consultant with Vision2Lead, said, "I hope that the more that people come to rely on technology, the more they will see the need for parameters and improved practices. These could include social norms as well as policies and regulations. I also hope that the more that people understand what technology can and can't do they will make decisions about its place in their lives. For example, electronic communication is valuable when we're apart but does not

replace the human touch or the nonverbal communications needed at significant life moments. Will social norms move away from the practice of staring at a screen to read a post from someone, somewhere, while ignoring the actual person whose eyes might convey a more meaningful message? Electronic voting might seem like a cool idea until we see how unregulated use of these tools allows for vulnerabilities that make our votes meaningless. Will people insist on mechanisms that make democracy more viable or let big corporations, special interests, anarchists or foreign entities decide who runs the country? Will people insist on some right to protection of private data or let companies buy and sell every digital footprint? I hope for social and civic innovations that celebrate and balance the best of both worlds, technologic and human. Education, health care, the workplace benefit from flexibility and access to information offered by technologies but are inadequate without human interaction. Access to unlimited information is only helpful when we have the ability to make meaning. I feel that attention to digital literacy is critical to innovations that will be positive for social and civic life in democracies."

Gary L. Kreps, a distinguished professor of communication and director of the Center for Health and Risk Communication at George Mason University, wrote, "Open access to relevant information will inevitably spur social innovations and public collaborations. The ongoing evolution of new and powerful channels for digital communication will provide increased opportunities for information sharing and creative development of new and relevant social applications."

Joshua New, senior policy analyst for the Center for Data Innovation at the Information Technology and Innovation Foundation, predicted, "Connected and data-driven technologies can dramatically reduce barriers to social and civic innovation, such as challenges related to accessing human capital, network building, fundraising and advocacy. One particularly likely result of this will be the creation of significantly more decentralized social and civic innovations. Whereas the social and civic innovations of the past have relied on local communities, technology can allow for the connection of people with similar needs across local, state and even national boundaries."

Matt Belge, founder and president of Vision and Logic, said, "Digital tools such as Facebook, email, websites and sharing sites are easy for the average person to access and use to organize others. They are much easier to use and access than previous-generation tools such as printing presses and television stations. For this reason, I expect that small groups with limited funds will have better access to organizing themselves than in previous generations. The downside is that these same tools can be manipulated by wealthy corporations and individuals as well as governments. We've already seen examples of that in the 2016 U.S. elections, when foreign, well-funded trolls attempted, and to some extent succeeded, in manipulating points of view. However, on the whole, the masses now have more access to tools that help them organize and get their

ideas out than they have ever had in the past. For this reason, I am cautiously optimistic about the future of democracy, although it is being severely tested at the time when I write these words."

Gina Glantz, political strategist and founder of GenderAvenger, commented, "Digital communication, decision-making and technological innovation will have been an everyday experience virtually since birth for emerging leaders. Social innovation that allows technology to create human bonds and community action – begun by dating apps and the emergence of social-change organizations such as Indivisible – are bound to grow. Despite all the pitfalls accompanying issues of privacy and detrimental outside interference, the development of tools that create opportunities for the exchange of intergenerational experiences and the exposure and discussion of competing ideas is essential. There is no stopping technology. It must be harnessed for good."

Jon Lebkowsky, CEO, founder and digital strategist at Polycot Associates, wrote, "Pessimism here is not an option: We have to leverage the aspects of technology that will support social and civic innovation and suppress the detrimental aspects that have emerged recently. One question: Who is the 'we' that will take effective action, and what actions might we take? Regulation is not enough: We must encourage broad and popular commitment to innovation and civic values. A first step to doing this is to overcome the noise and distraction promulgated by social media as a market for attention."

Gary Arlen, president of Arlen Communications, said, "BOTH options are likely. Tech will be used BOTH to encourage and to attack civic/social innovation. Cryptocurrency is one example, as we move beyond the cash/credit system. Despite its supposed protections, crypto will be hacked in some way, and some people will suffer, if only from inability to use/understand the tech. Yet, its ultimate value – as well as the entire blockchain infrastructure – will prove very valuable for all kinds of secure transactions. I expect the march of tech will NOT be positive for many individuals."

Amy Sample Ward, a director with the Nonprofit Technology Network, said, "Innovations are a response to a challenge, and we face many social and civil challenges now and will in the years to come. Interestingly, some of those challenges are the current technologies themselves. The internet in general, smartphones, applications are all tools that could fuel new ideas, and likely new technologies."

Marc Brenman, managing partner of IDARE LLC, said, "Technology will influence social and civic innovation in both good and bad ways. We cannot predict what those new technologies will be. Perhaps science fiction writers can. We can extrapolate current developments. One technological development affects another; for example, climate change, global warming and

ocean rise create the need for new technologies. But we may not be able to 'technologize' our way out of these problems. … The only improvements in the human condition that I see as a result of technology involve health. People will become more bionic. Genetic engineering will increase. Diagnosis will improve. Privacy will continue to erode."

Shannon Ellis, an expert in data science and teaching professor, at the University of California, San Diego, said, "Note that the internet can remain free while data, information and systems can be regulated. There is space for both. I see the most potential for positive changes in social and civic innovation in the protection of individual privacy when it comes to their data. I look to the right to be forgotten and the ability to know where one's data is being shared as critical in this space. As for social media and mental and physical health in this space, I think a lot still remains to be seen to see if there will be a positive outcome here."

Peter Lunenfeld, professor of design, media arts and digital humanities at the University of California, Los Angeles, and author of "Tales of the Computer as Culture Machine," wrote, "We will use technology to solve the problems the use of technology creates, but the new fixes will bring new issues. Every design solution creates a new design problem, and so it is with the ways we have built our global networks. Highly technological societies have to be iterative if they hope to compete, and I think that societies that have experienced democracy will move to curb the slide to authoritarianism that social media has accelerated. Those curbs will bring about their own unintended consequences, however, which will start the cycle anew."

Matt Colborn, a freelance writer and futurist based in Europe, said, "Technology will BOTH contribute and prevent social and civic innovation. The main issue is that I think constant tech use is addling people's brains, destroying attention spans and preventing critical thought. I've seen a number of instances where critical thought seems to drop to zero on the internet. One problem is that in virtual space, reality falls away, and only opinion is real. The potential for civic innovation is significant, but only if tech is seen as a facilitator and not the be all and end all. Actually, the main innovations shouldn't be in technology (we're awash with those) but in the social, economic and political spheres. Brian Martin has suggested a social experiment, with comparable funding to technology, where new political, social arrangements are tested small scale and scaled up. New tech could help facilitate this in an ancillary role. … One this is done, it will be more obvious where tech innovation will help, not the other way round."

Technology can be used as a tool for ill purpose

Many of these experts describe how technology can be harnessed for malicious purposes. From damage caused by anonymous bad actors online to the market-driven systems built by powerful companies, these experts warn that many current uses of tech can be harmful.

Kenneth A. Grady, an adjunct professor and affiliate of the Center for Legal Innovation at the Michigan State University, commented, "The Industrial Age was fundamentally different from the Information Age in at least one key respect that affects how social and civic innovation will proceed: data. Today, those who have abundant data are positioned to influence social and civic innovation in ways that were not possible during the Industrial Age. Through tools such as targeted social media, gerrymandering, lobbying and PACs, those who hold the data can do far more to control the outcome of change efforts than their peers could 100 years ago. In some ways, this comes down to trust – citizens do not know who to trust for information. Those who have superior tools to influence that trust can do more to affect social and civic innovation."

Deana A. Rohlinger, a professor of sociology at Florida State University whose expertise is political participation and politics, said, "It is possible that technology could contribute to social and civic innovation, but I am not terribly optimistic because of the tendency to monetize attention and the ability of stakeholders to cloak their identities in virtual spaces. First, social and civic change is less about involving people in causes and connecting them to one another in meaningful ways and more about getting attention (and funds) for initiatives and causes. This shift means that community roots are not very deep, and, ultimately, we need people and technology working together to affect change. Second, not all social and civic efforts are designed to help people. Astroturf groups such as Working Families for Walmart intentionally work against innovation and corporate change. In recent years, astroturf groups have increasingly attached themselves to legitimate organizations in an effort to maintain control over virtual spaces (e.g., telecom companies giving money to civic groups and asking them to oppose net neutrality in return). The overriding emphasis on attention, money and control makes social and civic innovation difficult."

J.A. English-Lueck, a distinguished fellow at the Institute for the Future, co-founder of the Silicon Valley Cultures Project, observed, "Social movements are the most impactful of the mechanisms for cultural change, and communication's technologies can accelerate such movements' ability to gather members. New technologies that enhance immersion and empathy, such as artificial reality and virtual reality, are particularly powerful. It is important to remember that social movements that foment change do not all head in the same direction. For example, civil rights activists and white supremacists coexist and represent radically different perspectives on the dilemma of multicultural America. The dark side of the change-fomenting technologies is the fragmentation that will unfold as different communities deepen their commitment to a particular form of change and the distances between communities broaden."

Marshall Ganz, senior lecturer in public policy at Harvard University, said, "The options in this question are constructed very problematically. Innovation and improvement are not the same

things. Many 'innovations' have done far more social damage – in the short run and in the long run – because of the weakness in our moral and political capacity to turn these innovations to constructive social purpose. So, of course, there will be innovation. Whether it turns out to be positive or negative depends in large part on who hold the power to make choices about its use and how wise those choices are. We have to look at the power question in order to evaluate possibilities."

Forget the tool and focus on the root cause of change; human nature is shaping the future

Many of these experts say that change is coming but technology use is not the thing to watch. Technology may be used while the change is unfolding or by activists who want to produce it, but technology is not the root cause of the change. From political shifts to climate change, the experts in this canvassing suggest many tumultuous areas that will play a role in the changes that will occur in the coming decade. In many cases, these experts assert that human element will be essential in deciding the type of change these noteworthy areas will produce.

danah boyd, principal researcher at Microsoft Research and founder of Data & Society, wrote, "Technology will be used by those who are thoughtful about social innovation, but it won't actually serve as the driving factor. When we talk about the opportunities for social innovation, we have to culturally contextualize ourselves. I'm going to start with the U.S.: Technology in the U.S. is caught up in American late-stage (or financialized) capitalism where profitability isn't the goal; perpetual return on investment is. Given this, the tools that we're seeing developed by corporations reinforce capitalist agendas. Innovation will require pushing past this capitalist infrastructure to achieve the social benefits and civic innovation that will work in the United States. China is a whole other ball of wax."

Serge Marelli, an IT professional based in Luxembourg who works on and with the net, wrote "Technology is just a tool. Technology will not 'create' any (magical) solution to mitigate misuse of the same technology. Compare this with our miserable failure to mitigate the effects of pollution and global warming. We know what is necessary, but we humans as a group find ourselves unable to effect change. We are facing the powers of huge companies and lobbies who are looking for short-term economic rentability (growth) whereas Humanity and politics should look for long-term sustainability. We could use technology and the rule of law to reduce the negative influence of technology, or of companies or of lobbies. We haven't done it in the past 30 years – how and why should we suddenly change this? (Even though I believe such a change is more than necessary, our survival, survival of our societies and of our civilisation depend on such a change.)"

Barry Parr, technology marketer at Delphix, previously an innovator and analyst in online journalism, commented, "Civic and social innovation depends on spheres that are less influenced by technology and more by people and money: health care, social insurance, increased democracy, accountability, antitrust."

Richard Lachmann, professor of political sociology at the State University of New York, Albany, said, "So far the internet and other technologies have had a marginal effect or at best reinforced existing developments. Journalistic coverage for the Arab Spring, for example, way underplayed the role of the Muslim Brotherhood or labor unions and instead gave an exaggerated heroic role to Twitter or to a single Google employee in Egypt. We now see, thanks to the work of real Middle Eastern specialists, that these early stories were misleading and, as much U.S. journalism does, strained to give pride of place to American individuals, corporations or technology. Real social and civic innovation comes from real social interactions between live individuals who create or revive organizations such as political parties, unions, churches and social movements."

Sanoussi Baahe Dadde, a self-employed internet consultant, observed, "We must understand that as the population of the world grows we are getting better scientists, young leaders with the motivation to enact lasting development, creative people and so many wonderful things. … So I think there is success in social and civic innovation."

Christian Schoon, external foresight consultant at Future Impacts, based in Germany, wrote, "In [the] future, a focus on development of social and civic innovations is of great relevance because of changing circumstances in developing societies via disruptive trends like globalization, in-migration, expanding social networks in interrelation with AI development, the growing gap between poor and rich, discontinuous political power patterns in established democracies and the volatile economic systems which are moving a lot due to differing tax regulations of nations. Consider the interaction between social and technology innovations. Both go with each other. But we need to place more focus on local and global social innovation-management systems."

Dick Hardt, an entrepreneur and speaker on digital life and politics, said, "Some technologies will have a positive impact on social and civic innovation. Other technologies will have a negative impact. In the end, the technology will not be a major factor in social and civic innovation. New thinking and observations will be the major factor in social and civic innovation."

Richard Jones, an entrepreneur based in Europe, said, "Today's adults have to embrace responsibility for things with ramifications beyond their understanding or control. Insurance was a concept developed to address changes at one time faced on new investment and activity as was clean air legislation. It seems similar innovation is required to address the vulnerability of people

to issues beyond their control. I wish I had a crystal ball! I know subject/citizen pressure will call for platforms to fix bias, propaganda, lies and a whole range of perceived problems. Currently I'm concerned this constrains free speech and thereby makes 'approved think' troubling. The whole edifice is built on shaky foundations so whether the pressure resolves itself positively is just my stab at whether it'll be resolved or fail."

Sam Punnett, futurist and consultant at FAD Research, said, "I don't believe technology use through social and civic innovation will 'significantly' reduce challenges of the digital age. I believe it will address some problems and create others. Digital affairs will continue to be a disruptive force. Credibility of media, disruption of financial business in banking and insurance, cyber and ransom attacks of institutions, all will continue to challenge society's capacity to adapt. Our ability to deal with digital age problems should improve with an evolution in leadership away from pre-internet incumbents. While it is difficult to be optimistic, I am compelled to be so. There is quite a gap in social and civic innovation between my own country, Canada and the United States. In my opinion the U.S. has regressed with its current administration and failed to keep up with the rest of the developed world during previous administrations in the areas of social and civic innovation. The problem is political, centering around vision and leadership. Having grown up in the U.S. I have confidence that America can change course."

Prepare for changes in democracy

Some respondents to this canvassing believe a tipping point is at hand in government and civic behavior. They said the realities of 2030 will be determined by the changes that emerge from this tipping point.

Kevin Carson, an independent scholar on issues of post-capitalist and post-state transition, wrote, "Once we experience a leftward demographic tipping point we'll be well underway into a decades-long post-capitalist and post-carbon transition. Relatively near-term reforms might include universal basic income, modern monetary theory and a rollback of the kind of maximalist 'intellectual property' legislation that is at the core of most economic rent extraction by corporations. I also expect the proliferating municipalist experiments in Barcelona, Madrid, Bologna, Preston, Jackson, etc., and the commons-based local economic models they are developing (land trusts, stakeholder cooperative utilities and services, etc.) to be the most significant seeds that the successor society will grow from. Governments will become more platform-like on the partner state model."

Tony Patt, a professor of climate policy at ETH Zurich and author of "Transforming Energy: Solving Climate Change with Technology Policy," said, "We are emerging from a period of several decades dominated by neoliberal political beliefs during which it was assumed that the private

sector – firms motivated primarily by profits – would make the critical decisions for the organization of society and the meeting of human wants and needs. This was not a good time for social and civic innovation, which is about leadership coming from other types of human organisations: public agencies steered by democratic governance and nonprofit organisations steered by a desire for social development and justice. We are reawakening to the need for these two latter sets of institutions to play a critical role in shaping society. As we wake up, I believe we will realize that it has been a mistake to leave the management of data – including social-networking data – to the for-profit private sector, and that leaving it to the private sector can create sharp divides in society. In previous generations we created institutions like public libraries, public and nonprofit schools and universities, even postal services, to manage the information and data of the data in a manner that met other societal objectives. These will be a model for the future. I haven't thought hard about what the institutions will look like."

Jerry Michalski, founder of REX, the Relationship Economy eXpedition, wrote, "Useful civic technology already exists in programs like Taiwan's pol.is, the Enspiral Network's Loomio and OpenPlans. The problem is that these solutions are nascent and not yet contagious. Just as LinkedIn ate the modern resume and Facebook ate our social lives, what if a new platform became more credible than voting? We don't need better voting every four years; we need credible, distributed, ongoing collaboration among citizens."

Knowledge of issues is needed to form solutions

Two experts expect that greater emphasis will be placed in better identifying the most vital issues and then informing people of these issues. These experts emphasize a growing focus on discussions and connections. Others are not sure, though, that this type of change will come soon.

Paul Jones, founder and director of ibiblio and a professor of information science at the University of North Carolina, Chapel Hill, wrote, "Identifying problems and challenges is the first step toward solutions to those problems. We will require and acquire a consensus as to management of the data and tools that can bind us and serve us. One thing that has become quickly obvious is that as we continue the irregular and rocky path to becoming truly global, common problems and best practice solutions – while somewhat local – will be part of our discussions. … Relatives and friends half a world away connect us to a more global sense. Not just in the case of disasters or riots, but in the mundane ways our lives are enriched through recipes, entertainments, sports and the urge to travel. People knowing people and in communication with people creates greater communities. Not perfect communities, but overall more connections and commonalities. Expect more global movements and more local movements connected globally."

Bebo White, internet pioneer and longtime leader of the International World Wide Web conference, wrote, "Relief must come in order for much of the using population to retain faith in the value of the technology. It would be very hard for a general user population to differentiate which technological tools can be trusted and which not. For example, for a general, nontechnical user, why should they trust Wikipedia and not trust Facebook?"

Amali De Silva-Mitchell, a futurist and consultant participating in multi-stakeholder, global internet governance processes, commented, "Social innovation that is effective for social change is critical. However, it is possible there may be a lot of money spent on talk but no action. Talk, however, is essential to have even the minimal foundation for social innovation. It will be worrying if there is no real impact of the majority of voices which are listened to through data collections but brushed over by civil society going after safe funding and by elected officials not seeing a future vision and working only in the present. We require real champions for advocating issues and carrying them to term who will have freedom of expression and no brush over. We have to take care of quick and major shifts due to populism by all parties in the absence of good risk-management practices being upheld or glossed over. Too much of broad-brush stroke policy can also be an issue."

Climate change is a pressing threat that will shape society

Several experts spoke to how climate change will factor into social and civic innovation in the coming decade.

Tim Bray, a technology leader who has worked for Amazon, Google and Sun Microsystems, wrote, "If we are to survive the incoming environmental devastation, we will be forced willy-nilly to bring all our human capabilities to bear on what amounts to a war footing. Imminent existential threats tend to sweep mercenary self-interests aside and focus the mind on making the best use of the tools available to us, obviously including internet-based social and civic technologies. Among other things, the malignant technology choices that have helped get us into this mess should have become thoroughly discredited."

Barbara Simons, past president of the Association for Computing Machinery, commented, "The bottom line is that climate change will dominate everything else. I would hope that people will finally start addressing climate change as the enormous threat that it is, but it's hard to keep up hope with all that is happening today."

Daniel Estrada, a digital humanities and ethics lecturer at New Jersey Institute of Technology, said, "A changing environment, in the form of mass migration, food and water shortages and other health and governance emergencies, will impose a demand for social and civic change. These

emergencies will require people to organize networks of support online. We will see tools for collective action at both global and local scales; tools for sharing information and resources, for fact-checking and rooting out malicious actors. We will also see increasing use of AI technologies, both as tools of oppression and as tools to resist digital oppression. The new laws banning facial-recognition technologies and requiring bot disclosure give some hints of the legal and political landscape to come."

Denise N. Rall, an academic researcher of popular culture at Southern Cross University, New South Wales, Australia, predicted, "Social and civic innovation will be held hostage to environmental degradation and the global scramble among the economic powers to secure scarcer and scarcer resources."

Social changes in the technology industry are looming

Several experts see change beginning to occur within tech companies. They expect that, depending upon the real-world results of these turning points, wider-reaching changes may occur.

Loren DeJonge Schulman, deputy director of studies and senior fellow at the Center for a New American Security, previously senior adviser to national security adviser Susan Rice, said, "As technology companies grow in size, we should expect to see social movements WITHIN companies have increasing effect (e.g., the anti-war/anti-military backlash against Project Maven), not only within companies themselves but externally. This path is fraught with potential upsides and downsides, but the political norms and values of tech workers will begin to have as much sway as, for example, Texas textbooks do in shaping American society."

Tom Dietterich, director of intelligent systems at Oregon State University, commented, "I predict that the service providers on 'sharing' platforms, such as Uber, Lyft, Airbnb, etc., will form 'digital unions' (or similar organizations) and that, with the help of legislation and regulation, they will level the playing field between the companies and the service providers. We are already seeing some digital-enabled strikes (Lyft drivers organizing via social media). This will promote a negotiation over the prices that the companies are charging. An interesting question is how the customers (riders on Uber, renters on Airbnb) will be engaged. Will they support these job actions? I suspect they will, because they have more direct contact with the service providers than they do with the companies. In the policy space, we are already seeing the crowdsourcing of data collection in cities. I predict we will also see the crowdsourcing of data analysis and auditing to support policymaking and policy execution. We will need to empower the public to audit the automated decision-making processes of government and corporations. Social media platforms will need to change to reduce the risk of 'cognitive infections' that spread misinformation. At this

point, we need much more research to develop policy ideas and counter measures. I think we should treat this from a public health perspective."

Marcus Foth, a professor of urban informatics at Queensland University of Technology, said, "People usually do not put up with societal issues and challenges and in turn seek to address such challenges. There is emerging evidence that the planetary health, climate emergency and societal challenges we are facing today are contributing to the rise of social and civic innovation already. Examples I am thinking of include: A labour union for tech workers in Silicon Valley type of platform companies: https://techworkerscoalition.org. Blockchain technology for good: https://www.blockchainforgood.com. Privacy-by-design and autonomy-by-design policy responses to tech and data ethics challenges."

Sasha Costanza-Chock, an associate professor of civic media at MIT, wrote, "On the bright side, there is a growing movement among technologists to rethink the ways we develop and deploy technology. Unfolding movements like #TechWontBuildIt are based on tech workers' desire to hold their companies accountable for harmful activities. There is increasing interest in how to co-design technologies together with marginalized communities, as reflected in the emergence of groups like the Design Justice Network. Newer generations of technologists are deeply invested in how social justice values might be reflected in the companies and products they dedicate their time to."

Evan Selinger, a professor of philosophy at Rochester Institute of Technology, commented, "Tech worker movements are a promising form of resistance that seems to be picking up momentum. Not too long ago, it seemed reasonable to expect that a hyper-competitive labor market would have left tech workers too afraid to speak out and challenge management on ethical, legal, and political issues. When a key message of capitalism is that everyone is fundamentally replaceable, fear easily dominates the workforce and manifests in chilled speech and action. Fortunately, we're seeing promising signs that conscience is not so easily suppressed and solidarity is achievable."

3. Power dynamics play a key role in problems and innovation

Many of the experts in this canvassing said power dynamics play a key role in technology development and social and civic innovation and have substantial impact in regard to broad societal issues. These experts highlighted the discrepancies they see in regard to who has access to power and who controls the instruments of power. Some said well-meaning individuals in positions of power do not understand the issues faced by the general public that relies upon digital platforms and systems.

While some respondents are greatly concerned about the ways in which tech companies' capitalist interests may affect social and civic innovation in the next decade, others expect that tech and social evolution will allow the public more opportunities to advocate for change. This chapter includes comments selected from those made by all respondents, regardless of their answer to the main question about the impact of technology on innovation by 2030. It includes predictions about the types of innovations that may emerge to counter abuses or imbalances in power. The comments are organized under five subthemes: Those in power seek to maintain it; those in power have no incentive to change; government regulation could address these problems; surveillance capitalism is coming to a head; and technology can be a catalyst for advocacy against abuses of power.

Those in power seek to maintain power

Some respondents were critical of today's digital form of market capitalism, which has created an environment that is proving to be problematic on many levels. Money equals power. Those in control of digital systems and platforms are highly motivated to remove or subsume any threats to their dominance. Market capitalism in today's digital realm has led to a small number of large players who are driven by driving up profit.

Jonathan Morgan, senior design researcher for the Wikimedia Foundation, said, "I'm mostly concerned with the role of digital platform owners and technology providers as stiflers of innovation. People are pretty locked into the tools they use to live, work and socialize. Increasingly, these activities are mediated by a small number of economically and politically powerful companies that actively squash competition, undermine and jettison open standards and protocols and resist regulation. These are anti-competitive practices that stifle innovation; they are anti-social practices that inhibit the development of new social norms. Our continued use of/dependence on the technologies they provide props up these organizations, allowing them to continue to engage in activities that undermine the fabric of our society in a variety of subtle and not-so-subtle ways."

Mark Surman, executive director of Mozilla Foundation and co-founder of Commons Group, wrote, "Right now, the big U.S. tech companies basically write the rules of the road. If governments and citizens can take back some of that power and build up the talent and vision to create civic innovation, we'll see the kind of social innovation we need. That said, current trends don't bode well. The companies hold all the cards. And governments don't have the expertise they need to regulate in ways that will be effective or work out well."

Henning Schulzrinne, Internet Hall of Fame member and former chief technology officer for the Federal Communications Commission, commented, "In certain countries, the state will make sure that there is no social and civic innovation, at least any that fundamentally threatens the existing power arrangements. In other countries, where private industry has largely captured regulatory and legislative bodies, protections of privacy and against AI-based discrimination, for example, or mitigation of social problems will be difficult as long as they are not aligned with industry interests."

Marc Rotenberg, executive director of the Electronic Privacy Information Center, observed, "A small number of platforms dominate communications, and they have devised techniques to minimize opposition. Consider how social movements arose in the past. Workers could organize other workers to seek better working conditions. Activists could join together in their communities to seek changes on matters from the funding for a park to the removal of a toxic waste disposal site. But Facebook prevents the use of its platform for any organizing against Facebook. By the company's own terms and conditions, users are not able to establish groups with names such as 'Facebook Users for Privacy Protection' or 'Stop the Trolls on Facebook.' Ironically, the company cites intellectual property law to prevent the use of its own identity by others. That is how technology firms diminish civic innovation."

Isaac Mao, director of Sharism Lab, said, "Technologies can help facilitate some kinds of social and civic innovations at first, but eventually those market leaders of technical products become barriers to further innovations because of their profit-driven nature. Social and civic applications running on those platforms are very vulnerable. It can be an on/off fate someday, like China's WeChat platform. Technologies running in commercial interests will also drive out other smaller players and technologies. This is harmful. We need more open technologies and open platforms run by trustable organizations."

A pioneering researcher of human-computer interaction commented, "I am concerned that technology will effectively undermine resistance to it. I believed the opposite until only a few months ago. Now, I am stunned by the amount of tech money thrown at the 'morals' of artificial

intelligence, just when AI and surveillance are becoming synonymous. So, I am much more concerned."

Estee Beck, author of "A Theory of Persuasive Computer Algorithms for Rhetorical Code Studies," commented, "The [Federal Trade Commission] issued several recommendation reports from 1998 to 2012 on regulation of private industry's growth with technology with regard to surveillance and privacy. Despite attempts of private industry to self-regulate, failures abound. The FTC will continue to target specific cases to apply remedy as they arise. Private industry will continue to push the bounds of ethical action."

Stuart Umpleby, retired cybernetician, professor of management and director research at George Washington University, commented, "There is currently a lot of innovation in electronic media. We can expect some successes in improving the social responsibility of social media. There is increasing participation in state and local politics due to acrimony at the national level. Artificial intelligence can be used to identify hate speech and errors and point to better information. However, any methods intended to improve social media could also be used to coarsen discussion. The balance of change may depend on who has the most money. People are becoming more adept at using social media for group discussions. People from other locations, anywhere in the world, can be involved. Hence, people with other views can be included and ideas can be shared at greater distance. The gap between the digitally literate and the digitally illiterate will grow. There will continue to be many efforts to increase digital literacy."

Jeff Johnson, a professor of computer science at the University of San Francisco, who previously worked at Xerox, HP Labs and Sun Microsystems, responded, "Although the question considers 'social and civic innovation' as a positive force, it can also be negative. Gaming the system for corporate or personal benefit is a negative form of social and civic innovation. Internet worms, viruses, hackers and bots that gather people's information, target ads and messages or wreak havoc are another form of social and civic innovation. Not all innovations are positive. In the 1990s, Richard Sclove hosted a series of citizen panels on democracy in the (still young) digital age (see the book "Governance.com: Democracy in the Digital Age"). His prognosis was positive, but at that time the main 'social' media consisted of email lists, electronic bulletin boards and Usenet newsgroups. The rise of Facebook, YouTube, Snapchat and the like has unfortunately turned the tide toward the negative."

Barney Dalgarno, a professor expert in learning in 3D environments at Charles Sturt University, Australia, said, "I think there will be a push for innovations and regulations to moderate the negative impacts to privacy and unbiased information distribution, however the vested interests of those who wield political and economic power are likely to prevail. In an

environment where information distribution is heavily controlled by those with a vested interest in maintaining their control, I don't see any pathway to a widespread rebellion against the unregulated internet."

J.M. Porup, a cybersecurity journalist, said, "America today is an oligarchy enforced by the secret police. Preventing any kind of meaningful social or political progress is essential to maintaining that status quo. Information technology gives totalitarian power to the toxic partnership between Silicon Valley, Wall Street and the so-called 'intelligence community.' Power desires – always – more power, and fights like hell to prevent any loss of power. This technology shift rewrites constitutional law, yet we keep citing law as though technology cares a whit for words on paper."

Mike O'Connor, retired, a former member of the ICANN policy development community, commented, "Follow the money and ethics. The forces of good are ethical, thoughtful and resource-poor. The negative forces are scurrilous and have plenty of money to buy/leverage the tech to advance their cause."

Keri Jaehnig, chief marketing officer for a media-marketing agency, wrote, "The development and adoption of artificial intelligence and cryptocurrencies will change how we live. This will make the advantaged have more opportunity and will make the poor poorer. Employment displacement will absolutely occur. Some new industry and opportunity will evolve, but it is hard to gauge at this point how much and if it will ever be enough."

Rick Lane, a future-of-work strategist and consultant, said, "We have already seen the power of tech to create misinformation campaigns when Silicon Valley companies and their supporters manipulate data and search to promote their own policy agenda. If data and search manipulation is not addressed, then the social and civic innovation that we all hope for in this new digital age will be stifled."

Juan Ortiz Freuler, policy fellow at the Web Foundation, predicted, "Many innovations will take place with the purpose of easing some of the social tensions and increase surveillance to neutralize the rest. Enacting big social changes will become increasingly difficult. Unless action is taken within the next decade, power and wealth will increasingly concentrate in the hands of the few, and citizens will lose capacity to coordinate in favor of systemic changes."

Shane Kerr, lead engineer for NS1 internet domain security, wrote, "As wealth and power consolidates, traditional options to achieve success in society decline. Historically this would have created unrest and demands for reform. With modern technology, it may be possible that large

minorities or even majorities of society will be able to 'opt out' of competition for power and prestige, and instead find alternative ways to measure success and the quality of their lives. People are already able to create, share, modify and otherwise enjoy photography, video, music and so on in ways that were barely possible to previous generations. Things in this vein will likely become more and more significant. In an ideal world, those winning the competition for power and control will be convinced that their victory is ultimately hollow without being a part of the wider human experience and competition. In a less than ideal world, they will use their power to attempt to eliminate joy and prevent anyone who does not follow their path from being happy."

John Skrentny, a professor of sociology at the University of California, San Diego, said, "Beliefs in (short-term) shareholder value as the reason for corporate existence and the interpretation of antitrust law that views monopolies as bad only if they hurt consumers, coupled with the Supreme Court's distortion of democracy to allow unlimited flows of cash and unlimited gerrymandering, all align as deep forces making democracy ever more difficult to achieve and sustain in the U.S., no matter the innovation capabilities of the people."

Doug Royer, a retired technology developer/administrator, responded, "The love of money is the root of evil. (1 Timothy 6:10 – Christian Bible – one interpretation). Companies will, and their stockholders will, continue to desire profit. People will always want things cheaper. Governments will always try to grease the loudest wheel, even when it is just noise to get attention or money. However, a society having access to trends as they happen and to the people making the decisions keeps away more manipulation of the masses than ever before possible."

Lokman Tsui, a professor at the School of Journalism and Communication of The Chinese University of Hong Kong, formerly Google's head of free expression in Asia and the Pacific, commented, "I understand social and civic innovation to be innovation driven by civil society, for civil society. I believe there will be some social and civic innovation in the next decade. But I am also concerned that the odds are not in their favor. I believe that the closed and centralized nature of the new technologies of the next decade will make this very difficult. The odds are in favor of these innovations to be driven by states and by corporations, rather than by civil society. What I see happening is that, increasingly, states and corporations are forming alliances such that the development of future innovations benefit each other at the detriment of civil society. The development of the GDPR in Europe is remarkable precisely because I see it as an exception to the norm."

Those in power have no incentive to change

Several of the experts in this canvassing expressed concerns that those in power have little incentive to change.

James S. O'Rourke IV, a University of Notre Dame professor whose research specialty is reputation management, said, "In thinking about whether technological innovations will improve or restrain society and contribute to the common good, the answer clearly is 'yes' to both questions. Western liberal civilizations have taken a laissez-faire approach to technology. 'The market will sort this out,' we're told. In the interim, reputations are ruined, lives are pulled apart, wealth is unfairly or illegally transferred. Social and psychological trauma are the result. If technology created the dilemma we now face, technology will – without question – offer ways for us to mitigate harm and improve the lives of ordinary citizens. The problem, however, is one of incentives. Most technology firms and their entrepreneurial owners are driven far more by the accumulation of wealth than the improvement of society. 'I'm all for improving life in this country,' they say, 'but only if there is clearly a market for that.' An associated problem is that government at state and national levels is insufficiently clever to deal with such issues. The smartest, most innovative, most intellectually nimble among us don't go to work for the government (especially in regulatory roles). The best and brightest do not run for public office. And the law always trails the effects of technology. Officials step in on behalf of the public interest long after the harm is done and the money is gone."

Jonathan Taplin, author of "Move Fast and Break Things: How Google, Facebook and Amazon Cornered Culture and Undermined Democracy," commented, "Google and Facebook are two of the largest corporations in the world (measured by market capitalization). They will use their financial and lobbying power to fend off significant regulation. … I would like to believe that real progress could be made on these issues, but I'm afraid that the financial power of the internet monopolies is too strong. I am highly doubtful that real progress will be made unless there is a catastrophe resulting in an autocratic state that leads to true citizen revolt."

Art Brodsky, a self-employed consultant, wrote, "I would like to think technology could help the situation, but we've seen no sign of that so far. Big companies have too much to gain and too little to lose as a result of current abuses. They have no incentives to do anything. The government also is powerless. … We have seen no evidence that tech companies have the best interests of the public at heart. Through lax enforcement of antitrust laws and little privacy protection, they focus on their bottom line only. As with other businesses, there is no sense of social responsibility and no institution bold enough to impose one."

Bernie Hogan, senior research fellow at Oxford Internet Institute, said, "Technology warps scales in favour of those who can wield the technology. It has always been the case, from the gun, the stirrup, the telephone and now the internet. This time, however, technology is operating on scales that we simply do not comprehend and cannot meaningfully do so. Google and Facebook can only make inferences about the rankings of their search results and newsfeeds, respectively;

they cannot give a clear answer about why precisely one element showed up before another. High frequency trading algorithms are similarly abstract and opaque. … The notion that we are either going to have 'no change' or substantial improvement is remarkably rosy. We are much more likely to have increased inequality, greater more effective propaganda and dissent codified and monitored. We will see some change in data security. Mostly we will see advances in health, particularly in areas where big data classification is useful such as detecting drug interactions, classifying genes and so forth. In areas that require extensive human coordination, we are only likely to see more attempts at control and centralisation along with the march of stark inequality."

Ellery Biddle, an advocacy director for Global Voices whose specialty is protection of online speech and fundamental digital rights, said, "Facebook, Google and Amazon each have a unique monopoly on the types of information they organize and offer to users. This means they are also the primary sources of many of our biggest problems. Unfortunately, all three of these companies have also occupied a significant amount of space (and injected a lot of money) in the academic, policy and civil society conversations that are intended to solve these problems. What we are left with is a situation of capture, in which the companies are creating problems with one hand and then presenting solutions for them with another. Take Facebook. This company has built a revenue model around the idea that clicks are good/profitable (as they generate ad revenue) and that material that receives lots of clicks should be given more visibility. It has also found unprecedented ways to profit from people's data. This is what lies at the core of the fake news/disinformation problem. Fake news was always there, it just wasn't so pervasive or present on our screens until we had a company that built a revenue model on clicks/shock value. In responding to the issue, Facebook has put on a great performance of engaging with fact-checkers and talking about disinformation dynamics. But the company has not changed its basic revenue model, which is the root of the problem. Facebook is never going to change this on its own – it makes far too much money for this to be a viable option. So, the solution must lie in some kind of regulation. Data-protection rules could actually have some impact here, as they would force the company to shift its practices away from endless data collection and tracking, which are deeply intertwined with the 'engagement' revenue model. We need to move away from this and seek solutions outside of these big tech companies. There may be other kinds of technology that could really change the game here, and bring us back to a more distributed, decentralized internet, but this has yet to take off."

Bill D. Herman, a researcher working at the intersection of human rights and technology, wrote, "Private industry has every incentive to create more addictive tech, and little incentive to improve society. Innovation around that won't happen in a direction that helps, at least not in total."

Philippe Blanchard, founder of Futurous, an innovation consultancy based in Switzerland, responded, "The major difficulty in the rise of a social and civic innovation comes from the pervasiveness of the general-purpose technologies and the globalisation. Technology will develop faster in less-regulated environments, and the critical mass of some use/technologies will push for its generalization worldwide."

Emilio Velis, executive director of the Appropedia Foundation, commented, "There is a growing involvement of the internet and technology on behalf of society for civic change. There will undoubtedly be a great surge of these innovations in the next few years. The only drawback to this is the lack of economic incentives to the way they work, especially for underdeveloped settings. How can innovations thrive and be effective for the bottom of the pyramid?"

Leila Bighash, an assistant professor of communication at the University of Arizona, expert in online public information, news and social media, said, "While I believe technology will be used by democratic adversaries to subvert institutions and processes, technology will also continue to be used to try to mitigate those efforts. There are issues with big tech companies not having incentives to pursue pro-democracy projects. Unfortunately, many of them, with their advocacy of completely free/open speech, have created a situation where all speech is given a platform, and sometimes the messages that spread are harmful. Nonprofits and others do not have the means that those big tech companies have, so citizens and governments have to start pressuring or incentivizing large companies to engage in activities that will bolster democracy. If this pressure works, then social and civic innovation at a mass scale will occur. If the pressure doesn't work, there may still be some smaller groups pursuing this innovation but it will not occur as quickly. We already see some efforts to build tools that mark sources of news on social media with indicators of their veracity. Volunteer groups who are highly engaged and motivated could be created/used to suss out mis/disinformation. Companies themselves could be incentivized by governments or citizen groups to remove messages, including deepfakes and other disinformation. Communication researchers are learning how fact-checking works to correct people's misinformed views, and this research could help create new systems, tools and groups. Governments will have to start creating new laws, but of course this will likely be the slowest to move."

Government regulation could address these issues

Many respondents to this canvassing suggest that government regulation may be the key to incentivizing companies to change.

Tracey Follows, futurist and founder of Futuremade, a futures consultancy based in the UK, wrote, "I feel that there is enough government interest in using technology to mitigate some of the risks, inequalities and harms that are emerging from the digital world. Most governments do not

want to upset the monopolistic, global platforms that drive growth and create employment, and have not to date pressured them to pay their taxes and to come under regulatory policies. That will change over the next five years. In the UK, the government is looking at new regulatory structures to prevent 'online harms' and is also calling for tighter restrictions on the type of content that appears in social feeds and online in general. Hard to say how successful this will be national or regional governments play a cat and mouse game with global players. However, I think things will change and change quickly once the public cotton-on to facial recognition and voice assistance as surveillance. Already there are now questions being asked and court cases being heard about the infringement of privacy from facial recognition systems being used by, for example, the police. Coupled with further awareness of China's social credit system, ordinary folk are about to wake up to a whole lot more than Alexa putting the coffee on in the morning. The governments will be forced to respond otherwise western citizens will begin to find ways to protest at their lack of privacy and start suing companies for the degradation of their mental health due to surveillance."

Ann Adams, a retired technology worker, commented, "Once the profit model changes, mitigation will follow. Unfortunately, governments have to intervene, as business currently has no incentive to change."

Ioana Marinescu, an assistant professor of economics at the University of Pennsylvania School of Social Policy and Practice, an expert in labor policy, responded, "I think new tools will likely be created to strengthen the voices of workers and the disadvantaged. These tools' emergence would be strengthened by regulations that empower people."

Susan Price, founder and CEO of Firecat Studio, a user-centered design and communication technologies expert, said, "As the technology and civic leaders' understanding of the issues mature together we'll see the pain lessen over time as more appropriate regulation is put into place."

Melissa Michelson, a professor of political science at Menlo College and author of "Mobilizing Inclusion: Redefining Citizenship Through Get-Out-the-Vote Campaigns," wrote, "Despite the many shortcomings and negative impacts of the digital age, I remain optimistic that innovators and leaders will find ways to overcome those negatives to use digital tools to allow for overall positive impacts on our social and civic lives. Every generation is threatened by the perceived drawbacks of new communication technologies, including television and telephones. Change is scary, and it can be easier to see the threats than the promise, but I believe that civic-minded people will find ways to control those negatives and allow for the benefits of the digital world to enhance and strengthen our democracy, whether that is through regulation, market competition or other new technologies that we cannot yet imagine."

Roger E.A. Farmer, research director at the National Institute of Economic and Social Research, London, and professor of economics at the University of Warwick, author of "Prosperity for All," wrote, "There is no yes-or-no answer to this question. Technology is already influencing the political process. A lot depends on how tech-media giants are regulated. Twitter, Instagram and Facebook are monopolies in the transmission of culture in the same way AT&T was a monopoly in the telecommunications industry in earlier decades. They should be broken up or regulated and treated as media organizations by the courts."

While some experts saw potential in government regulation, others debated if governments will be able to address these power imbalances and if potential regulation will solve any of the current issues. They suggest that among the potential hang-ups to meaningful regulatory change is the fact that many lawmakers are ill-equipped to create such legislation. They also question the potential efficacy of regulation.

Doc Searls, internet pioneer and editor-in-chief of Linux Journal, said, "For most people, the first response to disturbing disruptions is regulatory: 'Give us new privacy laws!' 'Break up Big Tech.' 'Turn Silicon Valley back into fruit orchards!' But that puts the regulatory cart in front of the development horse. We need development before everything. And we need norms after that. Those are the horses and the harnesses. The regulatory cart should follow the lead of both. With the GDPR (General Data Protection Regulation) in Europe we have a helpful lesson in how creating regulations in the absence of tech is a giant fail. What the GDPR does is address wrongdoing by perpetrators who are highly incentivized financially to keep doing all the wrong things they've been doing ever since they found they could track people like marked animals for the purpose of harvesting data about personal activities and using that data to aim 'relevant,' 'interest-based' and 'interactive' ads at those people's eyeballs everywhere they go in the digital world. Those ads don't work … but they do pay the perps; and it's too damned easy for the perps to put up insincere and misleading 'cookie notices' that obtain equally insincere 'consent' and thus to claim compliance. Successfully! At least so far. Meanwhile, all we need as individuals is the digital equivalent of privacy technologies we've had for the duration in the natural world: clothing and shelter. Getting those in the virtual world is job one. Fortunately, some of us are already on the case. Stay tuned."

Bruce Bimber, a professor of political science at the University of California, Santa Barbara, commented, "The scale of social innovation needed to bring societies successfully into the future is enormous. At least two problems arise. The first is that we can't get there incrementally, just by accumulating bits and pieces of adaptation and innovation; yet the sort of big change need would disrupt too many powerful interests invested in the slowly changing status quo, from which so

much money can be made. The second is that political institutions in many places have been too much hollowed out, polarized and captured to provide leadership for bold change."

Annemarie Bridy, a professor of law specializing in the impact of new technologies on existing legal frameworks, wrote, "In recent public hearings, policymakers have demonstrated repeatedly that they lack a basic understanding of how today's most socially consequential technologies work. Without better-informed policymakers, we have little hope of effectively regulating developing technologies that profoundly impact human behavior and social welfare, including those involving automated decision-making and pervasive biometric surveillance."

Neal Gorenflo, co-founder, chief editor and executive director at Shareable, a nonprofit news outlet that has covered the latest innovations in the sharing economy, responded, "If history is any guide, the United States should see a civic and perhaps even a religious revival. However, circumstances are different, the power imbalances may be at or progress to a point of no return soon. The ever-increasing power and pervasiveness of technology, the speed at which it is deployed, the inability of government and public to even understand it, never mind control it, the downgrading of our individual and collective behavior and decision making all bring into question if citizens can rally like we have before. I hope we can aim to be part of that, but I have my doubts, too. We may have been asleep at the wheel too long to avert disaster."

Some experts said change may best be found in the design of innovative new companies and tools that are built with public betterment in mind.

Ethan Zuckerman, director of MIT's Center for Civic Media and co-founder of Global Voices, said, "Development of social media technologies over the past 20 years has suffered from the false assumption that technology is and can be neutral. The assumption was that platforms like Facebook could be used for good or for ill, and that platform designers should work to keep their tools as open to as many uses as possible. We're now realizing that no technologies are neutral. Build a technology around the idea of increasing engagement and you're likely to create incentives for clickbait and disinformation. Over the next 10 years, I hope to see a wave of new platforms consciously designed to evoke different civic behaviors. We need mass innovation in design of social tools that help us bridge fragmentation and polarization, bring diversity into our media landscapes and help find common ground between disparate groups. With these as conscious design goals, technology could be a powerful positive force for civic change. If we don't take this challenge seriously and assume that we're stuck with mass-market tools, we won't see positive civic outcomes from technological tools."

Alex Halavais, an associate professor of critical data studies at Arizona State University, wrote, "There has long been a tension between civic uses of networked technologies and their co-option by both industrial and government actors. From open source projects, including things like Wikipedia, to the blogosphere, the early social web has largely given way to advertising-based platformization. Throughout this process there have been attempts to make space for more civic and public online spaces, but these have met with relatively meager success. There is a growing backlash against the corporate web, which creates the opportunity for new projects within the cooperative web. These are hardly a sure thing, of course, but there seems to be a growing interest in approaches that 'route around' corporate excesses by platforms that seem beholden to advertisers, and to a much lesser degree to government regulation. We already know how to build cooperative online spaces, and revelations of the last couple of years are providing ways for those who interact online to seek out alternatives at a growing rate."

Mark Andrejevic, an associate professor of communications at the University of Iowa, commented, "It is possible that we will see significant social and civic innovation in other regions than the U.S., but I am not optimistic about our current trajectory because the tools that we rely on for civic life are part of the problem. We have entrusted so much of our information ecosphere to huge commercial platforms that have evolved to fit neatly with the means and modes of contemporary information consumption in ways that are not conducive to the formation of functional civic dispositions. This is the problem we face: To innovate at the civic level we need communication systems and practices that allow us to deliberate in good faith, to recognize the claims of others we do not know, to form 'imagined communities' that bind us to a sense of shared, common or overlapping public interests. There is a Catch-22 involved here: We need to create new tools, but to create new tools we need civically functional modes and means of communication to start with. This is not to say that there is no way out or that history has somehow stopped. It is to suggest that we have reached the point that successful social and civic innovation will only result from a profound crisis or social breakdown. We will be building on the ruins. We have demonstrated that even when we see the coming crisis we have lost the ability to avert it. This strange paralysis haunts our current moment economically, politically and environmentally."

Surveillance capitalism is coming to a head

Surveillance capitalism is a term used to describe the market-driven business practice of digital platform providers and others of offering a "free" or reduced-rate service while collecting data about users to sell to third parties, often for marketing purposes. Many of the experts in this canvassing see this as a major underlying flaw in the design of today's digital information platforms – the primary cause of many digital threats to democracy. Some experts believe that public outcry about how their data are being used could be a catalyst for changes in privacy law.

Christian Huitema, president at Private Octopus and longtime internet developer and administrator, said, "Surveillance is a business model. Asking surveillance companies to be more respectful of privacy is asking them to make less profit. This is not going to happen without some kind of coercion. That may come from laws and regulations, but companies are pretty efficient lobbyists. Laws and regulations will only happen if a popular movement pushes them. Actually, if such a popular movement develops, it might start pushing back against the pillaging of personal data. That would be a first step in reining in the surveillance capitalists."

Seth Finkelstein, programmer, consultant and Electronic Frontier Foundation's Pioneer of the Electronic Frontier Award winner, wrote, "I'm not hopeful about ameliorating the social media hate mobs. The driving causes there are too deeply linked to the incentives from outrage-mongering. I should note there's a cottage industry in advice about social media pitfalls and good conduct. But this is hardly better than the simplistic 'If it sounds too good to be true, it probably is.' That's not bad advice in itself, but it's no substitute for something comparable to laws and regulations against fraud. Corporations that have their entire focus on selling advertising around outrage and surveillance are not stewards of news, democratic institutions, beneficial self-expression and so on. They are not ever going to become such stewards, as that is not what they do. However, it is generally not a good career strategy for someone to advocate programs such as extensive public funding of news and education, strong worker protections, laws encouraging unions, general support of public goods (that will likely not produce speaking fees or think-tank grants from those corporations). I suspect some the recent interest in the effects of 'algorithms' is in part a way of talking about these problems in a more politically acceptable manner, without directly addressing capitalism. This is all tied into the issues of inequality, plutocracy and the destruction of civic spaces. Monopolistic big businesses aren't your friend, unless you're a plutocrat. Either such companies are reined in, or society becomes highly distorted by their profit imperatives. We can make minor changes around the edges here, with stronger data protection laws, or demanding the marginalization of some specific bad actors who have grabbed the attention of a bunch of pundits. But that is all simply addressing the worst symptoms, not the cause. The particular technological background is different in various eras. But we shouldn't let that blind us to the historical underlying fundamental political conflict."

David P. Reed, pioneering architect of the internet, an expert in networking, spectrum and internet policy, wrote, "Social and civic innovation will be countered very effectively by technological surveillance and behavior modification technologies being developed to maximize corporate profitability. This highly effective technology inhabits the very tools of future social and civic innovation, enabling money to be directed efficiently to control each innovation in the direction that serves interests other than those of the citizens themselves."

Scott Burleigh, principal engineer at a major U.S. agency, commented, "The negatives of the digital age are rooted in the growing elusiveness of privacy and of trust. Digital technology will continue to provide mechanisms for violating privacy and trust that outstrip mechanisms for protecting them. People who care about these things will come to spend as little time on the grid as possible. I think there are technologies that actually could help, and I would like to believe that they will, that I'm wrong about this. But I don't think I am."

Vince Carducci, researcher of new uses of communication to mobilize civil society and dean at the College of Creative Studies, predicted, "What has variously been termed 'platform' or 'surveillance' capitalism will not prevent social innovation per se so much as direct it a particular way. Twentieth-century institutions such as unions, state bureaucracies and social welfare systems will continue to be disrupted by technologies that concentrate power in fewer hands."

Matt Moore, innovation manager at Disruptor's Handbook, Sydney, Australia, said, "Technologies will help and hinder social and civic innovation. They will drive people apart. They will bring people together. Based on our track record, these outcomes are inevitable. Their scale and scope are still largely unknown. The first 20 years of the World Wide Web (from, say, 1990 to 2010) gave many hints of new communities, new social possibilities. To me, these feel like they have been lost – or at least obscured. The web feels like a far more corporate space, controlled by a small number of large companies (Facebook, Google, Amazon) whose main business model is surveillance capitalism. Our cities will be ever more filled with sensors producing data that will feed into artificial intelligence systems. In theory, this will make cities more efficient. In practice, it may make them more chaotic – as large volumes of partial, biased data give us the illusion of omniscience. If data truly is the 'new oil' then that presumably means we will fight wars over it and its side effects will be toxic and expensive. On the plus side, as demographics change, technology can help us form the new communities (of age, identity, interdependence) that we will need in the next decade."

Scott B. MacDonald, an experienced chief economist and international economic adviser, wrote, "We should be very deeply concerned that technology will be used for better control and influencing of people and not necessarily for their betterment. The more information we know about people can allow a better customization of their lifestyle, but it provides knowledge of what they read and think. Social media and the like also will be formed by influencers, who will seek to determine what is morally right – either arch-conservative ideas or social justice warrior frameworks, both of which lend themselves to a 'Brave New World' landscape where you don't have to think; you can discuss, but only as long as your views conform with the views passed via technology from the commanding heights."

David Cake, an active leader of ICANN's Non-Commercial Users Constituency, commented, "Privacy and surveillance is becoming understood as one of the largest, and most complex, issues that must be addressed in the wake of technological change. Attitudes to privacy is emerging as one of the biggest dividers in responses to social and civic innovation. It is clear that privacy and surveillance concerns will only be partially mitigated, as surveillance becomes increasingly practical. But attitudes to use of surveillance techniques will be a major social divider between nations and societies. We see huge rifts emerging around the issue (such as attitudes to the GDPR) and there are certainly nations who are pushing ahead with aggressive surveillance and social control mechanisms. But the existence of the GDPR, and the widespread acceptance of the need for it, is a hopeful sign that acceptance of the need to regulate privacy invasive practices is rising."

Some respondents were hopeful that these issues will be worked out if new economic systems are designed and implemented to meet the needs of the digital age. One of them is **Henry Lieberman**, a research scientist at MIT's Computer Science and Artificial Intelligence Lab (CSAIL). He wrote, "The continued progress of science will make advances in all areas, such as physical and mental health, etc. The perceived 'dangers' of digital technology – loss of privacy, job loss, fake news and hate speech, 'dehumanization' of society, etc., are mostly pathologies of capitalism, not pathologies of technology. The next economic systems won't have the perverse incentives of capitalism that lead to most of these problems. See http://www.whycantwe.org/."

A pair of experts said government surveillance is a growing issue that will be of great consequence in the coming decade.

John Sniadowski, a systems architect based in the UK, wrote, "Many sovereign states are busily weaponising digital platforms to disseminate misinformation, AKA propaganda. In decades prior to the internet, states would regulate the broadcast media. Now they take action to assert control over digital lives by using technology to increasingly track individuals on a scale never before possible. Also, by enacting laws enforcing the use of 'digital surveillance' via gagging rules and other enforcement laws, it becomes increasingly difficult for individuals to lawfully protest. Also, technological advances allow the building of the so-called 'great firewall of China' where all but the most sophisticated digital citizen is denied information channels that the state consider prohibited and illegal content."

Rob Frieden, a professor of telecommunications and law at Penn State who previously worked with Motorola and has held senior policy-making positions at the Federal Communications Commission and the National Telecommunications and Information Administration, said, "Sadly, I do not see individual or even collective 'self-help' efforts as having sufficient effectiveness vis-a-vis the tools available in a surveillance society. Governments appear to have a nearly unlimited

budget to acquire the latest and greatest technologies for surveillance. How can an off-the-shelf encryption option providing 'pretty good privacy' match the power, range and resources available to governments?"

Technology can be a catalyst for advocacy against abuses of power

Many of these experts say that power imbalances and privacy concerns may mobilize the citizenry to push for change. Technology facilitates connecting with like-minded others to inform them of maleficence and advocate for redress. Just as previous digital movements have used technology to rally people together for causes in the past decade (e.g., Arab Spring, Black Lives Matter, the #MeToo movement, the Women's March), a number of these experts anticipate future movements will continue to harness technological tools during the coming decade.

Alexander B. Howard, independent writer, digital governance expert and open-government advocate, said, "Civic innovation in the U.S. has come from multiple sources in the past and will continue to do so in the future. Cities, states, Congress, federal agencies and even the courts will all build better services, interfaces and governance frameworks for public access to information, participation, policymaking and voter registration. So will existing tech companies that work with them, along with ones yet to be founded that will pioneer models for participatory media that don't depend on surveillance capitalism. Media companies, particularly nonprofits, will be a key force for innovation in connecting the public writ large and specific communities to trustworthy information and one another by adopting and developing both open and closed networks. Libraries and schools will perform similar roles in many communities, as teachers continue to experiment with improving education. Researchers and scientists at universities will collaborate with watchdogs, technologists and government to build better tools and approaches."

Charlie Firestone, executive director of the Communications and Society Program and vice president, Aspen Institute, wrote, "I am optimistic about the use of technologies towards positive uses in addressing our democratic society. I think this will come as a reaction to the abuses that have given rise to the 'techlash.' As abuses increase, which will likely happen in the coming few years, a reaction will bring reforms that will enhance democratic elements such as 1) civic participation and dialogue; 2) more widespread registration, financial contributions and voting; and 3) connecting to neighbors."

Micah Altman, director of the Center for Research in Equitable and Open Scholarship at MIT, commented, "A 19th century French critic famously quipped: 'The more things change, the more they stay the same.' And there are many regularities in human preferences; limits on individual human physical, emotional and cognitive performance; and entrenched societal interests that create substantial inertia in human social and civic institutions. However, in the last decade and a

half we've witnessed social-media-powered revolutions, crowd-sourced surveillance and countersurveillance, do-it-yourself redistricting and even a public-participation draft of a national constitution. This decade will see many more experiments, some will have impact, a few will stick. Technology change is fundamentally disruptive – in other words: The more technology changes, the more things stay insane."

Christopher Savage, a policy entrepreneur, responded, "Technology always starts with the rich/privileged and then diffuses to everyone else. Electric lighting. Cars. Landline phones. TVs. Computers. Mobile phones. Etc. This is going to happen as well with the means of influence over ideology and opinion, and, thus, with political power. Over the last decade professional political/policy folks have begun to learn to use technology tools (from cable news to email lists to targeted ads to Twitter-enabled flash mobs) to do what they've always done: create pressure on elected officials and bureaucrats to do what the professionals want. But the democratizing effects of widely dispersed tools for reaching potential political allies at the grassroots level, combined with growing populist/popular distrust of traditional institutions and interest groups, will begin to erode the message control of those groups. The internet has disintermediated countless institutions that had long had bottleneck control in their domains – from newspapers to taxicab companies to hotels to travel agents. Traditional influencers of opinion and ideology (interest groups and political parties) are ripe for disintermediation as well."

Douglas Rushkoff, a media theorist, author and professor of media at City University of New York, said, "Interesting that you didn't have an answer that was more like, 'Technology will hamper but not prevent our ability to enact social and civic innovation.' Tech will make it harder, but it won't prevent us from doing so. As inequality increases, eventually people will need to turn to one another for mutual aid. Communities will have to form for basic survival. The wealthy may move into augmented realities in order to shield themselves from the realities of the 99%, but most others will begin to find rapport and then solidarity by looking up from tech at one another, instead."

Jamais Cascio, a distinguished fellow at the Institute for the Future selected by Foreign Policy magazine in its "Top 100 Global Thinkers" predicted, "By 2030 the benefits of these social, civic and technological innovations won't be fully visible. The primary driver for ultimately succeeding in beneficial innovation is, in my view, generational, not just technological. Millennials and (in other regions) similar cohorts that grew up surrounded by networked communications will be taking on greater political, economic and social authority. These are people for whom effectively all media has been diverse, hyperbolic and created for ongoing engagement (not just one-and-done watching). They are likely to have greater skills at recognizing manipulation and seeing webs of influence (rather than lines)."

Charles Ess, a professor of digital ethics at the University of Oslo, said, "Despite the looming, if not all but overwhelming, threats of surveillance capitalism versus the Chinese social credit system, there are some encouraging signs that people can develop and exploit the more-positive possibilities of current and emerging technologies. First of all, however, it seems clear that putting hope in technology alone is simply mistaken if not counterproductive. As Merlyna Lim (2018) has convincingly demonstrated in her extensive analysis of global protests since 2010, successful activist movements and ensuring social and political transformations depend on 'hybrid human-communication-information networks that include social media' – but in which 'the human body will always be the most essential and central instrument.' ('Roots, Routes and Routers: Communications and Media of Contemporary Social Movements.' Journalism and Communication Monographs. May 2018.) The rising interest in hacker spaces, DIY and so on shows some indication that at least some numbers of people are increasingly interested in better understanding and utilizing these technologies in the name of good lives of flourishing and democracy, rather than simple consumption. If these movements can be encouraged, such human-social-technological amalgams will continue to spark eruptions of activity and movements in the right directions – as at least counterexamples and counterweights to the otherwise much darker and daunting developments."

Gina Neff, senior research fellow at the Oxford Internet Institute studying innovation and digital transformation, wrote, "Without broader participation in the conversations today that lead to the tools of tomorrow, civil society will be left behind. Too many people are being left behind in the decisions about today's technologies and data ecosystems."

Rey Junco, director of research at CIRCLE in the Tisch College of Civic Life at Tufts University, observed, "We have seen social technologies be used for good and to promote social and civic change. CIRCLE conducted polling of youth aged 18-24 around the 2018 midterm elections. A relevant finding from this polling was that youth were much more engaged in offline activism (such as attending a march, sitting in or occupying a place as an act of civil disobedience, walking out of school or college to make a statement or participating in a union strike) in 2018 than in 2016 and that this increase in participation is significantly correlated to online activism (or what had traditionally be termed 'slacktivism'). In other words, there is clearly evidence that technology use can spur civic innovation and lead to the spread and uptake of youth movements. The prototypical example of such a movement is the gun violence prevention movement. For months leading up to the 2018 election cycle, young people highlighted the problem of gun violence and school safety in many communities and made it part of the national conversation, which made a sizable impact in politics and in the media. Parkland students founded Never Again MSD, which called for protests and demonstrations to lobby for anti-gun violence legislation and co-organized the March for Our Lives in Washington, D.C., along with numerous voter registration drives and

get-out-the-vote efforts. They used social media such as Facebook, Twitter and Instagram to spread their message, and in turn caught the attention of other young people across the nation. Indeed, this movement elevated the conversation around gun violence prevention to a central theme for the 2018 midterms. Therefore we can expect, at some point, that technology will be used not only to further and spur social and civic innovation, but also to help solve some of the problems that said technology has created – such as the spread of misinformation and the contributions to political polarization."

Axel Bruns, a professor at the Digital Media Research Centre at Queensland University of Technology, said, "Adversity breeds innovation, and the present moment is one of severe adversity both for society in general and for a range of distinct societal groups in particular. At the same time that technologies are being used to surveil, control and attack them, such groups are also innovatively repurposing technologies to respond, resist and fight back. While this will generate significant change, it will not simply have uniformly positive or negative outcomes – the same tools that are being used constructively by minorities to assert and protect their identity and interests are also being used destructively by other fringe groups to disrupt and interfere with such processes. Technology is not neutral in any of this, but it is also not inherently a force for good or bad."

Paola Ricaurte, a fellow at Harvard's Berkman Klein Center for Internet and Society, wrote, "As technologies evolve with new functionalities, awareness about their risks and harms will increase. People will demand the improvement of their quality of life, the respect for human rights and the environment. However, there will be greater difficulties for those who are excluded from the digital economy to participate actively in the generation of new knowledge and to resist against the power of big tech."

Prateek Raj, an assistant professor in strategy and economics at Indian Institute of Management, Bangalore, commented, "Technology is already shaping social and civic institutions in developing countries like India. We live in a digital world, and it is bound to shape our physical reality. As long as local grassroots activism is strong, we can expect positive innovations driven by technology to happen as well. The key issue, however, is to make sure that no single entity has too much power in the digital world, so that it can block civic innovations from gaining salience. One such threat is the crisis in local journalism due to the drying up of advertising revenue (that today goes to digital giants), and prioritization of visceral content in online social media feeds."

Jaime McCauley, an associate professor of sociology at Coastal Carolina University expert in social movements and social change, observed, "Despite its shortcomings, social media and technology have proven to be useful in civic engagement, from the Arab Spring to neighborhoods

organizing on local issues. Human history is one of innovation. We will continue to use whatever tools are available to us for good AND ill. Hopefully, good will win out."

Banning Garrett, an independent consultant and futurist, said, "Much of the problem with technology has been a result of its democratization. While the current focus is on the extraordinary power and wealth of the big tech companies and their ability to harvest vast amounts of our data for commercial purposes, it is also case that technology has been democratized and put into the hands of users incredibly powerful tools of empowerment. These technologies – both the hardware like iPhones and platforms like Facebook – are powerful tools for individuals to not only 'publish' their views but also to organize others to act politically. We have already seen this for the last decade, of course, but it could take new and powerful forms in the future as virtual communities become better organized and more powerful politically, bypassing existing political parties and influencing institutions and political outcomes directly. How this will all evolve will not depend on technology but on developments in the economy and political leadership. The post-Trump era could be more of the same divisive, partisan politics, or it could move toward a rejection of the current trends. Social and civic innovation will influence which direction the country goes and will also be influenced by the trends."

William L. Schrader, founder of PSINet and internet pioneer, now with Logixedge, predicted, "I see more freedom coming for oppressed people throughout the world. Whether it is LGBTQ, people of color, people of caste, people with or without money, people of religion – I see the technology supporting social media actively leveling the playing field for all. And NO, it will not be complete by 2030, but who would have thought that we'd have gotten this far in progressing positively by 2019 after Stonewall riots in 1969? The educated populace will win over the uneducated, the unbiased will win over the biased, and the belief that people are basically GOOD will prevail. But it will take time. We all have a choice to be positive or negative, and I stand by my beliefs that the internet, in general, will be an overall help to society in every way."

Mike Gaudreau, a retired entrepreneur and business leader, wrote, "Polarization of politics will continue and positions will harden in the U.S. two-party system. The left will become too utopian and the right will veer toward national socialism that suits those who think immigrants are the cause of their issues. I fear there may be another civil war in the U.S. in the next 10 to 20 years, or at least a period of upheaval as seen in the 1960s."

4. It's all just history repeating itself

A number of these experts said that when people try to predict the future it can be helpful to look at the past and assess today's trends. They drew parallels from the present moment to past eras and extrapolated based on current trends. This section includes comments about how the past can inform the future. These comments were selected from among all responses, regardless of an expert's answer to this canvassing's main question about the impact of people's uses of technology on civic and social innovation. Remarks are organized under two subthemes: The more things change, the more they stay the same; and the future will flow from current trends.

The more things change, the more they stay the same

Many respondents to this canvassing said the story playing out today is quite similar to those of previous eras of great technological change. They pointed out that throughout history as humans have been met with new challenges they have adapted.

Rich Ling, a professor at Nanyang Technological University, Singapore, an expert on the social consequences of mobile communication, wrote, "Going back beyond the Industrial Revolution, it is also useful to look at the Printing Revolution. This development led to a wide variety of positive (e.g., the Enlightenment, scientific method, the Age of Exploration) and negative consequences (e.g., the intense bloodshed associated with the Reformation). These processes took several hundred years to work themselves out. The printing press facilitated diffusing the work of Newton and Lavoisier, but the divisions associated with Luther's Theses were profound, contributing to the St. Bartholomew's Day Massacre and the Thirty Years' War. Hopefully, we will avoid the bad and experience the good when it comes to the IT, and now the AI revolution."

Harold Feld, senior vice president at Public Knowledge, said, "The history of 150 years of regulation of electronic media show a consistent pattern of response to the disruption caused by dramatic changes in communications technology. This is often a tug of war between emerging individual freedom and innovation and emerging gatekeeper control. So far, the need to maintain flexibility even by gatekeepers, so as to maintain their networking power, weights this balance in favor of continued innovation. Change is inevitable. Human beings are communicating social creatures, and every new disruptive innovation in communication causes significant innovation and reorganization of commerce and civic engagement. With the exception of cable television, these have ultimately proven more positive and negative. I therefore remain optimistic as to widespread positive change, especially with the rise of a more politically active socially engaged generation."

Alexander Cho, a digital media anthropologist and postdoctoral scholar expert in youth and social media at the University of California, Irvine, commented, "The problems of the 'digital age' aren't new problems. What we are seeing is that 'digital' acts as a magnifier, accelerator and exacerbator of historical conduits of power that may have not been as obvious to folks before. And people are already using those same digital media to try to effect change. The wellspring of attention to anti-black state violence or to unpacking the gender binary or to calling attention to wealth inequality – all of these are social and civic conversations that are not new but that have been catalyzed through digital media."

Giacomo Mazzone, head of institutional relations, European Broadcasting Union and Eurovision, wrote, "Both scenarios could apply. But let's privilege the positive one. The technology could help to overcome social problems. But in order to do so, there will be … the need to deal with globalization issues. In the first Industrial Revolution, conflicts were happening within the same country: The workers that were losing jobs because of the innovation, first attacked the machines (Luddism), later negotiated the introduction of the machines against some social protection measures. Today's mechanism could allow to produce the negative impact in one country and to move the positive ones in another (i.e., close a plant that is highly labor-intensive in country A and replace it with another one very automatized and AI-assisted in country B). In this case, the risk is that negotiations that occurred in the 19th century will not be possible in the 21st. So, the first point to fix is about globalization and tax payment. After that, it would be possible to discuss the rest."

Mark Jamison, a professor at the University of Florida and visiting scholar at American Enterprise Institute, previously manager of regulatory policy at Sprint, responded, "I believe your premise that institutional change during the Industrial Revolution resulted from harm and abuse is false. For example, children worked in agricultural societies for centuries before the Industrial Revolution. So, the reaction of child labor laws wasn't about children being abused by having to work. It appears to me that many of the institutional changes were motivated by fear of particular kinds of change and from biases for the well-known and for protection by authority figures. Certainly, any change creates opportunities for bad actors to take advantage of persons who find themselves in unfamiliar circumstances, but there are also many good actors that use the change to do more for others. I believe this pattern is at work today, just as it has in the past."

E. Melanie DuPuis, chair and professor of environmental studies and science at Pace University, said, "I have been reading David Blight's biography of Frederick Douglass. During Reconstruction and Redemption, Douglass's speeches alternated between celebration and jeremiad. Of course, it was technology that made Douglass's words visible to a civic public: newspaper and, interestingly, train travel. It is interesting to read about a time when things were

definitely getting worse and see how someone like Douglass made sense of that. I don't think he would have guessed that the darkness would continue so long. I think American darkness will continue but that civil society will eventually reemerge, as it has in democratic countries over the last two centuries. But what emerges has to be something different from the Democratic Party form of neoliberalism, which honest and good people find problematic. There are sincere people who care about the country who have turned to America First as a reaction to neoliberalism. I don't blame them for that. As a university professor, I see my students as capable of the kind of civic innovation you are asking about here. That's where my hope lies."

John Pike, director and founder of GlobalSecurity.org, wrote, "We are now in the Second Gilded Age, dominated by a small number of stupendous companies. In the First Gilded Age the railway trust oppressed farmers and robber barons oppressed all kinds of folks, but eventually – after a few decades – that economic model was overthrown and collapsed. In principle, the Second Gilded Age should also end within a few decades. But at least the farmers could name their problem and organize for a solution. Today, how many people realize that Google is slanting search results to maximize revenue, rather than return the 'best' results? In the 1990s, very few people understood the Microsoft operating system monopoly, and that was simple compared with the toxic algorithms of today. Bryan could campaign for Free Silver, but what is the comparable demand today?"

Raimundo Beca, a longtime ICANN participant based in Chile, commented, "In my opinion, as in the past decades, democratic institutions will be able to use successfully any new technology. However, I believe that in the next decades innovations will continue to be introduced in a smooth way."

Jim Cashel, author of "The Great Connecting: The Emergence of Global Broadband and How That Changes Everything," observed, "Over the last several centuries there has been remarkable human progress in health, education, food production, environment, safety and other metrics of well-being. Progress will continue, and in many parts of the world will accelerate, due to the extension of the internet and innovations in social programs."

Steven Miller, vice provost and professor of information systems at Singapore Management University, wrote, "Now, how will things tilt? Will the 'bad stuff' dominate (like the Nazis in WWII, for a while at least)? Or will more enlightened forces prevail. I am not a historian and not so well read in history, but I suspect our human history is just full of examples of both and with some periods that are 'darker,' more regressive and harder on people and some periods that are more progressive and more positive, at least for the greater number of people."

A futurist and researcher expert in data and privacy said, "I don't believe technology will 'cause' the social and civic evolution, but various technologies will certainly be used, or will be the basis for social and legal actions to address perceived threats and harms. I do think we will see an arc similar to the Industrial Revolution of 100 years ago and I have made this parallel myself before. We 'innovated' without much restraint over several decades, but as abuses and harms became evident, countervailing values pushed back with both new social norming, civic organizations, legislative actions and even constitutional amendments. We will see (we are seeing) many of the same things now – consumers demanding more nuance, transparency and control of their privacy; demanding higher security practices and standards; and looking for state and federal legislation to set boundaries based on social values rather than technological capabilities. This will be particularly applicable in machine learning (pattern-recognition) systems that are potentially incorporated into the criminal justice system, but also in personal autonomy and individual rights and freedoms balanced against perceived security benefits. There will probably be separate (but parallel) actions regarding private (corporate) data collection and management and consumer rights as opposed to government data collection and activities with impact on civil rights (mass surveillance, facial recognition, border controls). It's a case of deciding with intent what aspects of technological capability we're comfortable with, benefit to risk."

A researcher for a futures research center based in Europe commented, "Humanity has always used the tools we have had at hand to produce social and civic innovations. Such positive innovations can be supported by targeting grant money and other resources to groups aiming to produce positive social and civic innovations with technology. Startups could also be included, as successful startups scale up and cross-national boundaries. This will need to be done in a 'portfolio' style, however. Rather than supporting a patchwork of actors to address some large issue such as foreign actors influencing public votes by distributing false story lines on social media, comprehensive bands of long-term investments must be applied to address whole situations (in this case, all free democracies need an umbrella set of efforts to fend off negative actors). This means that we now need significant resources applied to the key challenges we face socially and civically in our online habitats. The United Nations Sustainable Development Goals could be used as source of thematic directions in which to apply such efforts."

An anonymous respondent wrote, "Your analogy of the changes which occurred as a result of the Industrial Revolution is apt. There is no reason to suppose that the digital revolution will be any different. The pace of change and innovation will increase. Of that I am sure. Social change will be concomitant to the role that information technology plays in the workplace, the production cycle and the dematerialisation process already in progress. Individuals will have to reevaluate their lives and their prospects. Whether the responses to change are successful or not depends on multiple factors, such as the current sophistication of societies, the perceived place of a shared

morality and the level of education and awareness. The risk is the emergence of a disposed and disenchanted digital 'proletariat' whose response to change will be violent rather than reasoned."

A professor of computer science said, "It took more than 100 years and the blood of many workers before a balance between capital and labor was struck in the wake of the Industrial Revolution. Let's revisit this question in 2100."

The future – the good, the bad and the in-between – will flow from current trends

While some experts chose to point out parallels in the past, others looked to more recent events for clues about the future. Some said they see great promise on the horizon based on the evidence visible now and the social movements emerging today. Others feel disheartened and concerned about what the next decades holds, as they see growing challenges that seem to be unsurmountable by 2030.

Shel Israel, Forbes columnist and author of many business books on disruptive technologies, including "Resurrecting Trust: Technology, Transparency and the Bottom Line," said, "There will be more disruptive innovations over the next 10 years than have occurred in the past 10. Driven by AI and immersive technologies such as AR, the lines between humans and their digital technologies will actually blur. Chatbots, for example, will transform from words appearing on screens to holograms sitting next to us that can use haptic technologies to hug us. While the primary interface between people and their machines will move from keyboards to voice interaction, brain-computer interfaces will be rapidly advancing."

Jason Hong, a professor at the Human-Computer Interaction Institute at Carnegie Mellon University, wrote, "Society is going through the early stages of massive change that will be at the same scale as the changes seen as a result of the Industrial Revolution. As such, there will be both significant winners and losers as society is slowly restructured to match the demands of the new social, political and economic landscape. For example, we're starting to see glimpses of the future of work. We have people who are streaming what they do as they work, whether that is gaming, programming, creating art, cooking, eating (there's even whole channels on Twitch.TV on this) and more. While I also have qualms with the whole gig economy, it has also created new kinds of short-term on-demand jobs, in the form of Uber and Lyft, Fiverr, Postmates, Mechanical Turk, UpWork, TaskRabbit and more. Technology can also dramatically lower coordination costs. As one example, in the future there might not be a need for stop signs, since autonomous vehicles would know to slow down in neighborhoods and could smoothly negotiate with other vehicles and pedestrians to go through intersections. While I confess that my crystal ball doesn't have a clear answer, there are definitely many kinds of coordination costs that we face every day that

technology could help with. Some examples include polling for what kinds of retail stores are needed in a neighborhood, routing food that would have been thrown away to people who need it, routing people who can help to people who need help (see Pittsburgh Snow Angels) and more."

Michael Pilos, chief marketing officer at FirePro, London, commented, "Technology has consistently improved communication and transparency across the globe. Nothing will change that now. People are just intimidated because they only see a small part of the human story."

Garland McCoy, president, Technology Education Institute, responded, "This is a no-brainer! Postindustrial, information-age countries all have consumer-driven economies. What consumers want the market or government or both provides, and so it will be in this important area."

Kenneth Cukier, senior editor at The Economist and coauthor of "Big Data," predicted, "What the open-source software movement did for business it will do for politics. Already, groups of pioneering software coders are getting together and developing tools that enable the public to weigh on in politics – it even has a name: 'civic tech.' A new generation of citizen simply expects politics to be as efficient as Uber and Netflix – and if it isn't, they're working to change that."

Kathleen M. Carley, director of the Center for Computational Analysis of Social and Organizational Systems at Carnegie Mellon University, said, "Technology use will both contribute to and prevent innovation and successful civic response to the problems emerging in digital media. Technology designed without the end user in mind, that does not take policy into account from the start, and that is developed from a pure technology focus will only create new problems. Computational social science and computational policy need to be brought to the fore as leaders in developing new social cybersecurity technology and the associated policies. While there is much goodwill to do things for good, there is still an overriding economic force to build technologies and engage in innovation just for profit."

David J. Wierz, senior principal at The OCI Group, commented, "Technology should provide a common platform facilitating the development and evolution of organizations, legislation and regulation to mitigate disruption as well as displacement. What appears is more an increasing situation of entrenchment or using institutional means to insulate technology platforms and providers from normative engagement that fosters alleviation of the concerns often created by the platforms and providers."

Andrea Romaoli Garcia, an international tax lawyer actively involved with multi-stakeholder activities of the International Telecommunication Union and Internet Society, wrote, "The changes are positive despite the political, social and economic challenges that policymakers,

rulers, governments, scientists, engineers and everyone that is working in a technological industry is facing. Countries with healthy economies invest in trade and foreign relations. Kindly note that the countries with high technological and economic level where citizens experience a full social life are countries with high level of respect for human rights. They are countries that have incorporated in the internal laws the norms of the Universal Declaration of Human Rights. An example: the humanitarian crisis that Venezuela is experiencing. The country suffers from food shortages, economic crisis and a collapsed health system. More than 3 million Venezuelans have left the country since 2015. The government there has no support from the citizens. On the other hand, we have technologies like artificial intelligence, the Internet of Things, big data and blockchain – combined, these are bringing breakthroughs and solutions. The maximization of tax application as well as state cash flow can be increased through the elimination of criminal financial activities such as money laundering and corruption – too much public money is flowing that way. Artificial intelligence is bringing effects like cures for physical disabilities – it is wonderful. And what do I see ahead? Hyperglobalization has international trade at the point that links human survival and government decisions to a very high level of dependency. A larger participation by citizens in political discussions will be improved by technologies and responsible international cooperation."

Scott MacLeod, an associate professor of educational leadership at the University of Colorado, Denver, said, "I think success in social and civic innovation is likely. It may come to pass with groups responding to problems created by information technologies via new information technologies. I think MIT's and in particular [former] MIT Media Lab Director Joi Ito's focus on issues of racism in artificial intelligence and facial recognition is a good of example of this."

Peter B. Reiner, professor of neuroethics at the University of British Columbia, commented, "I am confident that technology will contribute to social and civic innovation. As I peruse the landscape, I see many earnest and smart people working hard to improve the somewhat dispiriting situation that we currently find ourselves in. One encouraging example: Only a few years ago, there was little interest in technology ethics. Today, interest is keen, and not just from technology developers but also from the world at large. These are the exact conditions that foster innovation in this realm."

Flynn Ross, a member of the Maine Humanities Council, wrote, "As the mother of two teenagers (screenagers), I see what quick access they have to events and information. My younger daughter is on feeds that are more pop culture while my older daughter is on more feeds that are critical social movements. We talk about what information they are getting and where it is coming from. As an education professor who is in schools often, I see that the CNN and CBS news that is piped into schools tends to have an industrialized military orientation. This is a powerful tool with a

captive audience. In Maine, the 1:1 laptop initiatives and teacher access to the internet for curriculum materials offer the potential power for teachers to create curriculum to help students become critical consumers of information and active citizens. This is tremendous."

Torben Riise, CEO at ExecuTeam Inc., responded, "It is a matter of opinion if changes are significant, but technology has the potential to make significant changes in civic areas. Most likely, however, the changes will come either in small groups of society or in small countries, like what we currently see in Finland and Lithuania. These units will increasingly experiment with everything from UBI [universal basic income], blockchain elections, swarm intelligence decision-making, and youth parliaments. The driving force will be the success of these experiments in 'small' civics groups. Corporations, unions and other organizations will follow up and, eventually – very likely by 2030 – societies around the world will follow through. Exploiting this potential requires significant investment in making societies 'tech mature,' starting in K-12 school systems, and it requires technology systems that are safe and unbreakable."

Camille Crittenden, deputy director of the Center for Information Technology Research in the Interest of Society at the University of California, Berkeley, commented, "Digital tools and platforms will undoubtedly contribute to social and civic innovation in the future. Social media has contributed to movements for labor organizing, issue-driven campaigns and political parties already. These trends will continue as new platforms are developed and participants become more familiar with their interfaces and affordances."

Miguel Moreno, a professor of philosophy at the University of Granada, Spain, an expert in ethics, epistemology and technology, said, "Attempts to control information flows and limit freedom of expression and political organisation have contributed to the development of new communication, protection and encryption tools for communications. While these tools have enhanced the capacity for civic mobilization and articulation of social response, the level of technical literacy and the culture of privacy required for their implementation are not evolving as rapidly as desirable for a significant part of the population. Nevertheless, there has been progress in the adoption of new models of intellectual property (open access licenses, Creative Commons), in access to culture (music and video streaming platforms) and in the dissemination of knowledge (open science initiatives and open books), which show the social capacity to face large monopolies in the digital content industry."

Richard Culatta, CEO of ISTE and a futurist and consultant, wrote "We are already seeing many examples of tech being used to address tough social problems (tools that allow you to take pictures of hotel rooms to stop human trafficking, apps that help identify public infrastructure that needs be fixed, etc.). However, to have widespread social and civic innovation we must be much more

intentional about teaching our children to view tech as a problem-solving tool. There are several initiatives that are helping here. First, there is a broad movement to teach computational thinking to all students across the country (helping them view tech as a tool they can design and control, not just use). Second, the DigCitCommit movement provides a concrete set of competencies for students to learn and practice using technology specifically to reinforce our democracy and strengthen our virtual communities."

Susan Price, founder and CEO of Firecat Studio, a user-centered design and communication technologies expert, said, "We're already seeing substantial efforts toward civic innovation. In San Antonio, Texas, and in our neighboring community, Austin. Several groups sponsor and promote civic innovation, and they're working together to achieve synergy, inviting the public to engage at various points, investing in expert facilitation, surveys, making public data more easily findable and usable and issuing calls to citizens and stakeholders to use the data to solve problems. I'm personally involved in several public/private partnerships, as a vendor/consultant and as a citizen. The problems of public emotional, mental and physical health as we adapt to a lifestyle that is less active, more focused on electronics, will be slower to solve."

Devin Fidler, futures strategist and founder of Rethinkery Labs, responded, "It depends if these questions primarily refer to the U.S. or to the world as a whole. … The Ukraine's Prozorro anti-corruption platform, for example, is an interesting deployment of civic technology that is already ahead of anything the U.S. has developed at a national level and is already being adopted by other EU countries. Similarly, Estonia is experimenting with organizational technologies around e-citizenship and a rethinking of what it means to be a citizen of a particular society. Even China's social credit system is an attempt to harness public-sector organizational technologies in new ways, albeit ways that are not in alignment with traditional democratic values. From the U.S. there is mostly silence. It may be that technology development and innovation here is so wedded to the venture capitalist and Crossing the Chasm models that *civic* innovation is actually an uphill battle relative to other regions."

David J. Krieger, director of the Institute for Communication and Leadership, based in Switzerland, wrote, "The socio-technical ensemble of the digital age promotes connectivity, the flow of information, communication, participation, transparency and authenticity. These new 'network norms' represent in themselves a social and civic innovation challenging the foundations of Western industrial society. History shows that the wider distribution and increased accessibility of information transforms traditional practices and institutions ushering in new forms of business, improved health care, better education and more democratic politics. An economy of scarcity in information is being replaced by an economy of abundance dismantling hierarchies, delegitimating command and control communication and shifting regulatory measures from

centralized government to cooperative forms of governance. The digital age is characterized by innovation and change and not by stability and tradition."

A futurist and technology advocate commented, "We're on the brink of a change of pathways. However, I see that as several years away. The reign of Trump and other nay-sayers will lead to a countermovement that will bring about sweeping changes in the digital world. We will see a privacy set of laws similar to Europe. We'll see the breakup of monopolies like Google that will generate new innovations."

A technologist for a top-five global technology company said, "The EU is the biggest social experiment in the world, where sovereign nations agree to pool some sovereignty to benefit the larger group collectively. Despite the negative impact of Brexit, some expansion of the EU is again being discussed. There are some worrying signs of bad behavior by some existing members including Poland and Hungary, but I still believe in the potential for the emergence of a stable, democratically based EU that remains strong in the world. Technology can help in many ways and has already done so. Estonia is an example of a single innovative EU country that can now be used by entrepreneurs as an EU base, with all services exercised securely electronically."

A distinguished professor of electrical engineering and computer science at a U.S. university who is an expert in the future of communications networks, wrote, "It is certainly possible to harness information technology in a way that would foster social and civic innovation. However, current trends are in the opposite direction due to a number of factors such as: the emergence of for-profit monopoly platforms that are primarily designed to generate revenue rather than creating or improving civic institutions, an emerging consensus that values profit over privacy in most Western societies, the inability of existing legal and political systems to deal with fundamental changes being driven by information technology, etc. Of course, analogous to the changes that followed the Industrial Revolution, it is possible that post-information revolution societies will operate in a chaotic way for a few decades, followed by a reform movement aiming to mitigate the damage caused by unregulated use of information technology. Some of the solutions that need to be considered include new legal frameworks for IT, strong privacy protections, limits to the use of social media for political and business purposes, and so on. Ultimately, this may require a fundamental redesign of some of the dominant technology platforms to make them more socially responsible and citizen-friendly."

A longtime participant in the Internet Engineering Task Force (IETF) commented, "Society has been getting more divided into ideological camps over the last decade, and each of the camps has been using technology to try to disrupt the others. I do not see that changing, and such divisions will tend to stifle social progress."

A director of entrepreneurship and innovation at a major technological university wrote, "We see these changes happening already. Groups can form more naturally around affinities and proclivities. Communication and constancy of presence through digital means will prevail. Brown University broke through every singly previous alumni participation record the university had seen – almost by 5X – when it allowed alums to engage digitally. Every single new technology application has been adopted faster and deeper. There are dystopian visions, sure (see 'Years and Years' on HBO), but on the whole people are more civically engaged. There's no way the Women's March on D.C. could've happened absent Facebook and Twitter. Or the democratic demonstrations in Hong Kong. And these changes are irreversible. There is a nascent movement in – of all places – Cuba because of the spread of smartphones."

An IETF participant said, "I already see a yearning for civic engagement of greater depth and nuance and a growing fatigue with the atmosphere of contempt that permeates social media. I suspect the extremism growing over the past two decades is within a decade of prompting a backlash among the silent majority of conservatives, liberals and moderates who just want institutions and policies that work, along with measured, gradual experimentation at the margins rather than vain attempts at revolutionary progress."

5. Tech causes more problems than it solves

A number of respondents to this canvassing about the likely future of social and civic innovation shared concerns. Some said that technology causes more problems than it solves. Some said it is likely that emerging worries over the impact of digital life will be at least somewhat mitigated as humans adapt. Some said it is possible that any remedies may create a new set of challenges. Others said humans' uses and abuses of digital technologies are causing societal harms that are not likely to be overcome.

The following comments were selected from among all responses, regardless of an expert's answer to this canvassing's main question about the impact of people's uses of technology. Some of these remarks of concern happen to also include comments about innovations that may emerge. Concerns are organized under four subthemes: Something is rotten in the state of technology; technology use often disconnects or hollows out a community; society needs to catch up and better address the threats and opportunities of tech; and despite current trends, there is reason to hope for better days.

The chapter begins with some overview insights:

Larry Masinter, internet pioneer, formerly with Adobe, AT&T Labs and Xerox PARC, who helped create internet and web standards with IETF and W3C, said, "Technology and social innovation intended to overcome the negatives of the digital age will likely cause additional negative consequences. Examples include: the decentralized web, end-to-end encryption, AI and machine learning, social media."

James Mickens, associate professor of computer science at Harvard University, formerly with Microsoft, commented, "Technology will obviously result in 'civic innovation.' The real question is whether the 'innovation' will result in better societal outcomes. For example, the gig economy is enabled by technology; technology finds buyers for workers and their services. However, given the choice between an economy with many gig workers and an economy with an equivalent number of traditional middle-class jobs, I think that most people would prefer the latter."

Michael Aisenberg, chair, ABA Information Security Committee, wrote, "Misappreciation of limits and genesis of, e.g., AI/machine learning will produce widely disparate results in deployment of tech innovations. Some will be dramatically beneficial; some may enable abuse of law enforcement, economic systems and other fundamental civic institutions and lead to exacerbation of gaps between tech controllers/users and underserved/under- or mis-skilled populations ('digital divide') in what may be a significant (embed limitations on career/economic

advancement) or even life-threatening (de facto health care or health procedure rationing) manner."

Peter Lunenfeld, a professor of design, media arts and digital humanities at the University of California, Los Angeles, and author of "Tales of the Computer as Culture Machine," predicted, "We will use technology to solve the problems the use of technology creates, but the new fixes will bring new issues. Every design solution creates a new design problem, and so it is with the ways we have built our global networks. Highly technological societies have to be iterative if they hope to compete, and I think that societies that have experienced democracy will move to curb the slide to authoritarianism that social media has accelerated. Those curbs will bring about their own unintended consequences, however, which will start the cycle anew."

Yaakov J. Stein, chief technology officer of RAD Data Communications, based in Israel, responded, "The problem with AI and machine learning is not the sci-fi scenario of AI taking over the world and not needing inferior humans. The problem is that we are becoming more and more dependent on machines and hence more susceptible to bugs and system failures. This is hardly a new phenomenon – once a major part of schooling was devoted to, e.g., penmanship and mental arithmetic, which have been superseded by technical means. But with the tremendous growth in the amount of information, education is more focused on how to retrieve required information rather than remembering things, resulting not only in less actual storage but less depth of knowledge and the lack of ability to make connections between disparate bits of information, which is the basis of creativity. However, in the past humankind has always developed a more-advanced technology to overcome limitations of whatever technology was current, and there is no reason to believe that it will be different this time."

A vice president for research and economic development wrote, "The problems we see now are caused by technology, and any new technological fixes we create will inevitably cause NEW social and political problems. Attempts to police the web will cause freedom of speech conflicts, for example."

Something is rotten in the state of technology

A large share of these experts say among the leading concerns about today's technology platforms are the ways in which they are exploited by bad actors who spread misinformation; and the privacy issues arising out of the business model behind the systems.

Misinformation – pervasive, potent, problematic

Numerous experts described misinformation and fake news as a serious issue in digital spaces. They expressed concern over how users will sort through fact and fiction in the coming decade.

Stephanie Fierman, partner, Futureproof Strategies, said, "I believe technology will meaningfully accelerate social and civic innovation. It's cheap, fast and able to reach huge audiences. But as long as false information is enabled by very large websites, such social and civic innovators will be shadow boxing with people, governments, organizations purposely countering truthful content with lies."

Sam Lehman-Wilzig, a professor of communications at Bar-Ilan University specializing in Israeli politics and the impact of technological evolution, wrote, "The biggest advance will be the use of artificial intelligence to fight disinformation, deepfakes and the like. There will be an AI 'arms race' between those spreading disinformation and those fighting/preventing it. Overall, I see the latter gaining the upper hand."

Greg Shatan, a lawyer with Moses & Singer LLP and self-described "internet governance wonk," predicted, "I see success, enabled by technology, as likely. I think it will take technology to make technology more useful and more meaningful. Many of us pride ourselves on having a 'BS-meter,' where we believe we can tell honestly delivered information from fake news and disinformation. The instinctual BS-meter is not enough. The next version of the 'BS-meter' will need to be technologically based. The tricks of misinformation have far outstripped the ability of people to reliably tell whether they are receiving BS or not – not to mention that it requires a constant state of vigilance that's exhausting to maintain. I think that the ability and usefulness of the web to enable positive grassroots civic communication will be harnessed, moving beyond mailing lists and fairly static one-way websites. Could there be 'Slack for Community Self-Governance?' If not that platform, perhaps something new and aimed specifically at these tasks and needs."

Oscar Gandy, a professor emeritus of communication at the University of Pennsylvania, said, "Corporate actors will make use of technology to *weaken* the possibility for improvements in social and civic relationships. I am particularly concerned about the use of technology in the communications realm in order to increase the power of strategic or manipulative communications to shape the engagement of members of the public with key actors within a variety of governance relationships."

An expert in the ethics of autonomous systems based in Europe responded, "Fake news is more and more used to manipulate a person's opinion. This war of information is becoming so important that it can influence democracy and the opinion of people before the vote in an election

for instance. Some AI tools can be developed to automatically recognize fake news, but such tools can be used in turn in the same manner to enhance the belief in some false information."

A research leader for a U.S. federal agency wrote, "At this point in time, I don't know how we will reduce the spread of misinformation (unknowing/individual-level) and disinformation (nefarious/group-level), but I hope that we can."

A retired information science professional commented, "Dream on, if you think that you can equate positive change with everybody yelling and those with the most clout (i.e., power and money) using their power to see their agendas succeed. Minority views will always be that, a minority. At present and in the near future the elites manipulate and control."

A research scientist for a major technology company whose expertise is technology design said, "We have already begun to see increased protections around personal privacy. At present, it is less clear how we might avoid the deliberate misuse of news or news-like content to manipulate political opinions or outcomes, but this does not seem impossible. The trick will be avoiding government censorship and maintaining a rich, vigorous exchange of opinions."

Privacy issues will continue to be a hot button topic

Multiple experts see a growing need for privacy to be addressed in online spaces.

Ayden Férdeline, technology policy fellow at the Mozilla Foundation, responded, "Imagine if everyone on our planet was naked, without any clear options for obtaining privacy technology (clothing). It would not make sense to ask people what they'd pay or trade to get this technology. This is a 'build it and they will come' kind of scenario. We're now on the verge, as a society, of appropriately recognizing the need to respect privacy in our Web 2.0 world, and we are designing tools and rules accordingly. Back in 1992, had you asked people if they'd want a free and open internet, or a graphical browser with a walled garden of content, most would have said they prefer AOL. What society needed was not AOL but something different. We are in a similar situation now with privacy; we're finally starting to grasp its necessity and importance."

Graham Norris, a business psychologist with expertise in the future of work, said, "Privacy no longer exists, and yet the concept of privacy still dominates social-policy debates. The real issue is autonomy of the individual. I should own my digital identity, the online expression of myself, not the corporations and governments that collect my interactions in order to channel my behaviour. Approaches to questions of ownership of digital identity cannot shift until the realization occurs that autonomy is the central question, not privacy. Nothing currently visible suggests that shift will take place."

Eduardo Villanueva-Mansilla, an associate professor of communications at Pontificia Universidad Catolica, Peru, and editor of the Journal of Community Informatics, wrote, "I'm trying to be optimistic, by leaving some room to innovative initiatives from civic society actors. However, I don't see this as necessarily happening; the pressure from global firms will probably too much to deal with."

An international policy adviser on the internet and development based in Africa commented, "Technology is creating and will continue to evolve and increase the impact of social and civic innovation. With technology we will see new accountability tools and platforms to raise voices to counter societal ills, be it in leadership, business and other faculties. We must however be careful so that these innovations themselves are not used to negatively impact end users, such issues like privacy and use of data must be taken on in a way that users are protected and not exposed to cybercrime and data breaches that so often occur now."

Jamie Grady, a business leader, wrote, "As technology companies become more scrutinized by the media and government, changes – particularly in privacy rights – will change. People will learn of these changes through social media as they do now."

Technology use often disconnects or hollows out community

Some respondents commented on rising problems with a loss of community and the need for more-organic, in-person, human-to-human connection and the impact of digital distancing.

Jonathan Grudin, principal researcher at Microsoft, commented, "Social and civic activity will continue to change in response to technology use, but will it change its trajectory? Realignments following the Industrial Revolution resulted from the formation of new face-to-face communities, including union chapters, community service groups such as Rotary Club and League of Women Voters, church groups, bridge clubs, bowling leagues and so on. Our species is designed to thrive in modest-sized collocated communities, where everyone plays a valued part. Most primates become vulnerable and anxious when not surrounded by their band or troop. Digital media are eroding a sense of community everywhere we look. Can our fundamental human need for close community be restored or will we become more isolated, anxious and susceptible to manipulation?"

Rebecca Theobald, an assistant research professor at the University of Colorado, Colorado Springs, said, "Technology seems to be driving people apart, which would lead to fewer connections in society."

The program director of a university-based informatics institute said, "There is still a widening gap between rural and urban as well as digital 'haves' and 'have nots.' As well, the ability to interact in a forum in which all members of society have a voice is diminishing as those with technology move faster in the digital forums than the non-tech segment of the population that use non-digital discourse (interpersonal). The idea of social fabric in a neighborhood and neighborly interactions is diminishing. Most people want innovation – it is the speed of change that creates divisions."

An infrastructure architect and internet pioneer wrote, "The kind of social innovation required to resolve the problems caused by our current technologies relies on a movement back toward individual responsibility and a specific willingness to engage in community. As both of these work against the aims of the corporate and political elite as they exist today, there is little likelihood these kinds of social innovations are going to take place. The family and church, for instance, which must be the core institutions in any rebuilding of a culture that can teach the kind of personal responsibility required, were both hollowed out in the last few decades. The remaining outward structures are being destroyed. There is little hope either families or churches will recover without a major societal event of some sort, and it will likely take at least one generation for them to rebuild. The church could take on the task of helping rebuild families, but it is too captured in attempts to grow ever larger, and consume or ape our strongly individualistic culture, rather than standing against it."

Angela Campbell, a professor of law and co-director of the Institute for Public Representation at Georgetown University, responded, "I think there will be efforts to address the social and civic impacts of technology but they may not be sufficient. In particular, I am concerned about the impact of overuse or over-reliance on technology with respect to children and teens. I am concerned about the safety of children online, not just from predators but from peers (bullying). Overuse may also contribute to physical maladies such as obesity, bad posture, eye problems, ADHD, insufficient sleep and even addiction. While technology can help to educate older children (not preschoolers who need to interact with humans and objects), it needs to be selected [and] used carefully and should not subject children to commercialism or invade their privacy. My other major concerns are job loss and discrimination. It seems inevitable that many jobs will be eliminated by technology, and while technologies may generate new jobs, I suspect there will be fewer jobs, and those that remain will require certain skills. It will be important, and difficult, to ensure that everyone is able to have employment and to make enough to live at a reasonable level. As competition for jobs increases, I am also worried about how big data allows hidden discrimination in education, health and employment."

A researcher based in North America predicted a reining in of the digital in favor of the personal: "Between email and phones, I think we're close to peak screen time, a waste of time, and it's ruining our eyes. Just as we have forsaken our landlines, stopped writing letters, don't answer our cellphones, a concept of an average daily digital budget will develop, just as we have a concept of average daily caloric intake. We'll have warning labels that rate content against recommended daily allowances of different types of content that have been tested to be good for our mental health and socialization, moderately good, bad, and awful – the bacon of digital media. And people who engage too much will be in rehab, denied child custody and unemployable. Communities, residences and vacation areas will promote digital-free, mindfulness zones – just as they have quiet cars on the train."

Society needs to catch up and better address the threats and opportunities of tech

Some of these experts said that the accelerating technological change of the digital age is making it difficult for humans to keep up and respond to emerging challenges.

A chair of political science based in the American South commented, "Technology always creates two new problems for every one it solves. At some point, humans' cognitive and cooperative capacities – largely hard-wired into their brains by millennia of evolution – can't keep up. Human technology probably overran human coping mechanisms sometime in the later 19th century. The rest is history."

Larry Rosen, a professor emeritus of psychology at California State University, Dominguez Hills, known as an international expert on the psychology of technology, wrote, "I would like to believe that we, as citizens, will aid in innovation. Smart people are already working on many social issues, but the problem is that while society is slow to move, tech moves at lightning speed. I worry that solutions will come after the tech has either been integrated or rejected."

Louisa Heinrich, a futurist and consultant expert in data and the Internet of Things, said, "There is a gap between the rate at which technology develops and the rate at which society develops. We need to take care not to fall into that gap. I hope we will see a shift in governance toward framework-based regulation, which will help mitigate the gap between the pace of change in technology and that in government. At the very least, we need to understand the ways in which technology can extend or undermine the rules and guidelines we set for our businesses, workplaces, public spaces and interactions. To name just one common example, recruitment professionals routinely turn to Facebook as a source of information on prospective employees. This arguably violates a number of regulations designed to protect people from being denied work based on personal details not relevant to that work. How do we unravel this conundrum, bearing

in mind that there will always be another social network, another digital source to mine for information about people? Taken from another angle, there is a significant gap between what users understand about certain bits of technology and the risks they take using them. How can we educate people about these risks in a way that encourages participation and co-creation, rather than passivity? As the so-called Gen Z comes of age, we will see a whole generation of young adults who are politically engaged at a level not seen in several generations, who are also native users of technology tools. This could bring about a positive revolution in the way technology is used to facilitate civic engagement and mutually empower and assist citizens and government. Technology provides us with powerful tools that can help us advance socially and civically, but these tools need to be thoughtfully and carefully put to use – when we encode barriers and biases into the applications that people need to use in daily life, whether intentionally or no, we may exclude whole segments of society from experiencing positive outcomes. We are living through a time of rapid and radical change – as always, the early stages feel uncomfortable and chaotic. But we can already see the same tools that have been used to mislead citizens being used to educate, organise, motivate and empower them. What's needed is a collective desire to prioritise and incentivise this. New Zealand is leading the way with the world's first 'well-being' budget."

Bulbul Gupta, founding adviser at Socos Labs, a think tank designing artificial intelligence to maximize human potential, responded, "Until government policies, regulators, can keep up with the speed of technology and AI, there is an inherent imbalance of power between technology's potential to contribute to social and civic innovation and its execution in being used this way. If technology and AI can make decisions about people in milliseconds that can prevent their full social or civic engagement, the incentive structures to be used toward mitigating the problems of the digital age cannot then be solved by technology."

Gene Policinski, a journalist and First Amendment law expert at the Freedom Forum Institute, observed, "We forget how new the 'tech revolution' really is. As we move forward in the next decade, the public's awareness of the possibilities inherent in social and civic innovation, the creativity of the tech world working with the public sector and public acceptance of new methods of participation in democratic processes will begin to drown out and eventually will surpass the initial problems and missteps."

Gabriel Kahn, former bureau chief for The Wall Street Journal, now a professor of journalism researching innovation economics in emerging media at the University of Southern California, wrote, "We are not facing a 'Terminator'-like scenario. Nor are we facing a tech-driven social utopia. Humans are catching up and understanding the pernicious impact of technology and how to mitigate it."

Kathee Brewer, director of content at CANN Media Group, predicted, "Much like society developed solutions to the challenges brought about by the Industrial Revolution, society will find solutions to the challenges of the Digital Revolution. Whether that will happen by 2030 is up for debate. Change occurs much more rapidly in the digital age than it did at the turn of the 20th century, and for society to solve its problems it must catch up to them first. AND people, including self-interested politicians, must be willing to change. Groups like the Mozilla Foundation already are working on solutions to invasions of privacy. That work will continue. The U.S. government probably won't make any major changes to the digital elections framework until after the 2020 election, but changes will be made. Sadly, those changes probably will result from some nastiness that develops due to voters of all persuasions being unwilling to accept electoral results, whatever the results may be."

Valerie Bock of VCB Consulting, former Technical Services Lead at Q2 Learning, responded, "I think our cultures are in the process of adapting to the power our technologies wield, and that we will have developed some communal wisdom around how to evaluate new ones. There are some challenges, but because ordinary citizens have become aware that images can be 'photoshopped' the awareness that video can be 'deepfaked' is more quickly spreading. Cultural norms as well as technologies will continue to evolve to help people to apply more informed critiques to the messages they are given."

Bach Avezdjanov, a program officer with Columbia University's Global Freedom of Expression project, said, "Technological development – being driven by the Silicon Valley theory of uncontrolled growth – will continue to outpace civic and social innovation. The latter needs to happen in tandem with technological innovation, but instead plays catch-up. This will not change in the future, unless political will to heavily regulate digital tools is introduced – an unlikely occurrence."

A computing science professor emeritus from a top U.S. technological university commented, "Social/civic innovation will occur but most likely lag well behind technological innovation. For example, face-recognition technology will spread and be used by businesses at a faster pace than social and legal norms can develop to protect citizens from any negative effects of that technology. This technology will spread quickly, due to its various positives (increased efficiencies, conveniences and generation of profits in the marketplace) while its negatives will most likely not be countered effectively through thoughtful legislation. Past Supreme Court decisions (such as treating corporations as persons, WRT unlimited funding of political candidates, along with excessive privacy of PACs) have already undermined U.S. democracy. Current populist backlashes, against the corruption of the Trump government, may also undermine democracy, such as the proposed Elizabeth Warren tax, being not on profits, but upon

passive wealth itself – a tax on non-revenue-producing illiquid assets (whose valuation is highly subjective), as in her statement to 'tax the jewelry of the rich' at 2% annually. Illiquid assets include great private libraries, great private collections of art, antiques, coins, etc. – constituting an assault on the private sector, that if successful, will weaken democracy by strengthening the confiscatory power of government. We could swing from current excesses of the right to future excesses of the left."

Despite current trends, there is reason to hope for better days

Many of the experts in this canvassing see a complicated and difficult road ahead, but express hope for the future.

Cheryl B. Preston, an expert in internet law and professor at Brigham Young University Law School, said, "Innovation will bring risk. Change will bring pain. Learning will bring challenges. Potential profits will bring abuse. But, as was the decision of Eve in the Garden of Eden, we need to leave the comfortable to learn and improve. If we can, by more informed voting, reduce the corruption in governmental entities and control corporate abuse, we can overcome difficulties and advance as a society. These advances will ultimately bring improvement to individuals and families."

John Carr, a leading global expert on young people's use of digital technologies, a former vice president of MySpace, commented, "I know of no proof for the notion that more people simply knowing more stuff, even stuff that is certifiably factually accurate, will necessarily lead to better outcomes for societies. But I do harbour a hope that if, over time, we can establish the idea that there are places on the internet that are reliable sources of information, it will in the medium to longer term help enough people in enough countries to challenge local demagogues and liars, making it harder for the demagogues and liars to succeed, particularly in times of national crisis or in times when war might be on the visible horizon. I used to think that if the internet had been around another Hitler would be impossible. Recently I have had a wobble on that but my optimism 'trumps' that gloomy view."

Mike Douglass, an independent developer, wrote, "There is a significant realization that a stampede to create connections between anonymous people and devices was a bad idea. It's up to the technologists and – more importantly – those who want to make money out of technology – to come up with a more measured approach. There's a reason why gentlemen obtained letter of introduction to other gentlemen – one shouldn't trust some random individual turning up on your doorstep. We need the equivalent approach. I've no idea what new innovations might turn up. But if we don't get the trust/privacy/security model right we'll end up with more social media disasters."

Hume Winzar, an associate professor and director of the business analytics undergraduate program at Macquarie University, Sydney, Australia, predicted, "With more hope than evidence, I'd like to think that reason will eventually overcome the extraordinary propaganda machines that are being built. When the educated upper-middle classes realise that the 'system' is no longer serving them, then legal and institutional changes will be necessary. That is, only when the managers who are driving the propaganda machine(s) start to feel that they, personally, are losing privacy, autonomy, money and their children's future, then they will need to undermine the efforts of corporate owners and government bureaucrats and officials."

Carolyn Heinrich, a professor of education and public policy at Vanderbilt University, said, "My hope (not belief) is that the 'techlash' will help to spur social and civic innovations that can combat the negative effects of our digitization of society. Oftentimes, I think the technology developers create their products with one ideal in mind of how they will be used, overlooking that technology can be adapted and used in unintended and harmful ways. We have found this in our study of educational technology in schools. The developers of digital tools envision them as being used in classrooms in 'blended' ways with live instructors who work with the students to help customize instruction to their needs. Unfortunately, more often than not, we have seen the digital tools used as substitutes for higher-quality, live instruction and have observed how that contributes to student disengagement from learning. We have also found some of the content lacking in cultural relevance and responsiveness. If left unchecked, this could be harmful for far larger numbers of students exposed to these digital instructional programs in all 50 states. But if we can spur vendors to improve the content, those improvements can also extend to large numbers of students. We have our work cut out for us!"

Heywood Sloane, entrepreneur and banking and securities consultant, wrote, "I'm hopeful the it will be a positive contributor. It has the ability to alter the way we relate to our environment in ways that shrink the distances between people and help us exercise control over our personal and social spaces. We are making substantial progress, and 5G technology will accelerate that. On the flip side, we need to find mechanisms and processes to protect our data and ourselves. They need to be strong, economic and simple to deploy and use. That is going to be a challenge."

Pamela McCorduck, writer, consultant and author of several books, including "Machines Who Think," commented, "I am heartened by the number of organizations that have formed to enhance social and civic organization through technology. In the field I follow, artificial intelligence, the numbers of professionals who take seriously the problems that arise as a consequence of this technology are reassuring. Will they all succeed? Of course not. We will not get it right the first time. But eventually, I hope."

Yoshihiko Nakamura, a professor of mechno-informatics at the University of Tokyo, observed, "The current information and communication technology loses diversity because it is still insufficient to enhance the affectivity or emotion side of societies. In this sense I can see the negative side of current technology to human society. However, I have a hope that we can invent uses of technology to enhance the weaker side and develop tomorrow's technology. The focus should be on the education of society in the liberal arts."

Ryan Sweeney, director of analytics at Ignite Social Media, commented, "In order to survive as a functioning society, we need social and civic innovation to match our use of technology. Jobs and job requirements are changing as a result of technology. Automation is increasing across a multitude of industries. Identifying how we protect citizens from these changes and help them adapt will be instrumental in building happiness and well-being."

Miles Fidelman, founder, Center for Civic Networking and principal Protocol Technologies Group, responded, "We can see clear evidence that the internet is enabling new connections, across traditional boundaries – for the flow of information, culture and commerce. It is strengthening some traditional institutions (e.g., ties between geographically distributed family members) and weakening others (e.g., the press). Perhaps the most notable innovation is that of ad hoc, network-centric organizations – be they global project teams, or crisis response efforts. How much of this innovation will make things better, how much it will hurt us, remains an open question."

A technology developer active in IETF said, "I *hope* mechanisms will evolve to exploit the advantages of new tech and mitigate the problems. I want to be optimistic, but I am far from confident."

A renowned professor of sociology known for her research into online communications and digital literacies observed, "New groups expose the error of false equivalence and continue to challenge humans to evolve into our pre-frontal cortex. I guess I am optimistic because the downside is pretty terrible to imagine. It's like E.O. Wilson said: 'The real problem of humanity is the following: We have paleolithic emotions; medieval institutions; and god-like technology. And it is terrifically dangerous, and it is now approaching a point of crisis overall.'"

6. The net effects in 10 years will be negligible

Many of the experts in this canvassing responded that there may not be a great deal of meaningful change in social and civic innovation in the next decade. Some said they expect 2030 to be relatively similar to today. Some said there will be change for the better and the worse, and, as such, the net effect is likely to be neither positive nor negative. These comments were selected from among all responses, regardless of an expert's answer to this canvassing's main question about the impact of people's uses of technology on civic and social innovation. Remarks are organized under two subthemes: A decade is not enough time to see meaningful change; and the net effect of change is likely to be neither positive nor negative.

A decade is not much time when it comes to meaningful change

A share of these experts say their best estimate is that 2030 will look much like today in regard to social and civic innovation. Several said most large-scale societal changes take time; in the grand scheme of things, 10 years is likely not enough time to determine if any change is meaningful or to know if it will be temporary or long-lasting.

John Battelle, co-founder and CEO of Recount Media and editor-in-chief and CEO of NewCo, predicted, "It'll feel like a decade of going nowhere while we digest the full impact of these technologies. But it won't be lost in the eyes of history."

Gianluca Demartini, senior lecturer in data science at the University of Queensland, wrote, "I believe there will be an impact on social and civic innovation, but that it will take longer than 10 years to appear."

Kenneth Sherrill, a professor emeritus of political science at Hunter College, said, "I'm optimistic – but it may take a very long time for good to overcome evil."

Zizi Papacharissi, a professor of communication and political science at the University of Illinois, Chicago, responded, "Two things: 1) 2030 is a mere 10 years away. It is unlikely that we will see change to civic and social processes so quickly. We may see changes in the technology we use; these will not translate into deeper change. Change is gradual. It is possible that we will see some changes to our routines, prompted by technology use. Those will reflect superficial change and not deeper transformation of a civic or social nature. 2) Technology is not something external to us, that contributes, prevents or is neutral. It is human. It is designed by us, it is part of us, and it is influenced by our beliefs. Any changes will stem from core adjustments to our value system, which is dated. It supports the habits of societies that formed centuries ago. It is our value system

(economic, political, social, cultural) that needs restructuring and is actually in the process of evolving. Until this process is complete, we will not observe actual change."

Jennifer deWinter, a professor of humanities at Worcester Polytechnic Institute, said social and civic innovation will eventually have "tremendous effects, simultaneously positive and negative." She added, "2030 might be too soon for the full social correction, but technologies are allowing wealth to be concentrated to an unprecedented extent. If internet and social technologies are the information rail system of the 21st century, then we can look to historical examples on how wealth and systems are disrupted while still maintaining the technological system – agriculture and land rights of the 14th century, rail and mass transportation of the late 19th/early 20th centuries. It is not about the technological system; it's about the human interactions/systems dialogically shaped within those technological systems and ways to reconfigure relationships between one another and with human-created systems."

Nigel Cameron, president emeritus at the Center for Policy on Emerging Technologies, predicted, "Tech will be used on both sides. Hostile powers, especially China and Russia, have the capacity and huge incentive to bend Western opinion to their will and, at a minimum, cause chaos and damage confidence in the democratic process. Nonstate actors too. There will be a growing struggle; the future of democracy is not secure, and the response of both political leaders and the tech giants to the first round (Trump election, et al.) has been dispiriting. But innovation by new tech players and determination by the military and security communities may shift the ground in the favor of freedom and truth. The example of the Industrial Revolution is not comforting. I've been writing about it recently, and the evidence is increasingly clear that it took a long time – for example – for the economic benefits to benefit ordinary people in the UK (two generations?). One of the first impacts was to deskill large numbers, as the machines didn't just require fewer workers, they were designed for child labor, which exploded and took decades to contain."

Mark Maben, a general manager at Seton Hall University, wrote, "In terms of social and civic innovation, in 2030 the transformation will be in progress but not complete. Just as it took many decades to fully respond to the disruption, exploitation and damage that the Industrial Revolution brought to societies across the global, it will take time to address the effects of 'techlash.' Over the next 10 years, social technologies will be developed to better combat sexism and racism in the workplace and civic sphere. Apps will be created to facilitate more civic engagement on the local and state level. Laws and regulations will be enacted to better protect data privacy. The civic and social innovations that occur between now and 2030 will be modest compared to what will likely follow after 2030. The New Deal couldn't have happened without the groundwork laid in the decades before it by civic activists, labor organizers and social reformers. The work of the next decade is taking the small steps that set the stage for massive transformation that will reshape

traditional Western-style liberal democracy and market capitalism into something more responsive to the needs of the general population. If you are privileged enough to be in regular conversation with Americans between the ages of 16 and 30, you can sense that these young people are already working on how to use technology for positive social change outside of the current existing political and economic structure. Their desire for a fairer democracy is inspiring."

Shane Kerr, lead engineer for NS1 internet domain security, said, "The biggest problem facing humanity – climate change – is unlikely to see any real improvement due to social or civic innovation since the only real solution in the long term is moving away from economic models based on unending growth. The problems of exponential growth have been recognized for hundreds of years, and I don't expect these to get solved in the next 10 years."

Frederico Links, a journalist, governance researcher and activist based in Africa, observed, "I think there is already much – even if mostly still crude – social and civic innovation emerging in parts of the world, which suggests that with time such phenomena will emerge in other parts as well, as technology becomes an ever greater force in everyday interactions across diverse and varying societies as regards tech penetration and adoption. The major social and civic questions are already being grappled with to a greater or lesser extent across the globe, and this will only intensify, probably leading to more substantive globalised discussions and multi-stakeholder and multidisciplinary approaches to solving emerging and still unforeseen questions and qualms of the still unfolding digital age. I think we'll only really see the fixes and innovations effectively play out beyond 2030 in most parts of the world, especially developing countries. But I do believe there'll be much social and civic innovation – and at an ever-accelerating pace – over the next decade or so."

Angela Campbell, a professor of law and co-director of the Institute for Public Representation at Georgetown University, said, "It usually takes a long time for laws to change, as well as social norms. Ten years is a very short time to expect significant social change, especially in a country where the population is so diverse and polarized. At the same time, technology can change very fast. So it is hard for law (and society) to adjust to these changes. Often, we are facing issues that have not been addressed before (e.g., big data) and so the solutions are far from clear. It may be made even more difficult, given that the major technology companies have such large market shares and are vertically integrated, thus making new entry and innovation harder. This problem is magnified because almost all other sectors of the economy depend on technology."

Jeremy Malcolm, director of the Prostasia Foundation, formerly with the Electronic Frontier Foundation, wrote, "Except in the case of revolution, current political structures are not amenable to the kind of disruptive innovation that characterizes the tech industry. It is difficult to envisage

the U.S. or other major democracies embracing sweeping social and civic innovation in such a short timeframe. Innovations adopted by governments can affect the way government communicates and how government services operate. But larger innovations (e.g., blockchain-based currencies, liquid democracy experiments) have longer-term and subtler effects on government."

Kenneth A. Grady, an adjunct professor and affiliate of the Center for Legal Innovation at Michigan State University, commented, "Although 2030 may seem like it is rapidly approaching, in terms of social and civic innovation it is far in the future. Barring some major trigger event, society will slowly adjust to technological changes rather than try to proactively control them. The convenience those changes bring will outweigh the moral outrage that could spark rapid change."

A research scientist focused on fairness, transparency and accountability in artificial intelligence said, "I think there will be a proliferation of tech tools to try to address the negative effects of technology. As people increasingly identify the negative effects technology is having on their lives, our capitalist system will supply purported solutions to these problems. That said, I don't think these solutions will necessarily be effective. We will likely require longer-term reforms to laws and culture to truly address these problems, but I don't think these will happen by 2030."

A lecturer on the social implications of computer technology who is based at a major Silicon Valley-area university observed, "2030 is just around the corner. All those mitigations you mentioned for the Industrial Revolution took a lot longer than that. And the reforms we need aren't fundamentally about technology. They're about things like defining corporations as people. Used to be that corporations were a kind of bargain with society: We give you limitations on personal liability, and in return you are required to run your corporation in the interest of society – well, at least in the interest of society's rulers. Now corporations have human rights, like fetuses. Meanwhile the rights of actual living human beings are worn away. I would love to be wrong about this. I would love for the GDPR to put Google and Facebook and Amazon out of business. (I'm having trouble imagining how it would work for the GDPR to achieve its privacy goals while still letting those companies derive their profit from something other than violating privacy.) But in the real world, legislators mostly seem to think that as long as the company posts a privacy policy that says how they're violating your privacy, that's good enough."

The net effect of the decade of change is likely to be neither positive nor negative

Some experts foresee change ahead but warn that such change will have both good and bad results. They do not expect to see society in a much better or worse position than it is today – possibly only a slightly different position.

Philip J. Salem, a professor emeritus at Texas State University, expert in complexity of organizational change, commented, "Every new technology creates its own unique challenges in addition to solving some problems and failing to prevent others."

David Sarokin of Sarokin Consulting, author of "Missed Information," wrote, "It seems obvious that technology will both help and hinder. It's a mindless tool that can be used for good or ill. Society will continue to respond to concerns with new laws and cultural pressure on companies like Facebook and Google to amend any practices seen as detrimental. From an American standpoint, the most interesting dilemma posed by the internet is the status of free and unfettered speech. People are generally allowed to tell lies, no matter how outrageous, and other people are entitled to believe them, no matter how ridiculous. There's no easy framework for deciding when a false statement crosses the line into an unacceptable post on social media."

John Pike, director and founder of GlobalSecurity.org, said, "The impact will be a mixed bag, with some things getting better and others worse, and it is too soon to judge the net effect. Social change requires organized social movements, and these seem to be increasingly scarce. Social change requires a coherent policy agenda, which in the old days was simple, and now that the world is increasingly diversified, the agenda are fragmented and unstable."

Jonathan Kolber, author, "A Celebration Society: Solving the Coming Automation Crisis," predicted, "Actually, technology will in some ways facilitate social and civic innovation, and in some ways impair it. It will facilitate by creating platforms for people to engage with each other in focused and efficient ways for which today's niche websites and social media platforms are only the beginning. (Full immersion, multisensory VR, for which we see the beginnings in Dreamscape, will enable whole new ways of living and engaging.) The impairment will come when governments and other powerful interests are able to continuously scan all internet traffic, probably assisted by AIs, for anything deemed 'subversive.' Whoever holds those levers of power will have unprecedented ability to nip change in the bud. This is one reason we need new kinds of model societies in which no such centralized control is possible."

John Harlow, a smart-city research specialist in the Engagement Lab at Emerson College, responded, "Technology will both support and prevent social and civic innovation. Social media

will help social and civic groups organize but also help governments oppress dissidents. Open government, open innovation, CrowdLaw, etc., have promise and draw on technology for social and civic innovation, but I think technology will mostly prevent those innovations from achieving scale. In particular, status quo legacy systems will exhibit inertia and path dependence, and the digital divide between generations will prevent rapid, widespread adoption of social and civic innovation. It's not necessarily that technology will inhibit these innovations, but that facility with new technology among the constituency who might adopt it could be low."

Ian Fish, an internet and communications technology professional and specialist in information security based in Europe, predicted, "Technology use will contribute to social and civic innovation but that it will not significantly mitigate the harms. The reason for this is that those who are either deliberately or as a side effect causing the harms are far more agile than civil society and infinitely more agile than the law and regulation."

Keith Moore, author and co-author of several Internet Engineering Task Force Request for Comments documents wrote, "I would not say that technology will have no effect on social and civic innovation, but rather it will be a mixed bag and it's hard to tell whether the net effect will be positive or negative. Ordinary individuals are already widely attempting to adapt to the ills of new technologies. Ironically, some of these new technologies will play a role in helping them to adapt. But the anti-democratic effects of these new technologies and mega-companies will not easily be overcome, and the laws and technological infrastructure are now well-rigged against the interests of individuals."

David Eaves, a public policy entrepreneur expert in information technology and government at Harvard's Kennedy School, commented "My sense is that this question is somewhat perplexing. Technology will be impeded *and* cause social and civic innovation. People will be using technology to suppress others' voices and impede organizations from engaging in reforms, while others will be using technology to drive change."

Brandt Dainow, whose research specialty is ethical aspects of ICT innovation over the next 30 years, said, "Tech will be central to innovation, but the net effect will neither mitigate nor exacerbate. It could do either and will do both. The result will be the outcome of competition between users of the tech."

Faisal A. Nasr, an advocate, research scientist, futurist and professor, predicted, "There is no doubt there will be some relief, but the net effect will not be significant. The confluence of technological change and social and civic innovation has to be reinforcing in nature and thrust for it to have a meaningful and lasting impact. Meaningful reform has to occur in many critical areas

to support such envisioned and desired outcomes and results. To begin with, the rule of law has to be seen within the context of inclusivity, tolerance, diversity to ascertain that the legal process serves all societal groups equally and efficiently. Otherwise social and civic innovation will have a dampened impact as it had thus far. Schools and universities play an important role in this process, not to mention the role of the public sector and effective governance. With what is being currently witnessed, the public sector is increasingly emulating the private sector mindset, much to the detriment of accountability, transparency and effective leadership."

Christian Huitema, president at Private Octopus and longtime internet developer and administrator, said, "Yes, I can see resistance organizing, an underground movement to fight for liberty. There is some of that already, with tracking blockers and decentralized alternatives to the big technology companies, but it is hard for these to compete against surveillance-funded competition. It is very hard to compete against surveillance-funded competitors who can give away their wares and finance themselves from the data stream. Will motivated customers be ready to pay more and get less services to escape surveillance? The example of the organic food movement gives me some hope, but it will take time before the resistance becomes mainstream. Besides, the behavior-manipulation techniques of the surveillance companies may well guarantee their dominance over the popular discourse."

A professor of information science commented, "Actually, a significant body of work in Science and Technology Studies (and social informatics) shows that tech always has intended and unintended consequences, that its implementation creates winners and losers, and that it helps and hinders social and cultural change. The same type of technology can help alleviate congestion in the delivery of government social services and be used for voter suppression. The important question, in my mind, is who will be in charge of designing, implementing and managing these technologies? The political aspects of new technologies will be important in determining the range of effects they will have."

An anonymous technology journalist predicted, "Technology will both help and hinder social and civic innovation. After a period in which it looked like social media would be a new tool for challenging the powerful, as in the Arab Spring, the current perception focuses on the damage it's doing. This damage is real, but the potential for new social innovation hasn't disappeared either. This doesn't necessarily mean the two sides are a wash, cancelling each other out entirely. It's an arms race."

About this canvassing of experts

The expert predictions reported here about the impact of digital technologies on key aspects of democracy and democratic representation and likely social and civic innovation came in response to a set of questions asked by Pew Research Center and Elon University's Imagining the Internet Center in an online canvassing conducted July 3-Aug. 5, 2019. This is the 11th "Future of the Internet" canvassing the two organizations have conducted together. More than 10,000 experts and members of the interested public were invited to share their opinions on two questions: 1) the impact on democracy and democratic representation of uses of networked technologies in the next decade, and 2) the potential for significant social and civic digital innovation in the next decade accomplished in some significant way due to the application of technology. This report includes only the data tied to the second question. The report that included results from the question on democracy and democratic representation was released in February 2020.

The results published here come from a nonscientific canvassing. They cover respondents' answers the following:

> ***Social and civic innovation and its impact on the new difficulties of the digital age:*** *As the Industrial Revolution swept through societies, people eventually took steps to mitigate abuses and harms that emerged. For instance, new laws were enacted to make workplaces safer and protect children; standards were created for product safety and effectiveness; new kinds of organizations came into being to help workers (e.g., labor unions) and make urban life more meaningful (e.g., settlement houses, Boys/Girls Clubs); new educational institutions were created (e.g., trade schools); household roles in families were reconfigured.*
>
> *Today's "techlash" illuminates the issues that have surfaced in the digital era. We seek your insights as to whether and how reforms to ease these problems and others might unfold.*
>
> ***The question:*** *Will significant social and civic innovation occur between now and 2030?*
>
> - *Yes*
> - *No*
>
> ***Follow-up question:*** *Will humans' use of technology lead to or prevent significant social and civic innovation? By "social and civic innovation" we mean the creation of things like new technology tools, legal protections, social norms,*

new or reconfigured groups and communities, educational efforts and other strategies to address digital-age challenges.

- *Technology use will contribute to social and civic innovation that significantly mitigates problems of the digital age*
- *Technology use will prevent social and civic innovation from significantly overcoming the negatives of the digital age*
- *Technology use will have no effect on social and civic innovation*

Please explain: *If you see no relief, why? If you see success in social and civic innovation as likely, how might it come to pass and what kinds of new groups, systems and tools will be created?*

Participants were further asked:

On a scale of 1-10 please rate the likelihood that this social and civic innovation change will take place. On this scale 1 means that the change will not occur and 10 is the certain likelihood that it will occur. By "social and civic innovation" we mean the creation of things like new technology tools, legal protections, social norms, new or reconfigured groups and communities, educational efforts and other strategies to address digital-age challenges.

Social and civic innovation will substantially …

1. *modulate the power of large tech companies*
2. *lead to ethical advances in uses of algorithms*
3. *improve the economic stability of the news media*
4. *improve trust in democratic institutions*
5. *establish social media platforms where beneficial self-expression, connection and fact-based information are dominant*
6. *enable political activities that lead to progress in solving major policy problems*
7. *establish an acceptable balance between personal privacy and public safety*
8. *reduce worker vulnerabilities associated with technological disruptions*
9. *improve physical health*
10. *mitigate mental and emotional health issues tied to digital life*

> ***Please explain:*** *What types of successful social and civic innovation do you expect to see by 2030 in the areas you ranked as most likely to see positive change? Are there problems you believe are unlikely to be mitigated by any means? Which ones and why?*

In all, 697 technology innovators, developers, business and policy leaders, researchers and activists responded to at least one part of this battery of questions. Answers of the 666 total responses to the quantitative question regarding whether significant social and civic innovation will occur between now and 2030 showed the following:

- **84%** said *yes*, significant social and civic innovation will occur between now and 2030
- **16%** said *no*, significant social and civic innovation will not occur between now and 2030.

Answers of the 646 total responses to the quantitative question regarding how technology use will influence social and civic innovation showed the following:

- **69%** said *technology use will contribute to social and civic innovation that significantly mitigates problems of the digital age*
- **20%** said *technology use will prevent social and civic innovation from significantly overcoming the negatives of the digital age*
- **11%** said *technology use will have no effect on social and civic innovation*.

We are not including the numeric responses to these questions because of data inconsistencies and because a notable share of experts did not fill out all the answers.

The web-based instrument was first sent directly to an international set of experts (primarily U.S.-based) identified and accumulated by Pew Research Center and Elon University during previous "Future of the Internet" studies, as well as those identified in an earlier study of people who made predictions about the likely future of the internet between 1990 to 1995. Additional experts with proven interest in digital government, governance, social and civic innovation and other aspects of this particular research topic were also added to the list.

We invited a large number of professionals and policy people from government bodies and technology businesses, think tanks and interest networks (for instance, those that include professionals and academics in law, political science, economics, social and civic innovation, anthropology, sociology, psychology and communications); globally located people working with communications technologies in government positions; technologists and innovators; top universities' engineering/computer science, political science, sociology/anthropology and

business/entrepreneurship faculty, graduate students and postgraduate researchers; plus some who are active in civil society organizations such as Association for Progressive Communications (APC), Electronic Privacy Information Center (EPIC) and Access Now; and those affiliated with newly emerging nonprofits and other research units examining the impacts of digital life.

Among those invited were researchers, developers and business leaders from leading global organizations, including Oxford, Cambridge, MIT, Stanford and Carnegie Mellon universities; Google, Microsoft, Akamai, BT and Cloudflare; leaders active in global internet governance and internet research activities, such as the Internet Engineering Task Force (IETF), Internet Corporation for Assigned Names and Numbers (ICANN), Internet Society (ISOC), International Telecommunications Union (ITU), Association of Internet Researchers (AoIR), and the Organization for Economic Cooperation and Development (OECD). Invitees were encouraged to share the survey link with others they believed would have an interest in participating, thus there may have been somewhat of a "snowball" effect as some invitees invited others to weigh in.

Since the data is based on a nonrandom sample, the results are not projectable to any population other than the individuals expressing their points of view in this sample.

> *The respondents' remarks reflect their personal positions and are not the positions of their employers; the descriptions of their leadership roles help identify their background and the locus of their expertise.*

A large number of the expert respondents elected to remain anonymous. Because people's level of expertise is an important element of their participation in the conversation, anonymous respondents were given the opportunity to share a description of their internet expertise or background, and this was noted, when available, in this report.

In this canvassing, 640 respondents answered the demographic questions. Some 75% identified themselves as being based in North America, while 25% hail from other corners of the world. When asked about their "primary area of interest," 33% identified themselves as professor/teacher; 14% as research scientists; 13% as futurists or consultants; 8% as technology developers or administrators; 8% as advocates or activist users; 6% as entrepreneurs or business leaders; 4% as pioneers or originators; and 15% specified their primary area of interest as "other."

Following is a list noting a selection of the key respondents who took credit for their responses on at least one of the overall topics in this canvassing on democracy and democratic representation and likely social and civic innovation. Workplaces are included to show expertise; they reflect the respondents' job titles and locations at the time of this canvassing.

Carlos Afonso, internet pioneer and digital rights leader based in Rio de Janeiro, Brazil; **Sam Adams,** 24-year veteran of IBM now senior research scientist in artificial intelligence for RTI International; **Jeffrey Alexander,** senior manager for innovation policy at RTI; **Micah Altman**, director of the Center for Research in Equitable and Open Scholarship at MIT**; Karl Auerbach,** chief technology officer, InterWorking Labs; **Satish Babu,** founding director, International Centre for Free and Open Source Software; **Fred Baker,** board member of the Internet Systems Consortium; **John Battelle,** co-founder and CEO, Recount Media, and editor-in-chief and CEO, NewCo; **Ellery Biddle,** advocacy director for Global Voices expert in protection of online speech and fundamental digital rights; **Bruce Bimber,** professor of political science, University of California, Santa Barbara; **danah boyd,** principal researcher, Microsoft Research, and founder of Data and Society; **Stowe Boyd,** consulting futurist expert in technological evolution; **Richard Bennett,** founder of the High-Tech Forum; **Philippe Blanchard,** founder of Futurous, an innovation consultancy based in Switzerland; **Daniel Berleant,** author of "The Human Race to the Future"; **David Bray**, executive director for the People-Centered Internet Coalition; **Tim Bray,** technology leader who has worked for Amazon, Google and Sun Microsystems; **Scott Burleigh,** principal engineer at a major U.S. agency; **Nigel Cameron,** president emeritus, Center for Policy on Emerging Technologies; **Angela Campbell,** professor of law and co-director, Institute for Public Representation, Georgetown University; **Robert Cannon,** senior counsel for a U.S. government agency and founder of Cybertelecom; **Kathleen M. Carley,** director, Center for Computational Analysis of Social and Organizational Systems, Carnegie Mellon University; **John Carr,** a leading global expert on young people's use of digital technologies and former vice president of MySpace; **Jamais Cascio**, distinguished fellow at the Institute for the Future; **Carol Chetkovich,** professor emeritus of public policy at Mills College; **Eline Chivot,** a public-policy researcher at the Center for Data Innovation; **Alexander Cho,** digital media anthropologist and postdoctoral scholar expert in youth and social media at the University of California, Irvine; **Barry Chudakov,** founder and principal at Sertain Research; **Julie Cohen,** professor of law and technology, Georgetown University; **Sasha Costanza-Chock,** associate professor of civic media, Massachusetts Institute of Technology; **Kenneth Cukier,** senior editor at The Economist and coauthor of "Big Data"; **Judith Donath**, fellow at Harvard University's Berkman Klein Center for Internet and Society and founder of the Sociable Media Group at the MIT Media Lab; **Stephen Downes,** senior research officer for digital technologies, National Research Council of Canada; **Bill Dutton**, professor of media and information policy at Michigan State University; **Esther Dyson,** internet pioneer, journalist, entrepreneur and executive founder of Way to Wellville; **David Eaves,** public policy entrepreneur expert in information technology and government at Harvard's Kennedy School; **Emmanuel Edet,** legal adviser, National Information Technology Development Agency, Nigeria; **Robert Epstein,** senior research psychologist, American Institute for Behavioral Research and Technology; **Daniel Estrada,** digital humanities and ethics lecturer, New Jersey Institute of

Technology; **Susan Etlinger**, industry analyst for Altimeter Group; **Harold Feld,** senior vice president at Public Knowledge; **Ayden Férdeline,** technology policy fellow, Mozilla Foundation; **Stephanie Fierman,** partner, Futureproof Strategies; **Seth Finkelstein,** consulting programmer and EFF Pioneer Award winner; **Charlie Firestone,** executive director and vice president, Aspen Institute Communications and Society program; **Richard Forno,** director, Center for Cybersecurity, University of Maryland, Baltimore County; **Marcus Foth,** professor of urban informatics, Queensland University of Technology; **Juan Ortiz Freuler,** policy fellow, World Wide Web Foundation; **Thomas Frey,** founder and senior futurist, DaVinci Institute; **Rob Frieden,** professor of telecommunications law at Penn State, previously worked with Motorola and held senior policy positions at the Federal Communications Commission and the U.S. National Telecommunications and Information Administration; **Oscar Gandy,** professor emeritus of communication at the University of Pennsylvania; **James Gannon,** cybersecurity and internet governance expert based in Europe; **Marshall Ganz,** senior lecturer in public policy, Harvard University; **Thierry Gaudin,** co-founder and president, France 2100 Foundation; **Dan Gillmor,** co-founder of the News Co/Lab at Arizona State University's Walter Cronkite School of Journalism and Mass Communication, and professor of practice in digital media literacy; **Herbert Gintis,** external professor, Santa Fe Institute; **Gina Glantz,** political strategist and founder of GenderAvenger; **Eric Goldman,** professor and director, High-Tech Law Institute, Santa Clara University School of Law; **Neal Gorenflo,** co-founder, chief editor and executive director at Shareable; **Kenneth Grady,** futurist, founding author of The Algorithmic Society blog; **Erhardt Graeff,** researcher expert in the design and use of technology for civic and political engagement, Olin College of Engineering; **Jonathan Grudin,** principal researcher, Microsoft; **Bulbul Gupta,** founding adviser, Socos Labs, a think tank designing artificial intelligence to maximize human potential; **John Harlow,** smart-city research specialist, Engagement Lab, Emerson College; **Gry Hasselbalch,** co-founder, DataEthicsEU; **Jim Hendler,** Tetherless World Professor, Rensselaer Polytechnic Institute; **Bernie Hogan,** senior research fellow, Oxford Internet Institute; **Jason Hong,** professor, Human-Computer Interaction Institute, Carnegie Mellon University; **Terri Horton,** workforce futurist, FuturePath LLC; **Christian Huitema,** president, Private Octopus; **Alan Inouye,** senior director for public policy and government, American Library Association; **Shel Israel,** Forbes columnist and author of many books on disruptive technologies; **Mark Jamison,** professor at the University of Florida and visiting scholar at American Enterprise Institute, previously manager of regulatory policy at Sprint; **Jeff Jarvis,** director, Tow-Knight Center, City University of New York; **Bryan Johnson,** founder and CEO, Kernel (developer of advanced neural interfaces) and at OS Fund; **Jeff Johnson,** professor of computer science, University of San Francisco, previously worked at Xerox, HP Labs and Sun Microsystems; **Kevin Doyle Jones,** co-founder, GatherLab; **Rey Junco,** director of research, CIRCLE, Tisch College of Civic Life, Tufts University; **Gabriel Kahn,** former bureau chief, The Wall Street Journal; **Michael Kleeman,** senior fellow,

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A selection of institutions at which some of the respondents work or have affiliations:

Access Now; Akamai Technologies; Altimeter Group; American Institute for Behavioral Research and Technology; American Library Association; Anticipatory Futures Group; Appropedia Foundation; Arizona State University; Aspen Institute; AT&T; Australian National University; Bloomberg Businessweek; Brookings Institution; BT Group; Carnegie Mellon University; Center for a New American Security; Center for Data Innovation; Centre for Policy Modelling, Manchester Metropolitan University; Centre National de la Recherche Scientifique, France;

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Complete sets of credited and anonymous responses can be found here:

https://www.elon.edu/u/imagining/surveys/future-of-civic-innovation-2020/credit/

https://www.elon.edu/u/imagining/surveys/future-of-civic-innovation-2020/anonymous/

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