The Internet as a Public Utility

A Joint Meeting of the RCEDF and Futures Group

Thursday, April 7, 2022, 11AM – 12PM

AGENDA

Welcome & Introductions

DVRPC planning staff from the Futures Group and Regional Community and Economic Development Forum will welcome attendees and introduce the guest speakers.

Deploying Broadband in Chester County

Jim Mercante will discuss the background and current status of two Digital Equity initiatives underway in Southern Chester County: a Digital Broadband Connectivity Assessment project and a Digital Skills/Literacy project.
Jessica Zufolo will discuss broadband funding and network deployment opportunities for rural unserved communities throughout Southern Chester County.

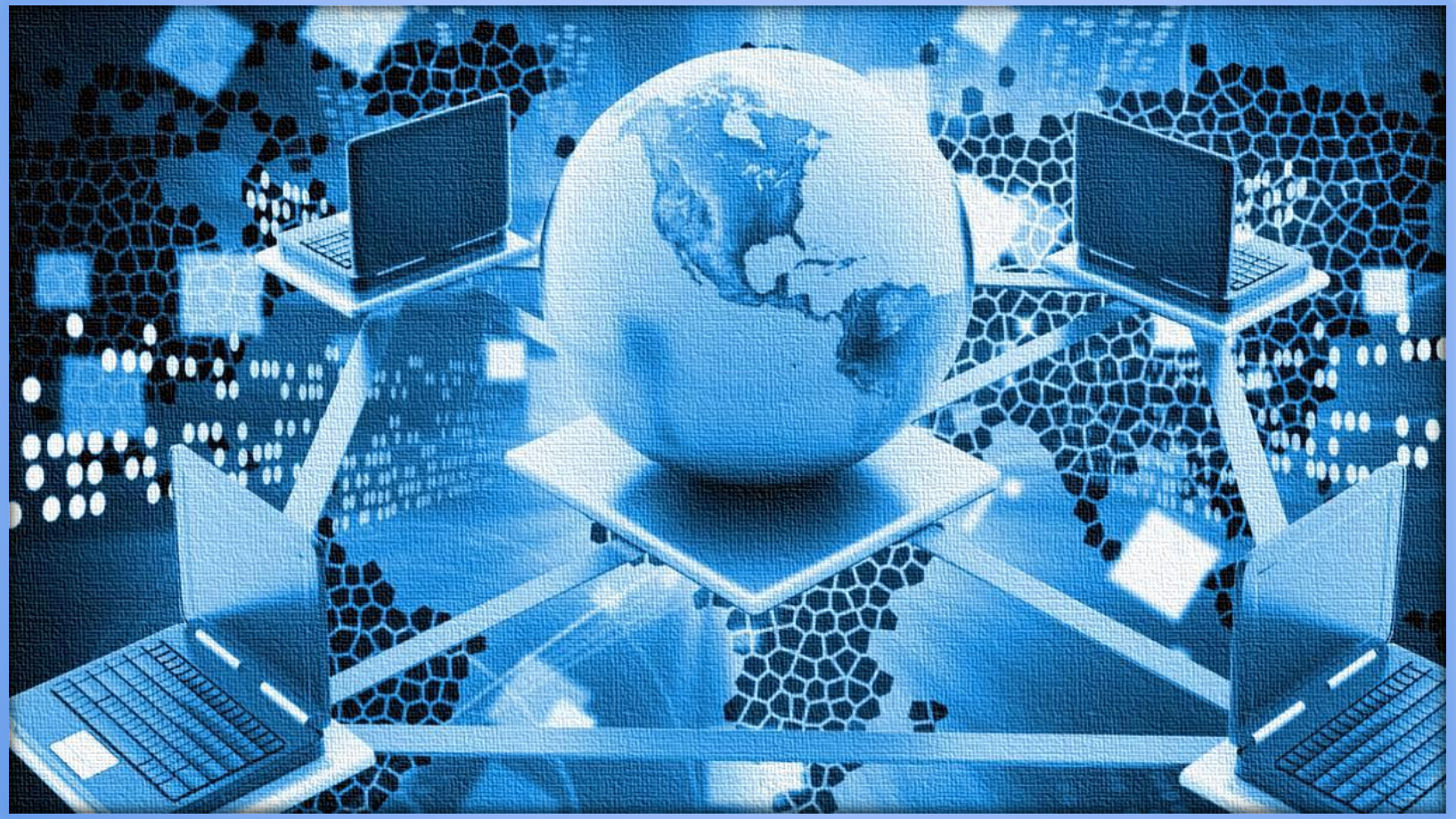
Where is the Internet Headed?

Amani Bey will present their review of "Visions of the Internet in 2035", a collaborative report by Pew Research Center and Elon University which documents experts' hopes and expectations for social media platforms and other online public-discussion spaces to be improved by 2035 in ways that significantly serve the public good.

Q&A

A very brief opportunity for questions will be held at the end of the event.

Bridging the Digital Divide
Futures/RCEDF webinar – April 7th, 2022



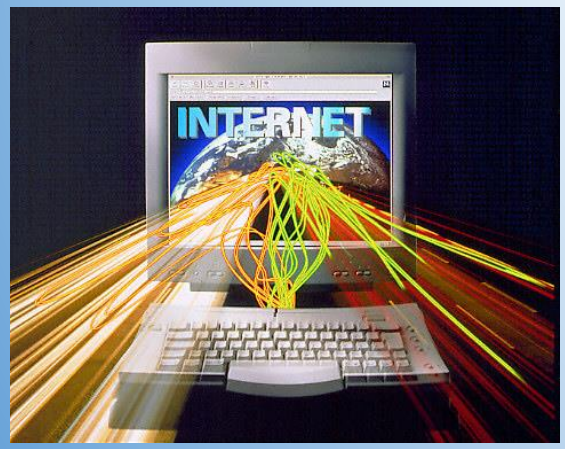
The digital divide is the gap between those who have affordable access, skills, and support to effectively engage online and those who do not.

As technology constantly evolves, the digital divide prevents equal participation and opportunity in all parts of life, disproportionately affecting people of color, Indigenous peoples, households with low incomes, people with disabilities, people in rural areas, and older adults.

Chester County Digital Equity Coalition

Municipalities, County, State

School Districts & CCIU

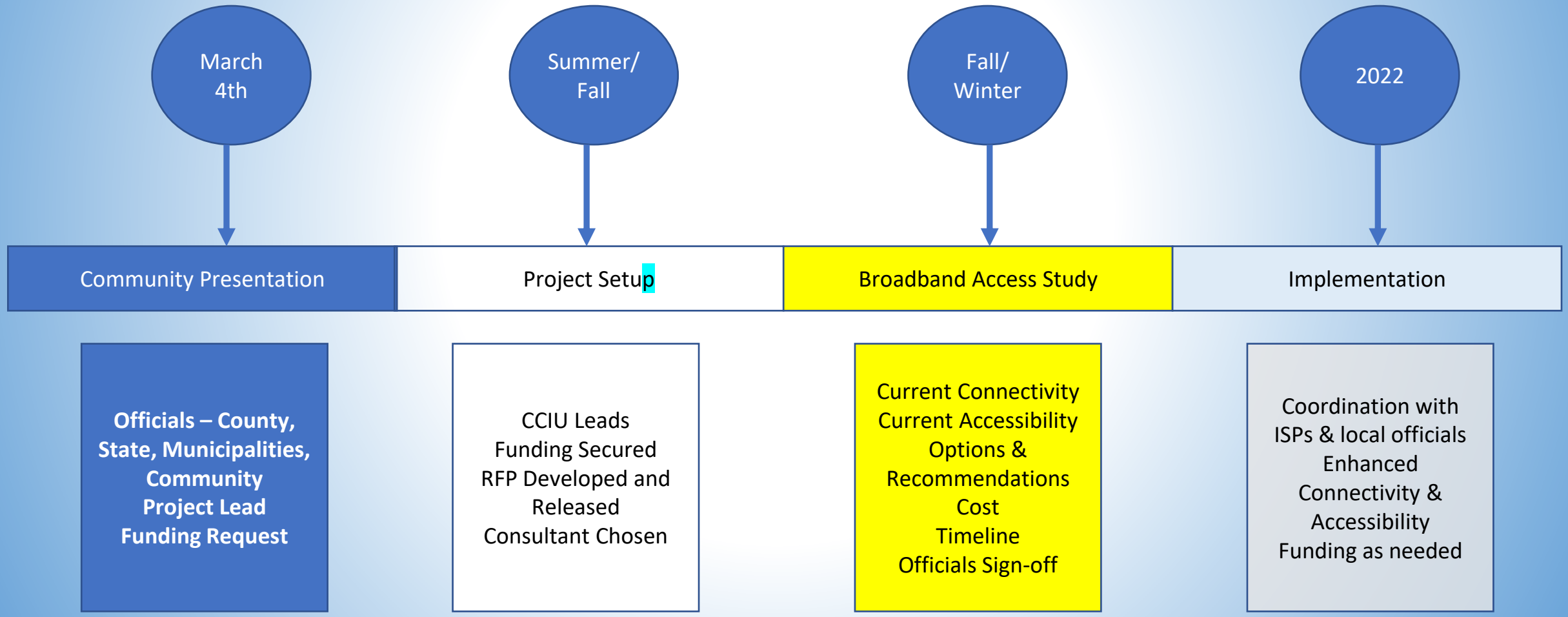


Internet Service Providers

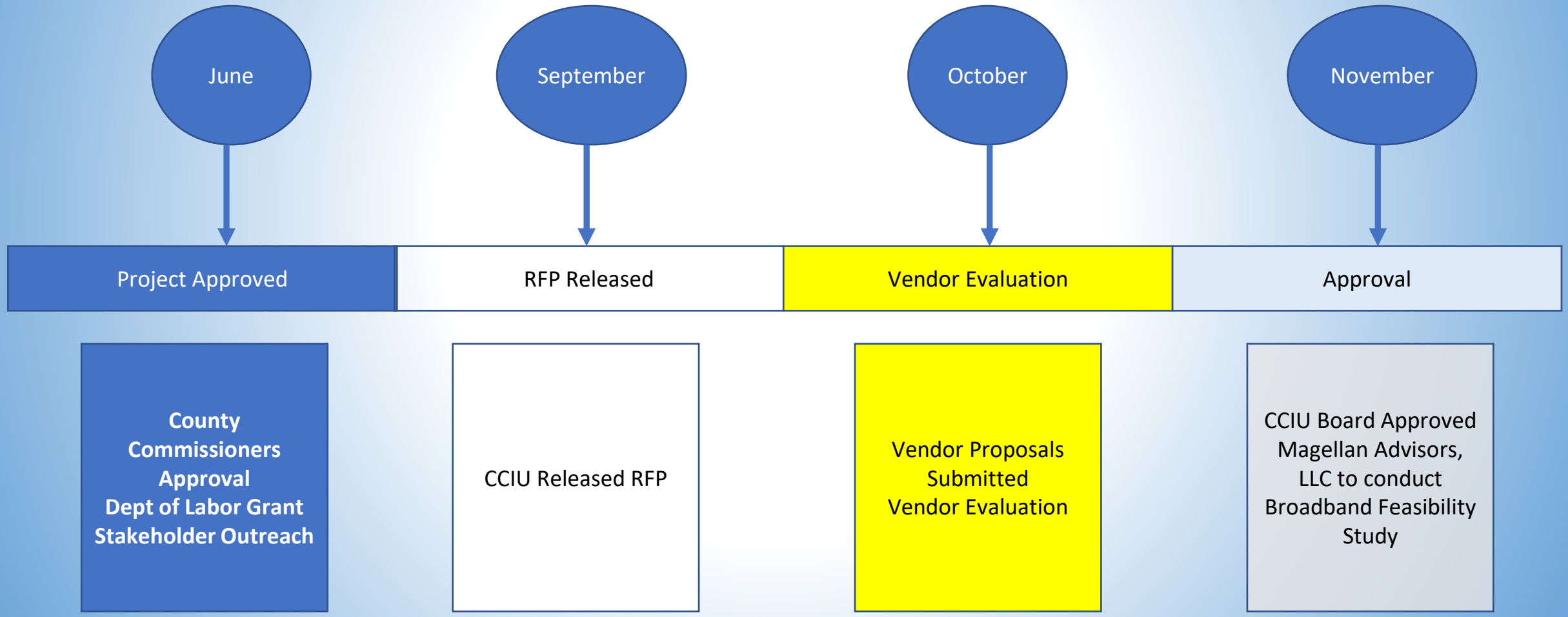
Funding: Federal – FCC; State/County; Private

Community Based Organizations

Digital Connectivity Timeline



Broadband Access RFP Timeline



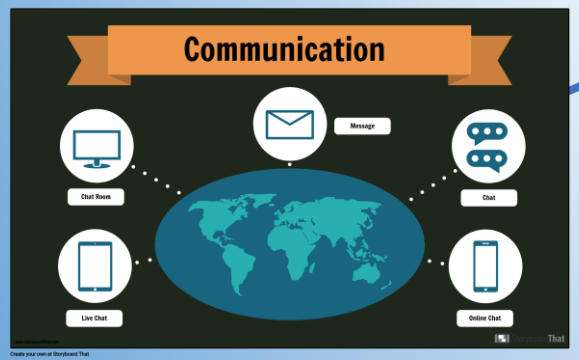
Digital Skills/Literacy is the ability to participate in the economy and culture surrounding information technologies.

Orientation to Computer Skills

Computer Based Research

Digital Literacy

Social Media

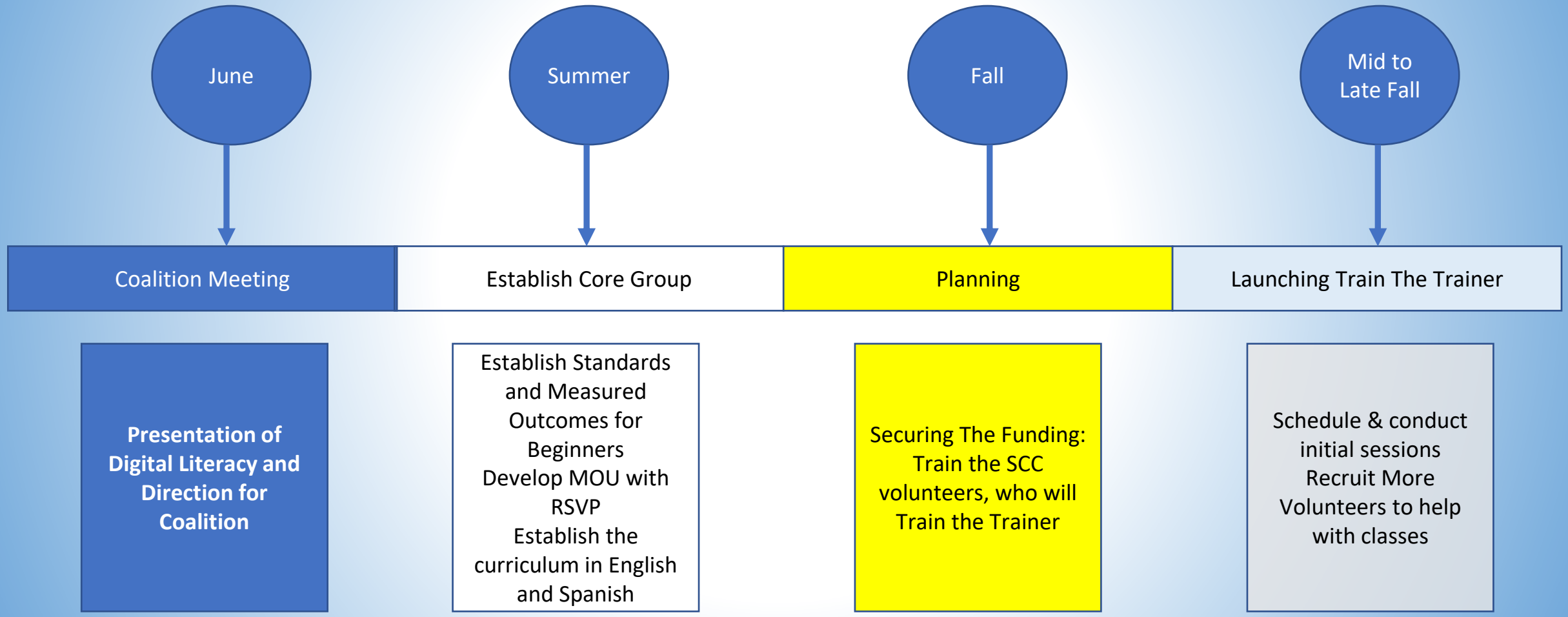


Communication: Zoom, Email, Telehealth

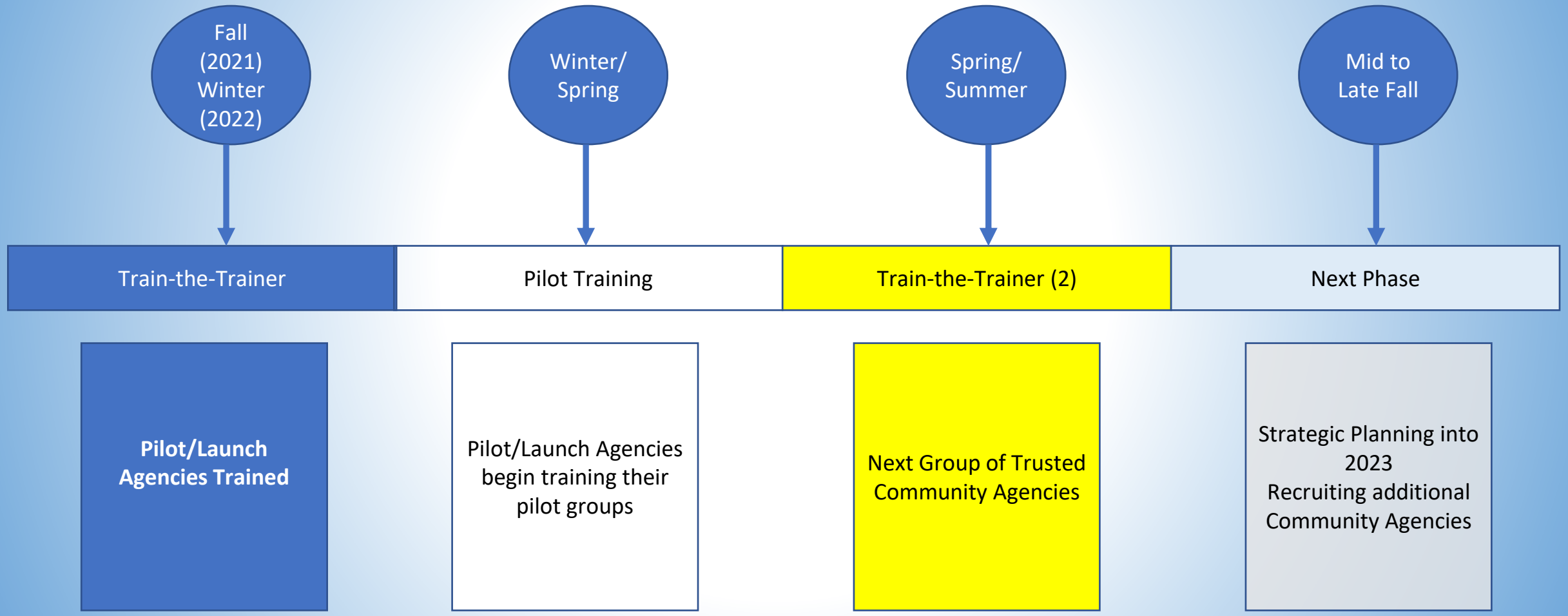
Workforce Development

Economic/Commerce Participation

Digital Skills/Literacy Timeline -- 2021



Digital Skills/Literacy Timeline -- 2022



Lead Agency for Train The Trainer

RSVP

Pilot Agencies for Train The Trainer

Collaborating with Trusted Agencies in the SCC Community
Building on existing client relationships, many bilingual

Maternal and Child Health Consortium of Chester County

KENNETT AREA SENIOR CENTER

MIGHTY WRITERS

Interested Agencies for Train The Trainer

AVON GROVE LIBRARY

LCH HEALTH AND COMMUNITY SERVICES

YoungMoms

AMERICAN Mushroom INSTITUTE

Oxford Area Senior Center

Kennett Library
Begin your journey here

Schools

OXFORD LIBRARY
COME EXPLORE WITH US

Train the Trainer

Collaborating with Trusted Agencies in the Southern Chester County Community:

Building on existing client relationships, many bilingual

- Maternal & Child Health Consortium
- Kennett Consolidated School District
- Mighty Writers
- Kennett Area Senior Center
- Kennett Library
- Oxford Library
- Unionville/ Chadds Ford Schools
- South Mill Champs Mushroom Company
- Young Moms
- Oxford Neighborhood Services

Ripple effect- Each trainer trains five + more…

RSVP
Your Invitation to Make a Difference

Vision for Digital Skills/Literacy

- Doors are opened to new potential for achieving good health, employment, education and social connection.
- Barriers are removed to becoming an engaged, contributing community member.
- A sustainable organization (i.e. library) will carry on the mission.

Digital Equity has become the foundational backbone of community life

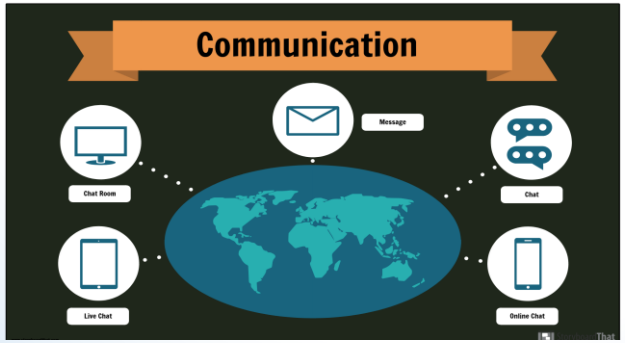
Education

Workforce Development

Housing

Healthcare

Communication: Zoom, Email, Telehealth



Economic/Commerce Participation

Digital Equity
Access, Speed, Affordability, Skills/Literacy

12

Concluding Thoughts

Broadband Feasibility Analysis for Southern Chester County

April 7, 2022

Magellan

Agenda

- About Magellan Advisors
- Magellan/CCIU Project Overview
- Stakeholder Outreach & Survey
- Funding Opportunities
- Final Thoughts

Jessica Zufolo

- Vice President, Rural Broadband Strategy, Magellan
- Former Senior Advisor, Strategic Partnerships, Lifeline, Universal Service Administrative Company (USAC)
- Former Deputy Administrator, USDA Rural Utilities Service (RUS)
- Current Federal Communications Commission Precision Agriculture Task Force member

Proven Process. Proven Results.

Magellan

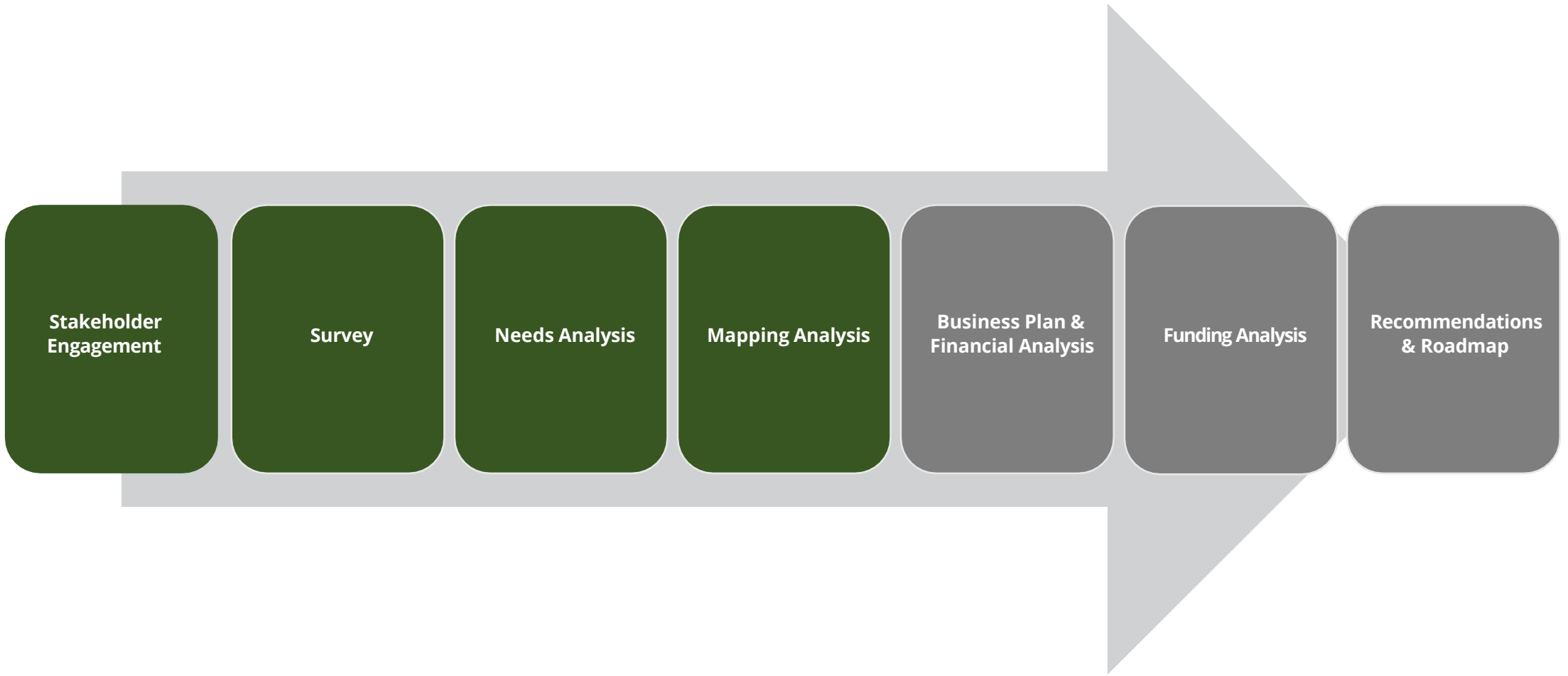
Over 400 co-ops, broadband providers & municipalities rely on Magellan to develop their fiber & broadband networks.

- Purpose-built to support economic development, education, healthcare, smart city & the internet of things
- Custom-designed fiber & broadband networks to achieve each community's unique goals

Magellan manages the entire process

- **Grant/Loan Funding Strategy & Optimization**
  - Identifies best funding opportunities to increase probability of winning funds
- **Manage Entire Application Preparation Process**
  - High-level design, pre-planning & financial modeling
  - Seamless coordination throughout the application process
  - Write, research, compile & submit applications
- **Post-Award Engineering**
  - Optimize routes to achieve operational & cost efficiencies
  - Environmental, SHPO, permitting, pole attachments
  - Final engineering, construction packages, final bill of materials
- **Construction Management, Inspections & Turnup**
  - Onsite construction managers, inspectors & integrators
  - Compliance management & reporting
  - Final network activation & certification

CCIU/Magellan Broadband Project Status



Broadband Coverage Survey

- **Provided in English & Spanish**
- **Available on-line, via cell phone or paper form**
- **Includes built-in speed test & requires respondents to provide an address**

Core Goals

Identify areas with poorest coverage & map them

Develop solutions to improve broadband access in these areas

Our Conversations

Community Stakeholders

- American Mushroom Institute
- Mighty Writers
- Advisory Commission on Latino Affairs
- The Garage Community & Youth Center
- RSVPMC
- La Communidad Hispana
- Spanish Health Ministry
- Southern Chester County Digital Equity Coalition
- Kennett Area Community Services

Industry

- Verizon
- Comcast
- Upward Broadband
- Armstrong Cable
- Crown Castle
- Chesconet

Southern Chester County School Districts

- School District: Avon Grove
- School District: Oxford Area
- School District: Unionville-Chadds Ford
- School District: Kennett Consolidated

Our Conversations (cont.)

County government agencies & offices

- Chester County Board of Commissioners
- Chester County Planning Commission
- Chester County Economic Development Council
- Southern Chester County Chamber of Commerce
- Chester County Department of Emergency Services

State Government agencies & departments

- PA Department of Education
- PA Department of Agriculture
- PA Public Utilities Commission
- PA State Senate
- Penn State Cooperative Extension

Community Feedback

Kennett Township

- Last-mile broadband access is challenging – No good residential options due to geographic limitations
- Police unable to connect with Chester County 9-1-1 dispatch – Cannot respond to crime events
- Families unable to afford broadband service
- Spotty mobile phone coverage throughout township

Avon Grove School District

- Unreliable residential internet access – Many home without devices or digital literacy
- Landenberg area nearby consistent dead spot for broadband access
- Phone use for residential internet access provides poor signal coverage
- Oxford area is rural with no connectivity – Limited access to health care & COVID-19 information

Broadband Access Challenges for Agriculture

- Southern Chester County farm workers 98% Mexican
  - Heavily integrated community interacting closely with area mushroom workers
- 50k Chester County mushroom growers (2k+ households)
  - Significant need for broadband for public health, safety & quality of life
- Lack of broadband impacts ability to deliver products faster & more efficiently
- Cannot reach global markets & achieve supply chain efficiencies without digital tools

How to Get Started

- Identify amount of ARPA funds allocated to your county, state, region, etc.
- Research county or municipal government broadband plans
- Survey coverage & internet speeds among households in target region
- Become familiar with broadband provisions adopted by your state legislature
- Learn what governor's office or state agencies are doing to promote or administer broadband investments
- Establish alliances with other local & regional stakeholders to build support
- Map proposed service areas & determine whether other federal funds have been obligated for that area

Items Needed to Get Started

- Dunn & Bradstreet DUNS number
- CAGE Code
- SAM (System of Awards Management) registration
- Tax ID or EIN numbers
- Completion of the SF 424 Form
- Leadership bios & overview of their relevant qualifications
- Copies of all financial statements for the past four years
- Plan demonstrating who will own, operate & maintain the network

Final Thoughts

- Identify lack of broadband access in community & gather input from local residential, business & anchor institution stakeholders
- Pursue ”shovel ready” projects
  - Ready for network design/engineering
  - Need comprehensive business plan
  - Have sufficient local government or state support
  - Pre-engineering funds must be earmarked to begin scoping network design costs
  - Local governments must identify specific staff available daily for project

Thank You

Jessica Zufolo
Jzufolo@magellan-advisors.com

www.magellan-advisors.com

Pew Research Center

FOR RELEASE FEB. 7, 2022

Visions of the Internet in 2035

Asked to 'imagine a better world online,' experts hope for a ubiquitous – even immersive – digital environment that promotes fact-based knowledge, offers better defense of individuals' rights, empowers diverse voices and provides tools for technology breakthroughs and collaborations to solve the world's wicked problems

BY *Janna Anderson and Lee Rainie*


EXPLORATORY SCENARIOS FOR GREATER PHILADELPH
DISPATCHES
from
ALTERNATE
FUTURES
DELAYED EXPECTATIONS
A world overcome by climate change and economic slowdown
PEOPLE POWER
Grassroots movement to a more just and sustainable future
TECHNOLOGY IN THE DRIVER'S SEAT
Big Tech takes control
INCLUSIVE TECH
A new equitable economy emerges through open source technologies
IN THIS ISSUE
COVID-19
BREAKING NEWS
See pages 26, 40, 54, and 68
JULY 2020
working FUTURES GROUP
GREATER PHILADELPHIA
2050
DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION
Preparing
REATER PHILADELPHIA
for
IGHLY AUTOMATED
HICLE DEPLOYMENT
s Already
ening in
r Philadelphia
SCENARIOS INSIDE
Delayed Expectations: Automated vehicle development stalls due to stagnant economy.
People Power: Federal government advancing truck platooning, connected vehicles, and automated shuttles.
Tech in the Driver's Seat: Automated vehicles are here. Are we ready?
Inclusive Tech: Open source principles and federal regulations shape automated vehicles.
GREATER PHILADELPHIA FUTURES GROUP
DIALOGUE. COLLABORATION. KNOWLEDGE-SHARING.
2050
DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

FOUR SCENARIOS

TECHNOLOGY

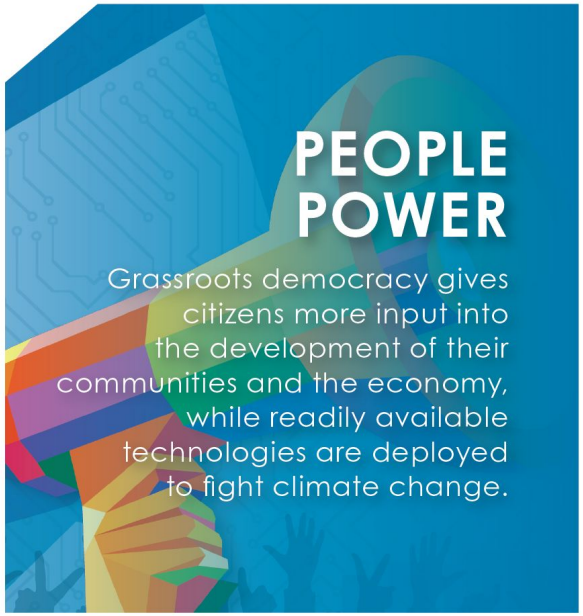
INCREMENTAL CHANGE

TRANSFORMATIVE CHANGE

CLIMATE CHANGE & EQUITY

POLITICAL WILL / COLLECTIVE ACTION

MARKET FORCES / INDIVIDUAL RESPONSIBILITY



PEOPLE POWER

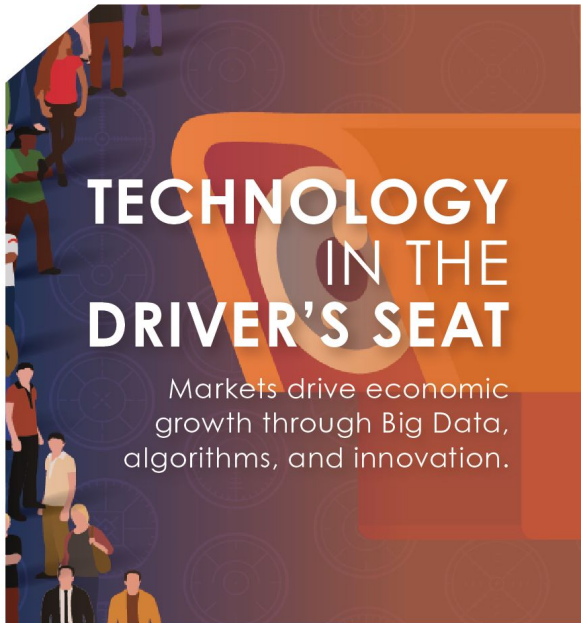
Grassroots democracy gives citizens more input into the development of their communities and the economy, while readily available technologies are deployed to fight climate change.

INCLUSIVE TECH

A collaborative, networked, open source economy of abundance emerges from societal efforts to make technological advances more sustainable and equitable.

DELAYED EXPECTATIONS

Climate change, sharp political swings, ongoing civil discord, and a slowdown in innovation lead to a lack of direction and economic stagnation.



TECHNOLOGY IN THE DRIVER'S SEAT

Markets drive economic growth through Big Data, algorithms, and innovation.

dvrpc

FOUR SCENARIOS

TECHNOLOGY

INCREMENTAL CHANGE

TRANSFORMATIVE CHANGE

CLIMATE CHANGE & EQUITY

POLITICAL WILL / COLLECTIVE ACTION

MARKET FORCES / INDIVIDUAL RESPONSIBILITY

PEOPLE POWER

Grassroots democracy gives citizens more input into the development of their communities and the economy, while readily available technologies are deployed to fight climate change.

INCLUSIVE TECH

A collaborative, networked, open source economy of abundance emerges from societal efforts to make technological advances more sustainable and equitable.

DELAYED EXPECTATIONS

Climate change, sharp political swings, ongoing civil discord, and a slowdown in innovation lead to a lack of direction and economic stagnation.

TECHNOLOGY IN THE DRIVER'S SEAT

Markets drive economic growth through Big Data, algorithms, and innovation.

dvrpc

working

FUTURES GROUP

GREATER PHILADELPHIA

www.dvrpc.org/connections2045

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

CONNECT WITH US
www.dvrpc.org

Agenda and Engagement

- Writing Utensil
- Visions of the Internet in 2035
  - Digital Life
  - Themes from the Report

dvrpc

Visions of the Internet in 2035

We invite you to imagine a better world online:

What is one example of an aspect of digital life that you think could be different in 2035 than it is today?

Pew Research Center, February, 2022. “Visions of the Internet in 2035”

dvrpc

Defining Digital Life

- Finance
- Socialization
- Information
- Organization
- Representation
- Consumption
- Teaching
- Performing Tasks

dvrpc

Civic and Infrastructural Management is Already Digital

- Smart Cities
- ITS
- Voter Registration and Education
- Public Participation
- Energy Efficiency

dvrpc

Themes

- Building Better Spaces
- Constructing Effective Communities
- Empowering Individuals
- Changing economic life and work
- Altering “Reality”
- Tackling wicked problems

dvrpc

Building Better Spaces

Redesigned and innovative digital platforms will codify new norms for discourse and facilitate open and honest conversations.

- Trustworthy digital spaces for political discussion, trustworthy news, and vital information and foster good citizenship online and offline
- Building bridges across digital communities for generative use, no more silos
- Regulated rules: A Digital Bill of Rights will empower people to both control and benefit from the use of their personal information.

dvrpc

Constructing Effective Communities

A global culture built around people supporting each other's growth.

- Communities of communities model
  - Active collaboration between spaces
  - Bottom up, self-organizing governance
- Data-driven eradication of the sources of structural racism in health and education
- Virtual Earth, Mirror world
- Open crypto currency backed by central banks
- OpenCourseware

dvrpc

Empowering Individuals

- Privacy and control over your data
- Improving their interactions with and access to government and health services, businesses and other entities.
- Democracy 3.0
    - Engagement, soliciting feedback in real time

- blockchain; encryption; data cooperatives
- Personalized health care
- localized mesh networks; digital passports;
- virtual and augmented reality;
- digital “credit unions” that facilitate online interactions;
- supportive AI and bots;
- privacy “nutrition labels” for online activities;

dvrpc

Changing Economic Life and Work

- Remote Working is normalized
- Technology to aid or replace workers
- Shift in the employer, employee relationship
- New jobs being trained by and training AI
- The gig economy grows as new apps and services emerge

dvrpc

Altering “Reality”

- The Metaverse- artificial intelligence (AI) + virtual reality (VR) + augmented reality (AR)
- Internet of Things automates physical lives (shopping, cooking, cleaning)
- Regulations for AI surveillance

dvrpc

Tackling Wicked Problems

- Strategic essentialism
- Real time social service matching
- Using tech to help people understand eachother better
- Climate change
  - Real time Energy efficiency
  - Power sharing
  - Innovation
- Illegal money may be harder to find

dvrpc

For Further Exploration

- Dispatches from Alternate Futures: Exploratory Scenarios for Greater Philadelphia , DVRPC
- Visions of the Internet in 2035 ,Elon University and Pew Research
- 63 things a Digital Student Should Know

dvrpc

Pew Research Center

FOR RELEASE FEBRUARY 7, 2022

Visions of the Internet in 2035

Asked to 'imagine a better world online,' experts say they hope for a ubiquitous – even immersive – digital environment that promotes fact-based knowledge, offers better defense of individuals' rights, empowers diverse voices and provides tools for technology breakthroughs and collaborations to help solve the world's wicked problems

By Janna Anderson and Lee Rainie

FOR MEDIA OR OTHER INQUIRIES:

Lee Rainie, Director, Internet and Technology Research
Janna Anderson, Director, Elon University's Imagining the Internet Center
Haley Nolan, Communications Associate

202.419.4372

www.pewresearch.org

RECOMMENDED CITATION

Pew Research Center, February, 2022. "Visions of the Internet in 2035"

About Pew Research Center

Pew Research Center is a nonpartisan fact tank that informs the public about the issues, attitudes and trends shaping America and the world. It does not take policy positions. It conducts public opinion polling, demographic research, content analysis and other data-driven social science research. The Center studies U.S. politics and policy; journalism and media; internet, science and technology; religion and public life; Hispanic trends; global attitudes and trends; and U.S. social and demographic trends. All of the Center's reports are available at www.pewresearch.org. Pew Research Center is a subsidiary of The Pew Charitable Trusts, its primary funder.

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 second of two reports emerging from the 13th "Future of the Internet" canvassing Pew Research Center and Elon University's Imagining the Internet Center have conducted together to gather expert views about important digital issues. In this report, the questions focused on the prospects for improvements in the tone and activities of the digital public sphere by 2035. This is a nonscientific canvassing based on a nonrandom sample; this broad array of opinions about where current trends may lead in the next decade represents only the points of view of the individuals who responded to the queries.

Pew Research Center and Elon's Imagining the Internet Center built a database of experts to canvass from a wide range of fields, inviting professionals and policy people based in government bodies, nonprofits and foundations, technology businesses and think tanks, as well as interested academics and technology innovators. The predictions reported here came in response to a set of questions in an online canvassing conducted between June 29 and Aug. 2, 2021. In all, 434 technology innovators and developers, business and policy leaders, researchers and activists responded to the question covered in this report. More on the methodology underlying this canvassing and the participants can be found in the section titled "About this canvassing of experts."

Visions of the Internet in 2035

Asked to 'imagine a better world online,' experts hope for a ubiquitous – even immersive – digital environment that promotes fact-based knowledge, offers better defense of individuals' rights, empowers diverse voices and provides tools for technology breakthroughs and collaborations to solve the world's wicked problems

This report is the second of two analyzing the insights of hundreds of technology experts who responded in the summer of 2021 to a canvassing of their predictions about the evolution of online public spaces and their role in democracy in the coming years. In response to the primary research question, many said they expect that these forums will be significantly improved by 2035 if reformers, big technology firms, governments and activists tackle the problems created by misinformation, disinformation and toxic discourse. At the same time, they expressed ongoing concerns about the destructive forces in culture and technology that could continue to plague online life and disrupt beneficial change in the coming years.

In that canvassing, Pew Research Center and Elon University's Imagining the Internet Center asked a follow-up question inviting these experts to share their vision for what a better digital world could be like in 2035. This report covers scores of those responses. Many envisioned a vastly more hospitable online environment that facilitates socially enriching relationships; the flowering of knowledge-creating communities; growth of truth-seeking group discussions; and new kinds of interactions enabled by artificial intelligence (AI), virtual reality (VR) and augmented reality (AR). At best, they imagine tech-aided collaborations – sometimes global in scale – that can tackle the world's most pressing questions.

In all, 434 technology innovators, developers, business and policy leaders, researchers and activists provided open-ended responses to this question:

> *We invite you to imagine a better world online: What is one example of an aspect of digital life that you think could be different in 2035 than it is today? We invite you to create a vignette of something you would like to see taking place in a "new and improved" digital realm in 2035. Your example might involve politics or social activities or jobs or physical and mental health or community life or education. Feel free to think expansively – and specifically.*

The key themes these experts voiced in their written responses are outlined in the following table.

Experts imagine key changes that could improve digital interactions by 2035 and lead people and their societies to a better place

- **Building better spaces**: A large portion of respondents said they hope redesigned and new/innovative digital platforms will codify new norms for discourse and facilitate open and honest conversations that are less fractious and menacing. Among the reforms they imagine: people will have control of their data and their relationships with commercial and other entities; interoperable systems will allow people to move seamlessly from digital public space to space; artificial intelligence (AI) will play a greater role in isolating bad actors and encouraging positive connections; government-and-public-funded "public media" spaces will arise with new incentives to gain user attention; big social media firms will be regulated in ways that discourage socially-harmful activities while supporting free speech.

- **Constructing effective communities**: These experts say better digital communities will: focus on collecting, organizing, publishing and archiving useful, reality-based knowledge; inspire healthy debates that build trust in the knowledge they generate; feature AI that helps usefully organize the input of humans; clamp down on divisive anti-social contributions that dampen public participation in democracy; help serve to diminish social inequalities; and build a global culture of lifelong education built around people supporting each other's growth.

- **Empowering individuals**: Some experts said a better online world will grant individuals better agency and autonomy, starting with control of their identities and personal information. They hope for a future in which the trust people invest in each other and organizations is enabled by tech tools, including: blockchain; localized mesh networks; digital passports; digital "credit unions" that facilitate interactions; supportive AI and bots; privacy "nutrition labels" for online activities; encryption; data cooperatives; simple language translation interfaces; and the creation of "digital twins" that can help people be more productive. They also foresee greater individual citizen participation in government decision making.

- **Changing economic life and work:** Many experts mentioned the benefits they expect better digital spheres might bring to economic development and people's transition into new kinds of work. They expect the nature of work to change, with remote work becoming a norm for many jobs. Some expect technology will ever-more-deeply move into the workplace, assisting most workers and replacing others, and some say that more people will become eligible for more types of jobs.

- **Altering "reality"**: A considerable number of these experts focused their answers on the transformative potential of AI, virtual reality (VR) and augmented reality (AR). They expect that these digital enhancements or alternatives will have growing impact on everything online and in the physical world. This, they believe, is the real "metaverse" that indisputably lies ahead. They salute the possibilities inherent in the advancement of these assistive technologies, but also worry they can be abused – often in ways that are yet to be discovered.

- **Tackling wicked problems**: A share of these experts expressed the hope that many of humanity's grand challenges such as climate change, the further advancement of human rights and addressing global health issues such as pandemics will begin to be solved in the next decade thanks to new digital technologies. Some predict or say they hope that humanity will move forward to improve the ways in which knowledge is generated and applied.

Source: Nonscientific canvassing of select experts conducted June 29-August 2, 2021.
"Visions of the Internet in 2035"

PEW RESEARCH CENTER and ELON UNIVERSITY'S IMAGINING THE INTERNET CENTER, 2022

This is a nonscientific canvassing, based on a nonrandom sample. The results represent only the opinions of the individuals who responded to the queries and are not projectable to any other population.

It is important to note that even those who sketched out the desirable way things *could evolve* by 2035 often acknowledge that bad actors and bad systems can thwart change in online life. Indeed, in answering other questions in the canvassing, they spelled out ways that corporations, governments and the public might disrupt positive change in digital spaces. It is also worth noting that the responses were gathered in mid-summer of 2021. People's responses came in the cultural context of the ongoing COVID-19 pandemic, and at a time when rising concerns over climate change, racial justice and social inequality were particularly prominent – and half a year after the Jan. 6, 2021, attack at the U.S. Capitol in the aftermath of one of the most highly contentious U.S. presidential elections in recent history.

Many of the answers reported here track with the core issues raised by **Mike Liebhold,** distinguished fellow, retired, at The Institute for the Future, in his answer to this query. He commented: "A revolution in technology education and media services is required to help populations adapt safely to radical changes in digital experiences that are expected to arrive by 2035. Here are some of the core questions that must be asked:

- How do we develop security and privacy technologies and practices sufficient to protect most people and organizations in these new settings?
- How do we develop basic cognitive and behavioral science-supporting, cybertech-aware pedagogies and curricula to protect humans (provide immunity) from systemic vulnerabilities to epidemics of false, misleading, or true-yet-malign persuasive data and media?
- How do we live and thrive in a dangerous digital world of pervasive vulnerabilities across systems and a perpetual spiral of exploits and patches – a world with continued potential for significant cyber outages?
- How do we find a way to live and thrive in a setting that features these three concurrent economic systems?
    - Secure private identity and data
    - Open/public identity and data
    - Surveillance data (pervasive sensing and intrusive analytics)."

Some of the more intriguing predictions from those canvassed included:

- Physical spaces and virtual spaces will be seamlessly integrated, and digital technologies will disappear so completely into our lives and surrounding environments that we will barely notice it. Some call it a "metaverse," but it has several meanings and manifestations to different experts.
- Super-sophisticated warning systems will be widely employed in many domains, including health care, community well-being, environmental assessments, housing and commercial activities; and rapid-response collaborative groups will be poised to address problems

identified by those warning systems. Relatedly, community service hubs will exist to handle citizen and customer issues.

- A new class of professionals – coders, information curators, literacy advisors – will arise to help digital platforms encourage democratic behaviors. They will enable a "culture of accountability" in parts of the internet that is deeply trusted.
- Networked bands of activists will arise in younger generations to press for structural political change and much of civic life will be shaped by "K-pop fan armies."
- In lawmaking itself, "citizen juries" could be empaneled to bring "collective imagination" to legislating and rule-making and then eventually make their own decisions about economic and civic life. This will lead to much more public input into everything from government budgeting to regulating the environment.
- New forms of digital property and a new regime of copyright and ownership will be commonplace.
- A Human API (application programming interface) will be designed to store and enforce the rules people set about what is allowed to come into their awareness, what takes up their time and what information is shared about their activities.
- The continued challenges to big systems like capitalism, representative democracy and nation-states will push people toward hyperlocal "sovereignty" – both geographic and by personal affinities and interests.
- A large-scale educational ecosystem will emerge to meet people's formal and informal learning needs and it will be buttressed with a similarly impressive credentialing and testing regime to give people and employers feedback on those participating in the system.
- A Digital Bill of Rights will govern at least a share of the activity that occurs online.
- A sharing economy will arise to challenge the economy based on owning property; subscription models also supplant ownership regimes.
- The sensibilities of service science will emerge and be employed in communities and industries.

In his answer to this canvassing, **Doc Searls,** internet pioneer, co-author of "The Cluetrain Manifesto" and "The Intention Economy" and co-founder and board member at Customer Commons, shared a detailed vision based on work in progress to improve the internet, including details about Self-Sovereign Identity, Emancipay, the Intention Byway, persistent compute objects (or picos), "palgorithms" and "intentrons."

In the next section, we highlight his remarks along with the thoughts of several experts who gave some of the most wide-ranging answers or incisive responses to our request for them to describe a better world online by 2035. Following it, we offer a number of additional sections with respondents' comments organized under the set of themes set out in the table above.

The remarks made by the respondents to this canvassing 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. Some responses are lightly edited for style and readability.

1. A sampling of overarching views

The following varied, incisive and comprehensive responses represent some of the big ideas shared by a small selection of the hundreds of thought leaders who participated in this canvassing. There are two particularly extensive essays at the bottom of the chapter by, one by **Doc Searls** about technology of the future he hopes will address some of the troublesome aspects of the current Web and one from **Mei Lin Fung,** chair of the People-Centered Internet, about the blended world of online and offline activities she calls the "fourth dimension."

Here are the overview commentaries:

Megatrends will prompt people and organizations to transform into better versions of themselves

Jim Spohrer, board member of the International Society of Service Innovation Professionals and recently retired director of IBM Cognitive Open Tech, said, "Digital life by 2035 will be shaped by the megatrends of local, universal basic income; universal upskilling (lifelong learning); and personal, privacy-preserving digital workers (cognitive mediators). All responsible entities (people, businesses, universities, governments) will be working to transform themselves into better future versions of themselves. All responsible entities will create a series of digital twins of themselves that can interact with the digital twins of other entities. Two hundred years ago, most people lived on multigenerational family farms that were satellites situated around cities. Advances in automation (AI, robotics) as well as high-speed mobility will allow multigenerational family 'digital farms' that are satellites around cities (high-speed mobility hubs). The view of people in Rutger Bregman's 'Humankind: A Hopeful History' and Robert Wright's 'Non-Zero: The Logic of Human Destiny' will be widespread. The emerging trans-discipline of service science will be better understood (though perhaps under a different name)."

Digital spaces will move inside us and physical spaces will include adjunct digital spaces

Barry Chudakov, founder and principal at Sertain Research, wrote, "The most noticeably different aspect of digital life for the average user in 2035 will be a more seamless integration of tools and so-called 'reality.' By importing the dynamics of simulation and virtual representation from the gaming world, we will swallow the internet. Digital spaces will move inside us. Whether augmented reality, virtual reality or a mirror world interaction, time and distance will effectively vanish. Here is where I am, where I can find you or any other – so there is only here. There is only now. The proscenium arch and backstage of 'The Truman Show' will have disappeared. What is now 'stickiness' – the design of a digital space to encourage more engagement – will become immersion.

"The outside of any digital space will be harder to fathom because physical spaces will include adjunct digital spaces (as every business and person has a URL now) and, just as people today pore over their phones and ignore cars, pedestrians and loved ones, by 2035, digital spaces will become so immersive we will have a problem, I predict a major problem, getting people to disengage with those digital spaces. We will all become video gamers, hooked on the mirror world of the world.

"While some will struggle with this overwhelming change, by 2035, the facility of use and integration of physical and digital realms will improve many experiences and transactions. For example, the automobile will become a significant digital space. As driverless cars become mobile digital spaces with end-to-end digital information streaming in and out of each car, our mobile digital experience will significantly lessen accidents and congestion, reducing the 38,000 deaths annually from traffic accidents."

Problems and solutions will be spotted more quickly and a flowering of creative activity will occur

Miguel Moreno, director of the department of philosophy at the University of Grenada, predicted, "By 2035 we can expect these advances, among others:

- The consolidation of warning systems – open to citizen participation – that serve notice of crimes of various kinds, environmentally harmful activities and other potential harms to the general public in regard to health, transportation, commercial activity and so forth.
- Upgraded collaborative systems capable of providing rapid response in emergency situations, especially in areas vulnerable to natural disasters, extreme weather phenomena, etc.
- Better visibility for problems that are still underestimated will lead to corresponding actions such as the reduction of inequality and discrimination or unfair and arbitrary treatment by private or state actors.
- Better platforms for quality educational resources and open access, with or without support from public institutions.
- Better tools to facilitate inclusive access to people with different degrees and types of disabilities.
- Better options at the service of creativity and artistic expression in any modality.
- Specific services encouraging citizen participation that contribute to open-science models will more efficiently address problems that would otherwise require costly investments in what has been, to this point, 'conventional' research.
- Leisure and entertainment services will continue to be important, with quality content affordable for a large part of the population as high-bandwidth networks become more widespread and prices become cheaper."

New behavioral norms and a new layer of professionals will help improve digital spaces

Zizi Papacharissi, professor of political science and professor and head of communication at the University of Illinois-Chicago, observed, "In most of the spaces we inhabit, humans have developed some form of curation. For example, a closed door may signify a preference for privacy; it may also signal a desire for security (and one of heightened security if the door is locked). Doors allow us to curate what enters our spaces and what remains out. Similarly, we humans have developed ways of chastising or punishing inappropriate behavior in commonly shared spaces.

"For example, if a person misbehaves in a bar, they are thrown out by a bouncer. We do not have a debate in this case about whether that person's rights to free speech were violated, because they started yelling in a bar. We simply kick them out. As of yet, we have no such types of broadly adopted rules for what appropriate behavior is online and how to enforce those rules online. When we try to establish them, we spark all kinds of debates about free speech. Yet free speech is not the same as free reach.

"Over the years, human society has developed nudges that invite us to behave in safe, socially conscious ways. There are a number of things that we do not do because we want to, we do them because we have to. For example, we do not cross the street any time we want to; we cross when we are able to do it safely. We do not board a train any time we want, but when it is our turn. I envision online spaces that are designed with nudges to encourage democratic behaviors in the future. I also envision that the people who enter these spaces will have been better socialized (by peers, parents and educators) on how to behave there – in the same way we have been socialized to behave appropriately in other public spaces that include museums, airports, parks.

"And, most important, I envision a whole new class of professionals to help people develop this layer of social behavior – information curators, democracy conduits, literacy advisors and similar others – who will make good money (salaries comparable to those of designers and coders) to help curate, to advise and to help humans come to use these technologies in positive ways."

The next frontier is designing digital spaces for safety and serendipity and taking those spaces out of the hands of corporations and governments

Lucy Bernholz, director of Stanford University's Digital Civil Society Lab, urged, "Designing digital spaces for safety and serendipity is a next step. Enabling people to go in, out and between such spaces as they choose is critical. And allowing groups of people to control information they generate about them is also important. Digital spaces need to become tools of the people, not of corporations and governments. They need to be fragmented, pluralistic, multitudinous and interconnected at the will of people, not by profit-driven lock-in. There should be no single, nor even a few, dominant digital systems or companies. People should be able to plug in and plug out.

… Turning our physical spaces – from private homes to public parks to government buildings to wide-open spaces – into 'screen-like' sensing is exactly the wrong way to go. We need, instead, to remember and maintain the best of our physical spaces online – our parks, libraries, sidewalks, stoops, benches, busses, trains and town squares – and bring that multiplicity of choice and its privacy within crowds, and safe serendipity into digital spaces."

Look for the creation of internet communities that become training grounds for participation in democracy

Ethan Zuckerman, director of the Initiative on Digital Public Infrastructure at the University of Massachusetts-Amherst, said, "I prefer to imagine a 2035 in which internet communities strengthen our civic and democratic muscles. Imagine a world in which most people are members of dozens of different online communities. Some are broad in membership and purpose, while others are narrowly focused and support small groups of users. These smaller groups, in particular, demand that their participants be involved in governing these spaces, acting as moderators and the authors of the community guidelines. The larger networks use representative systems to nominate interested users to task forces that write and rewrite guidelines, and participants take shifts as moderators, using mechanisms similar to jury service. Through the rise of these community governance mechanisms, social networks not only become less toxic but become a training ground for full participation in a democracy, with citizens sharpening their interpersonal and democratic skills in the online space and applying those lessons to 'real-world' governance."

Hope that biometric profiling will be outlawed and true contextual advertising will arise

Joseph Turow, professor of media systems and industries at the University of Pennsylvania, explained, "Recently, an interest in biometric voice profiling has been on the rise, as marketers (drawing on scientific work) believe the sound and syntax of someone's voice can yield information about the person's emotions, sentiments, height, weight, gender, race, age, diseases – even when they are on birth control pills. I hope by 2035, a new and improved digital realm will outlaw the use of biometric profiling in marketing and it will deeply limit the use of tracking data to differentiate among individuals. It will make it difficult for native ad creators and influencers to ply their trades without explicit and highly visible notices that they represent paid opportunities. The best kind of paid internet messaging in 2035 would be a sophisticated version of contextual advertising. That would involve using machine learning and deep neural network programs to examine what a person is reading, hearing or viewing on a site or app, and then to serve an ad for a product or service that seems to complement, supplement, or in some other way relate to the person's interests based on that content. The data about the person's activity would not be stored, nor would any other tracking record be created. Marketers may well conduct research to infer how particular forms of content resonate with particular types of products and services. But there

would be no opportunities for prejudicial discrimination based on the scoring of a person's history or background."

It will be much harder to get away with harmful things

Vinton G. Cerf, vice president and chief internet evangelist at Google and Internet Hall of Fame member, predicted that by 2035, "Straight extrapolation leads to better and higher-speed access to the Internet on a ubiquitous basis thanks in part to low-Earth-orbit networks and expansion of fiber and radio access methods. We will have figured out how to deliver education online in K-12 and post-secondary education. People will learn while they work and not only in a burst at the beginnings of their longer lives.

"Massive amounts of data will be available to inform policy decisions, and powerful processing tools will help to analyze it and provide useful guidance. We will have finally solved the problems of maintaining common health care records so as to improve diagnosis and track treatment. Provenance and supply chain tracking will be standard practice. Preservation of digital content for centuries will be a solved problem. People will still do harmful things, but it will be much harder to get away with it."

The natural monopolies of current social media platforms are broken

Brad Templeton, internet pioneer, futurist and activist, and former president of the Electronic Frontier Foundation, wrote this 2035 scenario: "People are asked to make one-time choices about what policies they want to govern their social feeds. People are more willing to make reflective choices when divorced from actual content, while they react emotionally when presented with incendiary content. People are encouraged to socially network with others of a diverse set of creeds, and steps are taken to make it less likely people would 'unfollow' such people by defusing confrontation.

"Social networks in 2035 allow some interconnection, so that you can have a 'home' on one network and interact with those whose 'home' is on another. This breaks the natural monopoly of current social networks, where the only useful one for you is the one your friends consider 'home'; breaking that monopoly allows more competition, meaning more innovation and better approaches, and the networks that make people feel more satisfied at the end of the day win the business of more people.

"In addition, new approaches that attract people quickly get taken up by other networks as well. By 2035, entrepreneurs will compete to produce the most useful 'feed' of the activities and posts of contacts, making good use of people's time while also eliminating 'FOMO' [fear of missing out] efficiently and encouraging connections with those who matter, as well as interesting new people.

In 2035, though this is very difficult, the networks will *work together* to fight off attacks from outsiders, particularly AI-driven, weaponized propaganda; it is a harder problem to fix than spam."

A happier world of lowered ambitions and less technology use lies ahead

Douglas Rushkoff, digital theorist and host of the NPR-One podcast "Team Human," said, "Let's imagine a world where people have somehow extricated themselves from central banking. We live in a world where we don't have to expand the economy every year just to keep wealthy people from having to work. We are allowed to stay as we are, or do less! We decide it's actually enough to keep everyone clothed, fed, educated and happy.

"We lower our ambitions so that just being fed and happy is all we need. So, most people end up living in communities where there is much less need for their businesses and activities to 'scale.' A kid might be happy engaging with 10 great friends where they live, rather than appealing to thousands of people on a social network. In such a world, digital technology will be used a lot less. More as a way to access the collective memory, to share research and to administrate more global affairs. Maybe to play games with people far away."

People will live in spaces where we can see how we are all connected and how our lives are dependent on those around us

danah boyd, founder and president of the Data & Society Research Institute and principal researcher at Microsoft, commented, "Imagine a world where we can 'see' how we're all connected, how our lives are dependent on all of those around us. Imagine a system where we can identify vulnerabilities in our social fabric and work collectively to repair them. Where we can 'see' people who aren't like us and appreciate how we are like one another. Where we can build tools to empower the collective to solve social problems. Where those in pain can get help. Where we can leverage the tools that connect us to understand and appreciate those connections."

A Human API allows people to reimagine their relationships with each other and organizations

Susan Price, human-centered design innovator at Firecat Studio, responded, "I've long had a vision for a Human API – an application programming interface that would serve as a filter layer between each individual human and any systems delivering content or services to us, or carrying/sharing information about us – such as our location, actions, decisions, identifiers, history and so forth – our data. I want a Human API that stores and enforces the rules I set about what is allowed to come into my awareness, what takes up my time and what information is shared about my activities. For example, the Human API would store all the 'I Agree' contractual

agreements I've made with various companies and services. It would store all the subscriptions and payment commitments I've executed and provide a single dashboard to examine, analyze and manage them. Rather than my preferences, settings, records and agreements being stored in dozens or hundreds of vendor databases, the data would be stored under MY control. When I make a transaction, the Human API keeps a trustworthy record of it and vendors can rely on the fact that this was me transacting. The Human API would store my human connections and their contact information along with my preferences for whose call, text or email can be allowed to interrupt my concentration (during hours I set), whose SOS 911 contacts should be immediately put through to friends or colleagues near me (my husband's caregiver, a babysitter, a school official). Access to such a system would be of great interest to governments and corporations; therefore, neither should control the Human API. It must be an open-source collective project, with participation and support from corporations, enterprises and government. Tim Berners-Lee's Solid web browser project is one such effort; it won't be the last attempt to solve this puzzle."

New kinds of programs could be built to serve those who are struggling

Esther Dyson, internet pioneer, journalist, entrepreneur and executive founder of Wellville.net, said, "Problems online are due not to the tech but to the people using the tech. In a world where it seems half the population is underserved and damaged in some way by the age of 15, it would be so much easier to do visibly better for those people. The positive effects of this will only increase over time, after 2035. Thus the single biggest thing we could do right now is to dramatically scale/expand programs similar to Nurse-Family Partnership (NFP), a nonprofit initiative that pairs pregnant women with nurses who continue to coach them for the first couple of years of their babies' lives. NFP has lots of rigidities and exclusions (including the requirement that the coaches be certified nurses), but it's a great model that needs to be improved and extended. Ideally, add in universal free child care. And to make *that* happen, invest all of the infrastructure funding necessary to train a new generation of doulas, maternal coaches, child care providers. And *then* give them respect and salaries that reflect the value they provide to society.

"This shock to the system would be positive and large, not especially digital-centric but it will affect a large enough proportion of the population to make a difference to society overall and therefore to what happens online. Those affected include the workers who get trained and learn people skills, gain a sense of agency and get paid enough to live healthy lives of dignity; the mothers, who will also learn people skills and gain a sense of agency (amazing, huh!); and their children, who will grow up with healthier habits and a sense of security based on good parenting. When they go online, they will be curious and respect others – well, maybe not always, but enough to make a difference! We need to train children even more than we need to train AIs. Obviously, this is no easy task. It cannot be rote or rigid; care and coaching need to be delivered with love and wisdom."

Hyperlocal sovereignty takes hold after representative democracy fails

Tony Smith, a Melbourne-based researcher of complex systems who has written and presented extensively on ICT trends and policy, shared this 2035 scenario, "With it being generally accepted that representative democracy failed to scale, effective priority dispute resolution will be dealt with locally and transparently, with aggregation only as far as needed for operational viability. Education will be a multiway whole-of-life engagement, open to all at every level, with irrevocable freedom of assembly in the digital realm. Accuracy in labelling will be the new first commandment. Out of near-universal admiration for Greta Thunberg's role in getting and keeping young people engaged through a crucial juncture, all mechanisms promoting childhood ignorance will be abandoned with consequences as overwhelmingly positive as they have been anywhere similar liberations have been tried. Potential parents will be particularly helped by the disappearance of social pressure to produce another generation, let alone to constrain their progeny's interests. Diversity will be celebrated in all areas, as will clinically-accurate information about the state of the world with aggressive elimination of anthropocentric biases. One of the few restrictions will be a still-liberal but sufficiently deterrent cap on selfies. With the collapse of the punitive industries and the termination of 'commercial in confidence,' there will be no secrets and no need for secrets. …

"My hope is that in 2035, digital spaces serve as a fleet of lifeboats for those trying to navigate the terminal collapse of final-stage capitalism and nation-states and their enforcement operations, reestablishing Indigenous and hyperlocal sovereignty transparently to provide confidence that others' localities are not preparing hostile actions, for an understanding of 'local' as much or more concerned with other commonalities than with physical location and thus placing individuals concurrently in several and, as likely as not, some individuals in most intersections. The biggest impacts will come from the natural realm. With the ecological and climate crises delivering evermore-rapid shocks, it will be a time in which the abandonment of monetary accumulation, of land ownership, of intellectual property regimes and of adversarial systems will be readily accepted, with holdouts disconnected. Generalisation of open-source principles into coordination centre stage should keep enough digital infrastructure operational that few questions will be asked. Engagement with the interested public will be the primary design filter.

"Some of the now temporarily rich or supposedly powerful will enjoy release from the demands such roles had placed on them and recover their creative abilities. Others will struggle with disconnection, not always quietly. The pressure to appear to be doing something will have largely disappeared as slowing down proves to be nowhere near as catastrophic as the evermore-frequent challenges of keeping Life viable. Spambots and their human imitators will have largely disappeared through a combination of reward failure and aggressive purging tools. Barriers to entry will have long fallen. Archival and editing tools will be accepted as a way of making

knowledge more widely available, with less need for explicit cross-posting. People will continue to inject irrelevancies and/or be misunderstood."

A sharing economy arises to challenge the economy based on owning property

Giacomo Mazzone, secretary general of the Eurovisioni think tank, commented, "By 2035, the use of data in a collaborative and safe way could create the conditions for a new economy based on sharing and not on accumulation. In that setting:

- Why I would need my own car, if I know that I can arrange for rented access anytime to common vehicles or take advantage of cleaner and more efficient public transportation at a price that is less than what it costs me today to have my own transportation tool?
- Why would I need to have my own individual connectivity if I could access guaranteed bandwidth everywhere for a reasonable sum, if it is structured as it is today for public lights in the streets?
- Why would I need to accumulate money if my basic needs (health, quality education, etc.) are satisfied and guaranteed by the community?
- Why would I not devote part of my time when I am young and healthy to the community in exchange for what the community will provide me anytime?
- Why would I need to live in megalopolis, where getting to work or going out to shop takes me many hours, when I can fruitfully work from a home in a small, quiet location and spend those hours as an active, contributing member of a real community?

"In this realistic 2035 scenario, the concepts of work, remuneration and the relationships between citizens and their communities could change dramatically."

The younger generation's organizing power – think K-pop armies – arise to bring change

Jay Owens, a research and innovation consultant with New River Insight, shared this scenario: "It's 2035, and the K-pop fan armies turn their prodigious social media organising capabilities toward local democracy. Livestreamers broadcast every council meeting, offering acerbic commentary and contextualisation – no decision goes unscrutinised. Fan squads use a 'cell' structure to mobilise their neighbors on messenger apps; each young person is responsible for getting the news out to their apartment block or street and collecting messages, signatures, videos and demands to feed to elected representatives. Influencers stand for election and win – reducing the average age in council chambers around the country by half. For the first time, young people gain a sense that politics is not irrelevant and remote but something they can play, hack and win – like a computer game, but in real life. Various fan armies compete to pass more radical laws – petrol cars are banned; a wealth tax is introduced; further education is made free and second homes are appropriated for the public good. Retirees – so long the decisive constituency in politics

– struggle to keep up with the younger generation's formidable organising powers and see their hegemony slip rapidly away."

Digital patrons will arise alongside influencers, underwriting digital creators

Yvette Wohn, associate professor and director of the Social Interaction Lab at New Jersey Institute of Technology, said, "In 2035, the current internet will be centered around the attention economy, but we will start to see small but significant shifts, such as the rise of digital patronage. Digital patronage will be an important aspect of digital life because it will allow content creators to monetize their work, even with a small number of followers, whereas the current 'influencer' model is based on the number of followers, views, etc. Content monetization from a platform perspective will become more widespread, since until now platforms took content for granted and even claim to own creative works posted by users.

"Copyright laws and methods of tracking digital artifacts across platforms will have to evolve – this will not be solved by 2035, but at least there will be higher demand and effort to do so. In 2035 we will start seeing more users be willing to pay for quality content, which means that a more viable news industry will reemerge and we will see more self-employed content creators. Of course, this will also come with negative consequences, as cults or extremists will also have more opportunity to build and monetize a following.

"Misinformation, online harassment, etc., will not go away, but more efforts will be made toward building resilience and inquisitive questioning of information. Resilience is best learned as a child, and this educational burden falls on parents. The government should be investing in resources to help with this education. Companies, pressured by public outcry, will be developing more features that incorporate reflective design. They will realize that deep learning still is not able to 'fix' the problem of disinformation and harassment."

Digital technology will have disappeared in the era of ubiquitous computing; it will be powerful and unseen

Paul Saffo, a leading Silicon Valley-based forecaster exploring long-term technology trends and their impact on society, predicted, "The biggest change is that we won't be talking about digital technology at all because it will have disappeared. Specifically, it will have disappeared so completely into our lives and surrounding environment that we will barely notice it. Or, rather, we will only notice it when it fails. This will be an instantiation of what the late Mark Weiser described as ubiquitous computing back in 1988.

"We are busy weaving a vast digital tapestry through civilization, a tapestry that we will become so dependent upon that our future selves in 2035 will laugh at the thought that digital technology

seemed ubiquitous and essential in 2021. What we will see are the myriad consequences of digital ubiquity: new revolutions made possible by computation, communications and sensors. Just as today we chatter endlessly about digital technology without a thought to the electrical system that powers it, in 2035 we will marvel at breathtaking innovations in the life sciences and the even newer sciences of the small without a thought to the fact that digital technology provided the tools to build those revolutions.

"Unfortunately, we will also face an ever-growing myriad of challenges spun off of our relentless digital innovation. If there is one lesson 2035 can take from 2021, it will be to learn to detect and address those new challenges earlier than we have managed over the last 20 years. And hopefully the citizens of 2035 will not be so preoccupied with fixing the neglected challenges they will inherit from us that they also do not pay sufficient attention to what is lurking over their horizon."

The distinction between online and offline will vanish

Susan Crawford, a professor at Harvard Law School and former special assistant in the Obama White House for science, technology and innovation policy, said, "Someday we'll cease to differentiate between on- and offline, just as we have stopped talking about 'electrified' life. Much that we now treasure will disappear. But the human spirit is creative and playful – we'll be up to new augmented shenanigans that we cannot now imagine."

Schools, families and every social institution must act

Alejandro Pisanty, Internet Hall of Fame member and professor of internet and information society at UNAM, National Autonomous University of Mexico, said, "By 2035 it is likely that there *will* be 'positive' digital spaces. In them, ideally, there will be enough trust in general to allow significant political discussion, diffusion of trustworthy news and vital information (such as health-related) in which digital citizenship can be exerted and enrich society. It is *so* necessary that societies will build this at whatever cost. However, this does not mean that ALL digital spaces will be healthy, nor that the healthy ones will be the ones we have today. There will continue to be veritable cesspools of lies, disinformation, discrimination and outright crime. The healthy spaces will probably have a cost and be disjointed from these others. There will be plenty of 'negative' spaces as well; human drivers for cheating, harassment, disconnection from the truth, ignorance, bad faith and crime don't seem to be on the wane and they won't be gone in 15 years.

"The hope we can have is that enough people and organizations (including for-profit) will push the common good so that the 'positive' spaces can still be useful. They *may* become gated, to everyone's loss. Education and political pressure on platforms will be key for the possible improvements. A strong focus on scientifically sound health-related information will be needed to remove the harmful lies and disinformation, which is also caused at present by the relentless sale

of pseudo-therapies, supplements that circumvent pharmaceutical regulation and pseudo- and bad science. Most major concerns stem from deeply rooted human conduct, be it individual, corporate, criminal or governmental.

"By 2035 we must already have begun to tackle the negatives arising out of the core of human conduct as it operates online and off. This requires us to address mass scaling (including network effects); identity management; cross-jurisdictional, barrier-lowering friction reduction; and memory/forgetting – applying structured efforts for both the offline part of a conduct (such as the motivation for sharing or the motivation for fraud) *and* its online presentation (for example, crowdsourcing or phishing).

"Some remedies for the online space seem out of whack – they just don't scale or are unable to respond to factors such as the cross-border models of crime. Purely governmental or intergovernmental/multilateral solutions won't work either. Multistakeholderism can make a difference. In this model, people discuss opportunities and challenges in multistakeholder spaces – all-inclusive gatherings that bring together representatives from the various sectors of tech/science, civil society, industry/business and government – to help point the way to better collaborative solutions. I am also particularly concerned about the growing influence of the public's lack of understanding of science and its influence on all fields of life at a time in which science and technology have become so important that they are, in fact, a key determinant of well-being.

"Schools, families and every social institution must act on all this."

Better technology than the Web will become the standard, allowing individuals to set their own rules of engagement with digital life

Doc Searls, internet pioneer, co-author of "The Cluetrain Manifesto" and "The Intention Economy" and co-founder and board member at Customer Commons, shared a detailed vision based on work in progress designed to improve the internet, including details about Self-Sovereign Identity, Emancipay, the Intention Byway, persistent compute objects (or picos), "palgorithms" and "intentrons." He explained:

"The new and improved digital realm of 2035 is one in which the Web still works but has been sidelined, because there are better models on the Internet for people and organizations to get along, and better technologies than can be imagined inside the client-server model of browser-website interactions. Those better technologies and models are ones the Internet supports, and has all along, but they have been hard to imagine and develop in the world of the Web, a world built by the giants that ruled our lives in the first few decades of the digital world.

"To see what is likely by 2035, imagine having your own personal privacy policies and terms and conditions for engagement, rather than always agreeing to those of others. The Internet supports that. The Web does not. On the Web, only sites and services can have privacy policies, or proffer terms and conditions. You are never the first party, but only the second – and a highly subordinate one as well.

"This is not the Web's fault, however. Standard-form 'agreements' (such as the 'consent' gauntlets that became ubiquitous on the Web after Europe's GDPR [General Data Protection Regulation] became enforceable in 2018) are called 'contracts of adhesion.' They were given that name in a landmark paper by Columbia law professor Friedrich Kessler and published in 1943. In that paper, Kessler lamented how freedom of contract between customers and companies had become impossible by then, at the height of the industrial age. But the Internet wasn't around in 1943. It is now, and it is possible to imagine, develop and enforce personalized privacy policies and personalized privacy terms and conditions. We have one of those already with Customer Commons' #NoStalking term. We also have it with the IEEE's P7012 group, working on machine-readable personal privacy terms, and with the whole field of online dispute resolution (ODR).

"Now imagine having complete control over how you identify yourself in the networked world, using your own system for telling others no more than they need to know about you – whether you're over 18, have a ticket to a show, are a member of a club, hold a valid passport, or are the same person picking up a coffee as the one who ordered it – and to do all of this using a choice of your legal name, a pseudonym, or no name at all because none is needed. This system is already thought out and coming into use with working code in agreed-upon governance frameworks. The system is called SSI, for Self-Sovereign Identity. None of this is imaginable in a world only of Web sites and services, all of which need to provide their own means for controlling how you are identified, and for what, on the old industrial model. But it is happening on the Internet.

"Now imagine also being able to change your last name, your address, or your credit card number for all the services you deal with, in one move. That too is possible with SSI.

"For demand and supply to be truly balanced, and for customers to operate at full agency in an open marketplace (which the Internet was designed to be), customers should have their own ways to signal how much they are willing to pay for goods and services, plus their own methods for making those payments, on their own terms as well. There is already a design for that, called Emancipay. It was outlined by ProjectVRM at Harvard's Berkman Klein Center in the first decade of the 2000s. There are countless other possible approaches, including crypto-based fintech. None of those can be imagined, much less allowed, in the frameworks of the Web and the platform giants of our current time – including those running mobile device and app technologies and

marketplaces. But those will not continue to dominate the world, because they can't. The Internet beneath them is too broad and supportive of an infinite variety of new alternatives.

"Now imagine being able, as a customer, to tell a whole market what you want to buy or hire, and do that outside the walled gardens of Craigslist, eBay and Facebook Marketplace. And to do it safely and securely, with minimal disclosure of personal information until it is required. This is called intentcasting. Its first open and standards-based messaging model is called the Intention Byway – or Byway for short – because it routes around the commercial highways modeled on the Web and prior industrial norms, and that are embodied in the apps and platforms owned and controlled by Apple, Google, Amazon and other giants of the Internet's first industrial epoch. Working with the Ostrom Workshop at Indiana University, Customer Commons will soon be conducting trials of the Byway in Bloomington, Indiana.

"Imagine having your own shopping cart – one you can take from store to store on the Internet. This was imagined by Joyce Searls in 1995, but never happened on the Web, or even in the retail ecosystem that preceded it. (Think about it: Nearly every shopping cart you push around a store is owned and branded by that store.) But it can be done on the Internet, and will, inevitably.

"Imagine having a dashboard or a cockpit for your life in the digital world: one with all your health, financial and property data, plus your calendar, lists of contacts, receipts and other records of interactions – all personal data – in one place, with your own way to make good decisions based on them. Now imagine running your own algorithms on that data – call them 'palgorithms' – using your own AI and ML, rather than those hosted by giants and meant first to serve their purposes rather than yours. All of that is possible using apps that run on intentrons, which are compute nodes individuals own and operate from behind their own firewall.

"Intentrons and apps that run on them – ones not controlled by the likes of Apple and Google – can be made by anybody, will run on Linux or any other open operating system, and communicate with each other on the Byway. And these too will be on the table for the trials and research in Bloomington during the current academic year.

"And how about a true Internet of Things, rather than an Apple of things, an Amazon of things, a Google of things, a Samsung of things. We should be able to own, control, operate and keep track of those things, as independent human beings in the digital world. Code for this already exists, with what are called 'picos,' or persistent compute objects, developed in and around Brigham Young University, where PicoLabs.org is based. There is also work proving picos' worth in the world.

"So much more can be imagined and developed when we exit the Web and the shadows of giants' silos:

- We can have loyalty programs based on actual loyalty felt by customers and expressed in standardized and noncoercive ways.
- We can have customer service that starts with normalized ways customers can call for and get support.
- We can have apps running on intentrons and communicating with companies on the Byway, just providing helpful feedback to companies willing to listen and improve how they work. (Picos can be involved in that too.)
- We can have political systems that work outward from citizen participation rather than starting with politicians working for wealthy influences or with algorithmically-amplified tendencies by citizens to vilify, complain and advance in partisan herds.

"Of course this is all stuff I've been thinking about and working toward for decades, in some cases with dozens or hundreds of others. The difference as I write this today – in August 2021 – is that I am on site in Bloomington, Indiana, working on developing the Byway and doing research around it. Whether or not that work succeeds, I do have faith that the Internet will support the kinds of developments outlined above, and not just the platform-dominated ecosystem that has dominated our thinking and policymaking in the first several decades of digital life."

'Home on the cloud' and living in the fourth dimension

Mei Lin Fung, chair of People-Centered Internet, predicted, "By 2035 instead of the 'home on the range' most people will be at 'home on the cloud,' able to stay surrounded by family and friends while finding and taking on income-earning, business opportunities anywhere in the world. I share the following excerpts from a chapter I am writing with Leng Lim for an upcoming book:

> "For many, the past year has merged people's real, physical, geographically located home for work and family life with digital spaces due to a COVID-19-forced cohabitation that might last longer than we imagined. In our real, physical home, work and family life have in the last year or so been radically merging. This COVID-19-forced cohabitation might last longer than we imagined. The more-digital lives many of us now lead have come sooner than we expected. The consequences are many. Not only has remote work reduced the need for office space, but it has also brought down barriers to migrating for work. We can live by the beach in Bali and work each day with colleagues in Brussels or Brazil or Baltimore, even as we socialize at night or on weekends in Bangkok, Barcelona or Bogota.

“Digital humanism driven by love of people and planet is urgently needed as a counterweight to what will otherwise be an inevitable digital colonization driven by profit. Surely, we all want to prioritize collective flourishing over the fury that will result if the world’s future is defined by conflicts between digital masters and the digitally unempowered. But too many feel helpless, blame others and find comfort in complaining. It’s past time for such inaction. It’s time to get going – with eyes wide open, not denying that the shift toward a more humane and sustainable society, however inevitable and badly needed, will be painful and fitful.

“We are connected now. The human factor in social, economic and relationship ecosystems can no longer be ignored. We can see, measure and model these interactions. We have an incredible opportunity to share and learn so we can find ways to flourish together on our planet home: what that visionary Marshall McLuhan called ‘Spaceship Earth.’

“The Global South has come to visit in the living rooms of the Global North, and it’s looking rather permanent. The Global North has put a device into the back pockets of many people in the Global South, and it’s becoming ubiquitous, the mobile phone in every aspect of life around the planet. Those connections are generating collisions which were avoided when distance separated ideas. Western science and economics are meeting Eastern body-mind-spirit and yet all is not one. As the pendulum swings from the dominance of Western science and economics to the embrace of holistic well-being and oneness with the planet, we find ourselves in the cloud together, yes, but the usual buffers for human relations of understanding and empathy are not just worn thin, they are worn down by growing waves of cultural and religious misunderstanding.

“Yet as digital taketh away, it also gives: Humans have used measurement as a tool to increase understanding – measuring distances in the sky using telescopes gave us the science of astronomy. Timing a ball rolling down a slope gave us physics. Weighing ingredients before mixing them together gave us chemistry. Measurement is entering a golden age with the Internet of Things. Sensors can provide precise nanosecond tracking of movements, temperature, humidity, food security and agriculture, mobility and transportation, well-being and housing, climate and environmental sensing. This has potential for reducing waste and costs, increasing quality of life and making for more sustainable life on Earth.

“Of course, today, digital accounting and tracking can – with its current emphasis only on profitable private enterprise – make a few people rich and unrestricted and keep many people tightly controlled and constrained in opportunities. When only money is counted, only money counts.

"The politics of the Left and Right is an archaic notion now that we are in an era when the problem of both production and distribution can be solved in an infinite number of ways, with the precise possibility of dialing the lever left or right, not at the national level, but at the local subnational and even neighborhood level. Mayors matter more than presidents in the distribution of resources and wealth in a world where there is enough food, water, electricity and shelter for everyone. Yet political divisions tear the human fabric, tilting the winnings to the tribe that knows how best to leverage digital technology to win the power game.

"We have a new fourth dimension, and that is Digital. At any instant we can engage with the visual playing out of scenarios, digital narratives sped up or slowed down, entire lives depicted, courses of action storyboarded, the impact of public health interventions on population health shown in Monte-Carlo simulations, modeling using data from sensors far away to precisely time when to water the crops.

"This is a huge new frontier that we can't understand until our intuition begins to develop and that takes time, just as it takes time to learn to read and write until we can do it unconsciously. Humility and a sense of inquiry is the only protection we have in exploring life enhanced, enriched and endangered by the vastly and rapidly expanding digital dimension.

"Digital Humanism driven by love of people and planet is urgently needed as a counterweight to what will otherwise be an inevitable Digital Colonization driven by profit. Surely, you say, we all want to prioritize Flourishing over the Fury that will result in the subsequent conflicts between the Digital Masters and the Digital Slaves?

"But lacking understanding that this is what we are heading toward, millions already watch in horror as dystopian nightmares of Poverty, Pandemic, Prejudice encroach. Feeling helpless, blaming others, justifying inaction, finding comfort in complaining as an alternative to acting, the silent majority is like a frog where the water is so gradually heating up that the frog does not try to jump out.

"The environmental factors so long ignored for being too complex to consider in Western science and economics, are now being considered in digital accounting beginning with climate accounting. The human factors, so long ignored because of being too complicated to do laboratory experiments with, are now being considered in digital humanism, digital health and in the building of resilient communities. Stewardship to assure a sustainable planet, sustainable food, water, shelter, flourishing ecosystems are being raised as counter-objectives to the one-dimensional financial factor.

> "We are connected now, and the human factor in the social, economic and relationship ecosystems can no longer be ignored – we can see it, we can measure it, we must model it and we must share and learn the new knowledge to find ways we can learn to flourish together on a planet that stays livable."

How this report is organized

The sections that follow in this report organize scores of additional expert predictions under headings that reflect the themes listed in the tables at the beginning of this report: building better spaces; constructing effective communities; empowering individuals; changing economic life and work; altering "reality"; and tackling wicked problems.

A final section covers some of the more sweeping predictions and wishes of some of the key respondents to this canvassing.

For more details regarding how this canvassing was conducted, including full question wording, see the section "About this canvassing of experts" at the end of this report.

2. Building better spaces

A large portion of respondents hoped and predicted that digital platforms will reform themselves and new platforms will arise by 2035 that could lead to a better online environment – one that enshrines new norms for discourse and allows for open and honest conversations that are less fractious and menacing. Among the reforms they imagine: people have control of their data and their relationships with commercial and nonprofit entities; big social media firms are regulated in ways that encourage them to create less socially-harmful spaces; interoperable systems allow people to move smoothly among digital spaces and not be confined to walled-garden commercial platforms; people are tied to clear online identities so they can be held accountable, though some forms of anonymity are enabled for those who are beleaguered; artificial intelligence (AI) plays a greater role in isolating bad actors, encouraging connections, moderating discussions; government-supported media platforms with different incentives and algorithms that encourage pro-social engagement; and auditors track the performance and impact of for-profit online enterprises.

Eileen Donahoe, executive director of the Stanford Global Digital Policy Incubator, wrote, "In a new and improved digital realm in 2035, I hope private sector companies are expected to engage in human rights impact assessments with respect to the design, development and deployment of their digital products and services. In addition, new processes will be developed for democratic governments to engage in human rights impact assessments with respect to their own procurement, use and regulation of digital tools and services. Part of what may motivate this trend would be global recognition that in digitized society, open democratic governments that protect the human rights of citizens will be stronger than authoritarian-leaning governments that use digital technology to repress citizens, and private sector companies that support democracy and respect human rights will be more successful than those that do not."

Andy Opel, professor of communications at Florida State University, predicted, "A major change that will improve the digital realm will be the rise of public broadband and publicly owned and operated social media tools. Wireless broadband will be recognized as a public good, akin to electricity, and access to broadband will be reinforced under the equal protection clause of the Constitution. The historic inequities of the digital divide will be recognized as economic inefficiencies that hold back large reservoirs of human potential. The ubiquity of access to broadband will accelerate the robotic revolution and promote shorter work weeks that allow for more sustainable work/life balance that supports families, the elderly, and the mental health of the entire society. The seeds of these trends emerged during the COVID-19 pandemic, and this lived experience will not be forgotten quickly. Publicly owned social media options will allow communities to build strong connections and not market fear and polarization. … The ongoing climate crisis, the visibility of dysfunctional income inequality, and the accelerating digital realm

create a dynamic force that is going to reshape our environment, culture, and economy and emphasize our interdependent, collective interests and limit the excesses of hyper-individualism. At this point in time in the near future, everyone will be fully in control of their digital profile. This control will allow people to edit their publicly available information and monetize their data, receiving micro-payments from companies that want to use personal data to market goods and services.

"Instead of black-box data harvesting of every moment online, with our data trails harvested and sold by Google, Facebook and others, a Digital Bill of Rights will empower people to both control and benefit from the use of their personal information. This concept will prove so popular that people will look back at our current era as the dark ages of digital technology. The idea that corporations created complex profiles of everyone and yet no one could access their own profile or know details about the algorithms that shaped their profile will be looked back upon as a repressive era of social control."

Peter Levine, professor of citizenship and public affairs at Tisch College, Tufts University, said, "Maybe by 2035, people will be able to spend their time on digital platforms that are not relentlessly engineered to compel attention, to transmit advertising and to collect consumer data from us, and are instead designed to serve their users' authentic needs and are accountable to the public. I don't think the problem is designing such spaces; the problem is making them profitable so they can compete."

Jeff Jarvis, director of the Tow-Knight Center for entrepreneurial journalism at City University of New York, commented, "I imagine the creation of an expert network such as the one scientists and doctors created in a matter of weeks at the start of the pandemic using preprint servers to share research and data and using Twitter – yes, Twitter – to peer-review those papers. I imagine social networks that are based on constructive collaboration regarding shared concerns. I imagine a media ecosystem – online and off – that breaks free of the corruptions of the attention-based business model it imported into the net."

Mary Chayko, distinguished teaching professor of communication and information at Rutgers University, predicted, "By 2035, politicians, the public and leaders from business, academic, technological and other communities can literally team up to address and solve pressing global social problems. For example, members from each of these groups could form actual teams that would take part in cross-field, interdisciplinary, international working 'summits' or 'competitions' aimed toward (and incentivizing) the creation of more equitable, just, inclusive accessible digital spaces."

Yasmeen Ibrahim, professor of digital economy and culture and author of "Posthuman Capitalism: Dancing with Data in the Digital Economy," commented, "We need to think through ownership and collective possession of data. A better online world is connected to a better offline world. When we pose questions about how to build a better online world, in essence we are asking how to build a better material, physical and tangible offline world as well. In essence, what we need to consider about the online environment is about how it amplifies social ills and misogyny through design. The governments and regulators have to intentionally curb data empires as a form of power in their own right. Retentive economies that save and track data should be countered by technologies which can selectively erase data after a transaction as a legal requirement where applicable. We need to think beyond consent and cookies, to think about how people may own and repurpose data for the common good collectively."

Seth Finkelstein, principal at Finkelstein Consulting and Electronic Frontier Foundation Pioneer Award winner, noted, "A long time ago I wrote in a column, 'There's an old joke: In heaven the police are British, the mechanics German, the cooks French, the lovers Italian and the Swiss organize it. In hell the police are German, the mechanics French, the cooks British, the lovers Swiss and the Italians organize it. An internet version might be: In theory, topic experts would supply our information, social networks would connect us for common humanity and Google would organize it for authority. In practice, we get our information from the most attention-driven sites, social networks bundle us for marketing and Google organizes it for ad sales.' … The public investment required to create such a system would be extensive. But it could happen – in the most utopian world."

Larry Lannom, director of information services and vice president at the Corporation for National Research Initiatives (CNRI), said, "The vastly improved compute and network facilities developed over the next decade or so will accelerate an evolution in the quantity, quality and availability of the data on which science makes its advances. Mere availability of data is insufficient, but work is already underway on interoperability, adding layers of abstraction that will push the details down into the technology stack, much as computer users today do not need to think about where the bits comprising their files are actually held or how their data flows around the world. We can assume that at some point, perhaps as early as 2035, all data will be instantly available to all scientists in an understandable and reusable form, with essentially unlimited storage and compute power."

William Lehr, an associate research scholar at MIT's Computer Science & Artificial Intelligence Laboratory with more than 25 years of internet and telecommunications experience, wrote, "In a new and improved digital realm there would be better-trusted curation so that digital speech is more trustworthy. Enablers of 'big lies' ought to be criminally liable for their speech. Society has to figure out how to design a framework for stopping speech that has real effects that can cause

major harm. When I go to my doctor and he diagnoses me with cancer, it is reasonable for me to trust his judgment and presume he is not lying to me, even though mistakes may happen. If a smart friend without medical training says he thinks I may have cancer and turns out to be wrong, I would not expect that friend to be liable. Whereas a doctor who makes an egregious mistake that violates reasonable standards of professional judgment or – much worse – intentionally lies to me about my cancer diagnosis in ways that cause harm, then there ought to be real penalties/liability.

"As more things move online, more types of speech may need to be subject to such graduated liability. In the future, there could be less insincere communication (bullying for effect, lies because they are easy, etc.) so that online is an extension of our better natures and behavior, rather than the converse. Online can expand access and make modalities of communication more inclusive and complement human capabilities with information resources. It can also be manipulated and used to capture or distort public narratives."

Adam Nagy, project coordinator at Harvard Law School's Cyberlaw Clinic, commented, "In an imagined future, one might consider platforms that make it easier to build bridges across communities that are different from one another within the platform and even across platforms. Today, people are increasingly atomized, distrustful, depressed, unable to organize for public goods, and divorced from civic engagement. Popular social media platforms can accelerate the growth of 'bonding' social capital, which is the reinforcement of relationships within an existing group or community. For example, one joins a group dedicated to topic X or exclusive to residents of neighborhood Y. One may follow news sources and personalities that typically align with their own political views. Even if one is a member of many different forums, the platform architecture compartmentalized those communities."

Kent Landfield, a chief standards and technology policy strategist with 30 years of experience, wrote, "If we are truly to become a new and improved digital realm in 2035, it is critically important that we can *trust* the infrastructure we are so dependent on. If we do not get a handle on improving the security aspects of the internet, we will continue to see ever-increasing and more-elaborate cybercrime, ransomware and nation-state attacks. Populations will distrust the internet as a way to communicate, collaborate and live our daily lives. We need a secure foundation from which to operate. Today's internet is fundamentally flawed because of the lack of built-in security to the foundational protocols. Identity theft brings the impact to the individual internet user. It adversely affects their lives, their finances and their futures. This is because we are currently operating on an Internet Protocol suite that is inherently and obviously insecure. If the government was to create a program for advanced research of a new set of Internet Protocols that are founded in a route of trust, we could, by 2035, create a foundation for a successful, valuable and useful digital realm. Without that transformation of our current infrastructure, we may find ourselves in a very scary place."

Ayden Férdeline, a public-interest technologist based in Berlin, Germany, commented, "There are three protocols that are gaining traction and, if widely adopted, could change the internet for the better in the next several years. First, the Interledger protocol being developed by the Interledger Foundation is an open-payment network that seeks to provide unbanked and underserved populations with access to financial services. Organizations like Coil are now using Interledger to enable online micropayments, helping fund the work of independent content creators around the world. Second, the Unlock protocol, which runs on the Ethereum blockchain, is empowering individuals to 'gate' their data, on their own terms, while allowing people to sell their data on their terms if they wish. Third, the InterPlanetary File System developed by Protocol Labs is creating archival solutions for the Web so that content on the Web does not rot and disappear. All three of these protocols have robust, bottom-up governance processes and their builders are working to make the internet a healthier, better, more sustainable place."

Leah Lievrouw, professor of information studies at the University of California-Los Angeles, commented, "Way back in the 1980s, social psychologists already found that interaction online was often 'disinhibited' – rude, asocial, vulgar, etc. People would basically act out online in ways they would never do face-to-face, with few consequences. There were attempts at establishing expectations and etiquette, but we know where that went. So, at the micro level, I'd say from a young age, people should be taught to have higher expectations for their own actions and those of others. At the more-macro level, I would like to see innovative new arenas or landscapes invented in which people are expected to cultivate positive, constructive, considerate sociality online – not filled with the current 'all about me' content and not the type of brute-force broadcasting Castells refers to as 'mass self-communication,' but instead reflecting other types of more-beneficial expression. It's interesting to me that even after nearly 20 years of social media, the genres of discourse and interaction online still mimic mass forms – broadcast video, 'branding' and self-promotion, telethons ('ring the bell!'), performance for unseen audiences (hopefully massive). Conversation and small groups have perhaps seen a bit of resurgence with platforms such as Zoom, but those have been designed to mimic conference rooms, which isn't exactly where we cultivate civil society, friendship and social capital in the Robert Putnam sense. I'd love to see the user-experience and interaction design communities really put their minds to this. Perhaps there will be a return to a kind of civics education that is more appropriate to the realities of public *and* private life online. People should be learning about the risks, responsibilities and ethics or ethos of 'being a good citizen' as well as being a genuinely good person online."

Neil Richards, professor of law at Washington University in St. Louis and one of the country's foremost academic experts on privacy law, wrote, "I'd love to see a duty of loyalty imposed on tech companies, requiring them to act in the best interests of the people whose lives they purport to improve. It's a simple change, but one that would radically reshape the digital world, surveillance capitalism, advertising and our ability to trust that digital world."

Charles Anaman, founder of waaliwireless.co, based in Ghana, responded, "No online platform of more than 400,000 users will exist (or at least less than 1 million, ideally). Users will be split up to manage the levels of disinformation, with admins who are dedicated to the verification of information with help to ONLY flag possible violations. Humans who are trained to conduct research will work around the clock to review content in a decentralised federation of networks to track and block malicious sources of misinformation with the assistance of a legal team in every country. Platforms that are open to new users without verification will be exempt and not be indexed to global search engines."

Bart Knijnenburg, associate professor of human-centered computing at Clemson University, said, "The de-commodification of online discourse could result in a more diverse political landscape, where actors can discuss nuanced political positions with like-minded (but not too like-minded) peers, without directly being pigeonholed into the aggregate position of 'the left' or 'the right' by bystanders. With politics currently happening 'center stage,' it is difficult to move beyond black-and-white discussions ('Should we abolish the police or not?'). I envision a future where such discussions happen in smaller spaces, so that they can be much more nuanced ('What would abolishing the police entail?'). I also imagine that it would become easier for people to interact with others who are similar to them in unexpected ways. Currently, it might be easy to find a group for people who eat halal food, or a group for people who like to grill, but where does one find a group of people on the intersection of those two preferences? In a more-distributed environment, AI algorithms could predict what types of currently nonexistent discourses you would be most interested in, and then automatically find you groups of like-minded (but not too like-minded) individuals structured around those potential discourses."

An author and social media and content marketing expert wrote, "One very simple way in which digital spaces – specifically social media platforms – can be improved is users having to verify they are indeed a real person with a real name. That alone would begin to improve social discourse. If you look at a platform like LinkedIn, it is a much more pleasant atmosphere. No one hides behind a username that is anything but who they are. Their job is a way of verifying they are indeed who they are. Another improvement would be breaking up the major players through the antitrust legislation currently in Congress. This would allow room for new and perhaps more creative social platforms and more choice."

Alf Rehn, a professor of innovation, design and management at the University of Southern Denmark, said, "In 2035, smart technologies will ensure that political conversations online will look less like a series of increasingly heated comments and more like town hall meetings with relatively coherent conversations. An AI-system – tried, tested and trusted by all participants – will control the opening and closing of mics and other ways of commenting as well as ensuring that people's XR [extended reality] glasses aren't overrun by emoji and similar visual chaff. The AI

will cycle participants throughout smaller breakout discussions, all whilst keeping everyone abreast of the general tenor of the conversation. People who are judged by the AI as being fair and equitable in the conversation will often get the best chance to input into the same – which will lead some to go for 'strategic listening' (keeping quiet and adopting a facial pose that indicates that they are taking in the argument) in order to game the AI for some extra time or decibels, but as listening is only part of the algorithm, this will not get anyone far. There will be no leaderboards, per se, as the AI will instead aim to continuously communicate the key argument in as fair a way as possible, taking on board all counterarguments whilst trying to filter out obvious rhetorical tricks and logical fallacies. As a result, seasoned politicians may find themselves marginalized in these conversations, as their pandering will often run afoul of what the AI sees as an interesting argument. Intelligent questions will tend to outperform the bombastic, and trolling will become difficult because people will not respond to obvious provocations simply because they never see them."

Russ White, a leading internet infrastructure architect at major technology companies for more than 20 years and a current member of the Internet Architecture Board of the IETF, responded, "Increasing transparency might help in some ways. While these big companies cannot be forced to open up their neural networks for examination (they often don't know how these decisions are made themselves), they could be forced to provide the ability for researchers to openly seek out bias, exposing that bias to public view. Further, governments *could* encourage the creation and use of truly local digital spaces to encourage a stronger sense of place, and to break up the strong centralization that is currently occurring in the internet realm (both in terms of services and infrastructure). Finally and importantly, we could educate people to stop taking these digital spaces so seriously. Digital spaces should be seen as an adjunct to the real world, rather than as a replacement to the real world."

Peng Hwa Ang, professor of media law and policy at Nanyang Technological University, Singapore, commented, "The current debate swirling around fake news and disinformation will lead to the development of rules, technologies and programs that will defeat such content. The quality of information will improve. The most downloaded economics article is the one by Nobel Prize winner for economics George Akerlof in 2001. His 'Market for Lemons' paper argues that in a market where information is asymmetrical, the absence of indicators of quality will destroy that market. In essence, if there is a buyer and seller and the only the seller knows the quality of the product (asymmetry of information) and there is no way to indicate the quality of information of the seller, the market will be destroyed. Applied to the internet, if internet advertising continues as the Wild West, then the market for internet advertising will be destroyed."

Alex Halavais, associate professor of data and society and director of the master's program in social technologies at Arizona State University, commented, “Some people recognize that they cannot offload the responsibility for fighting disinformation or for reigning in toxic interactions to platform owners; that if they want spaces that uphold their values they will need to shape those spaces themselves. This will necessarily mean a fracturing of online spaces into smaller groups, and I suspect the early abandonment of some of the massive platforms that have benefitted from economies of scale will continue. Of course, this is currently marked by splintering into groups where those values are not those we might prefer within a liberal democracy: hate groups, cults of personality and those that amplify disinformation, for example. Of course, these are concerning, but I suspect they will continue to be matched by communities that reproduce more prosocial values. The question will become what this kind of centrifugal disaggregation will mean; what happens to our public when it is divided into small intentional spheres?”

Kate Klonick, a law professor at St. John's University whose research has focused on private internet platforms' policies and social responsibilities, responded, “I'd like to see a rise in platforms creating different governance structures that imbue their private platforms with the democratic and participatory ideals that we imagine for powerful actors that control our public rights. In particular, I'd like to see this in the context of speech platforms – which would effectively create different systems to govern their platforms. Some platforms might use a court-like model to solve speech disputes, some might use a user-choice/choice architecture model – but there would be a consolidation of a few different ways that we see as normatively acceptable for private platforms to govern speech online.”

Mark Andrejevic, head of the Culture, Media and Economy Program at Australia's Monash University, responded, “I would like to see large-scale public investment in the collaborative, international development of public-service media platforms that combine content, sociality and public informational resources. I would like this to take place at the scale of a Google or Facebook – an international collaboration of public-service media that provides free access to news, information and entertainment, both professional and amateur, and uses this free access as a means of bringing people to the platform for the purposes of sociality and public education and deliberation. This would be subsidized by eliminating the loopholes that make it possible for tech companies to avoid a reasonable level of taxation. It would be a platform that does not need to collect and store the amount of personal information collected by the platforms (thus saving some costs). All platforms are curated – this one would be curated in the public interest using independent mechanisms similar to those developed for public service broadcasting.”

Tim Bray, founder and principal at Textuality Services, previously a vice president in the cloud computing division at Amazon, wrote, "I would like to see larger players of the internet adopt the Wikipedia practice of flagging content as unsubstantiated, with such material subject to removal if supporting evidence is not supplied."

Paul Manuel Aviles Baker, senior director for research and innovation at Georgia Tech's Center for Advanced Communications Policy, wrote, "I could envision the continued splintering of digital spaces to occur in a way that cocoons people in a comfortable self-reinforcing space. The model would be something like the way the old larger broadcast television networks lost dominance to, first, cable, then online distribution and engagement platforms. One role for the public sector or even the private sector as possible alternative innovative platforms spring up would be to provide relatively neutral spaces that could serve as either or both moderated channels as well as generally recognized 'fact-checking' resources."

Ellery Biddle, projects director at Ranking Digital Rights, predicted, "One encouraging trend that I could see continuing to rise and produce strong outcomes is that of messaging services that cater to small groups. Signal supports this well and has increased its userbase substantially in recent years. It has become a place where people who know each other in real life can meet and chat with relatively strong guarantees of privacy and an ad-free experience, allowing us to use digital technology to improve and enrich our lives without some of the risks presented by more open and more commercial platforms."

George Sadowsky, Internet Hall of Fame member and Trustee with the Internet Society, said, "I hope the growth of healthy online communities will be a feature of 2035. These communities can be geographic, professional, hobby-oriented or even ideological, provided that we can get the meanness out of online behavior. Some modification of Section 230 might require online posters to assume more responsibility for their remarks, and some combination of technical progress and regulation would work to make identification of originators of content easily identifiable and therefore more responsible for their contributions to online conversations. We should definitely preserve the right to anonymity but restrict its use to concerns where anonymity is needed rather than letting it protect those who intend to make incendiary remarks without taking responsibility for them. This will not be easy, and it will require rethinking our relationships to one another at the community, country and global levels."

An angel and venture investor who previously led innovation and investment for a major U.S. government organization commented, "There will be no such thing as passwords. All digital behavior will be discoverable and trackable. It will be impossible to turn off location services because of legal mandates, so all people will be trackable physically wherever they are all the time."

Jan English-Lueck, professor of anthropology at San Jose State University and distinguished fellow at the Institute for the Future, responded, "In 2035 there will be a host of 'trusted' oracles for information. They won't all agree on policy and politics, but they will have moved away from unsophisticated lying as a source of persuasion. A new generation of technology developers will emerge from disgruntled youth to create an array of tools to maximize transparency and build a culture of accountability in the organizations in which they work. The overall environment of a multiverse of information will not have gone away, if anything, it will have intensified, but new tools will be leveraged to judge the quality of the information used in public debates."

Bill Woodcock, executive director at the Packet Clearing House, wrote, "The single most important factor in improving the quality of digital life and the trajectory of digital interaction is the disintermediation of human communication: The removal of the agents with separate and competing agendas, like Facebook and Twitter, that have positioned themselves between people who could otherwise be engaging directly in civil discourse. This requires decentralization, federation and the empowerment of the users of digital technology to act on their own behalf."

Scott Santens, senior advisor at Humanity Forward, commented, "In a new and improved digital realm, clickbait is a thing of the past. With incentives realigned, there is no longer the same incentive to provoke outrage, anger and fear in order to cause people to click stuff, and the stuff they click no longer does the best if it's false, greatly exaggerated or highly polarizing. What people are more interested in is helpful, accurate information and healthy community spaces. This may seem like science fiction at this point, but it is possible if we make the many systemic changes necessary to make it happen."

A professor whose work is focused on technology and society wrote, "Wouldn't it be beautiful if people had a good reason to gather and deliberate and exchange ideas in safe spaces? Capitalism rules the roost and likely will have sway for a long, long time, so I hopefully imagine future spaces in which companies are incentivized to create these kinds of structures. It's extremely Pollyanna-ish, but you asked! I love James Fishkin's model of deliberative polling and gathering people of all stripes. Once gathered and in a neutral space, Americans do great things. They're less stupid, less reactive, more tolerant and come up with better ideas. I would like to imagine structures online that incentivize these kinds of civic gatherings and mixings, as opposed to our social network-based echo chambers."

Sean Mead, strategic lead at Ansuz Strategy, commented, "I imagine that in 2035 AI agents could exhibit a high degree of understanding of and customization for what people need; agents that can act autonomously for the benefit of individuals within useful parameters. There could also be network and software security redesigns that limit or largely eliminate cyberattacks, ransomware, information leaks and similar trust destroyers."

Oscar Gandy, an emeritus scholar of the political economy of information at the University of Pennsylvania, said, "I had once upon a time imagined that we would see the development, promotion and use of something akin to 'informational dietary supplements,' perhaps akin to personal digital assistants, that would take note of our informational exposure and recommend, or even 'nudge' us toward more-comprehensive, challenging, reflective materials for consumption, while also providing assistance to us in exploring our own contributions to public discussions. My concern, of course, is whether we would see the development of trustworthy, rather than manipulatory digital assistants. Ideally, the development of trust would have to be based on some form of personal investment, rather than third-party investments by marketers or influencers seeking to promote their own visions of what I need individually and we all need collectively."

A scholar, knowledge manager and adjunct professor listed the following as his top wishes for improvement of the digital public sphere by 2035:

- "Establish a clear distinction between open crowdsourcing and 'qualified crowdsourcing' – including in the latter only those with demonstrable competence.
- Make free and open-access the default mode for all internet content.
- Make exertion of intellectual property rights possible but difficult, and free ALL legacy sci-tech materials from intellectual property constraints, with the exception of potentially dangerous content – for example, insider information on chemical/biological/nuclear technology.
- All university courses should be free and open worldwide.
- Medical care should be freely and directly available on global scale."

Christopher Yoo, founding director of the Center for Technology, Innovation and Competition at the University of Pennsylvania, responded, "Most of the ways that digital life could change for the better involve users, who are ultimately the main determinant of what practices gain traction online. My hope would be to give users better tools to be more discerning about the information they encounter online. I would also hope that practices emerge that curb bullying, flaming and other forms of antisocial behavior, both by empowering users to avoid encountering such attacks and by encouraging a healthy distance from social media."

Russell Newman, associate professor of digital media and culture at Emerson College, wrote, "I hope we will have developed not just policies but entirely new schools of thought so that we can rethink our relationships with communication, with politics, with our economy and with our ecology. I imagine new schools of thought that supersede antitrust as a solution, simultaneously developing policies that address the very real material needs whose lack provides openings for 'culture warriors' to wedge us apart, with public subsidization of experiments directed toward the betterment of democratic discourse as opposed to simply the fomenting of new markets; and

maybe we find new uses for markets within a more just framework in which markets serve as means instead of ends. We won't tech our way out of our tech problems, even as we cannot leave the intricacies of the tech problems themselves to the dominant players today. Rather, we need to reframe the problems themselves. Perhaps by 2035, with enough effort, we will have conjured productive new formulations."

An eminent expert in technology and global political policy said in a better world in 2035, "The much-celebrated tech concept of 'permissionless innovation' will be replaced by 'responsible and accountable innovation,' in which digital businesses engage in serious dialogue with those with expertise in the areas likely to be affected by digital innovation and truly take into account, as an integral part of decision-making, its non-commercial impacts and risks (such as those that have impact on people's rights, the environment and in/equality)."

A share of these experts expect that government moves will have significant impacts on today's most-popular commercial social platforms.

A machine learning research scientist based in the U.S. wrote this futuristic news report: "Oct. 1, 2035. After five years of litigation, trillions in fines and countless incidents of civil strife, today YouTube, Facebook, TikTok and Twitter collectively announced they are abandoning the algorithmic ranking of user content. Content will now no longer be personalized to individual users but will instead present communities of information indifferent to the preferences of the user. The action follows a long series of incidents related to violent extremism as people's worst instincts were reinforced in deepening filter bubbles."

Several respondents suggested requiring public digital platforms be categorized as public utilities.

Brent Shambaugh, developer, researcher and consultant, said, "Order in the data world may allow for more chaos in the physical world that is conducive to creativity and innovation. Digital communication technologies have allowed for collaboration across space. By 2035, many organizations may be more flexible than before if interoperability of data is achieved. Online games will become more immersive, but the physical world will not be replaced. Social media has led to isolation and relationships that cannot compete with physical ones. However, it has also initiated relationships that when they enter the physical world are of high quality. The digital realm in 2035 will be improved when people are able to express their views openly."

An AI scientist at a major global technology company said, "Social media and tech companies that provide basic internet services (i.e., internet connectivity, internet search, email, website hosting) are categorized as utilities and forced to be open about how their algorithms work. Certified auditors monitor their algorithms in a secure manner to protect their intellectual

property, but they are able to see when algorithms violate human rights or social good, for instance, selling private data without consent, targeting ads to vulnerable populations (e.g., gambling ads to addicts) or promoting violent, hateful or disinformation content. When this activity is detected, companies are immediately warned to take action, victims are notified and compensated, and companies are fined if they do not alter the algorithms within 48 hours. Broadband is considered a basic necessity like water and electricity and provided to every citizen as a public good."

An activist and voice of the people wrote, "Ultimately the internet has to be governed like a public utility … to ensure that they are no longer so vulnerable to crime, trafficking are held responsible for outcomes."

A French professor of information science suggested a revamp for 2035 that divides the internet into non-commercial and commercial branches, writing, "I propose a division of the Internet into two distinct networks: the Original Internet and the Business Internet. The Original Internet would have a general ban on all for-profit activities, advertising, sales, marketing and so on. The Original Internet would be refocused on human activities: art, science, nature, knowledge, education, health, leisure, amateur sport, gardening, games (non-gambling games). An e-reputation for users in this setting is but only their non-commercial human activities can be mentioned. Any solicitation by email or sales of lists would be prohibited. The Original Network could be moderated a priori. No private company could impose anything on the Original Internet, which would be placed under the control and authority of a commission (for example a National Commission for Data Processing and Freedoms) from a government of sovereign states. The Original Internet would be maintained by accredited companies and under the control of the CNIL which could, at any time, withdraw its approval and take legal action in case of breach and fraud. The Business Internet would be dedicated to commercial activity and allow advertising, online shopping and so forth. Individuals' secondary, business email addresses would be available on the Business Internet to those who would like them (but people would not be required to have one). If a user deems that their Business email address is misused, they can at any time delete it and create a new one. All lucrative activities (transactions, sales, advertising revenues) on the Business Internet are taxed and all such proceeds are earmarked for the updating and maintenance of the nonprofit activities of the Original Internet."

New norms could be *the* principal driving factor for better human engagement online

A share of these respondents said that change by 2035 will emerge organically or with some focused assistance due to the gradual acceptance of new norms as the public adjusts to operating in online spaces.

Steve Jones, co-founder of the Association of Internet Researchers and distinguished professor of communication at the University of Illinois-Chicago, said, "By 2035 we will hopefully have a better understanding of how to evaluate and integrate the digital into everyday life and how to manage our online and offline interactions more holistically."

Robert Bell, co-founder of Intelligent Community Forum, urged, "Users of public digital spaces must evolve the same kind of etiquette that governs their behavior when in public. Most of us do not go to the biggest public square we can find and shout vile imaginings, filthy wishes and threats. Most of us do not form impromptu gangs and roam around seeking those who might disagree with us so that we can punish them. Most of us do not laugh uproariously in the face of another's harm or embarrassment. Why? Because we have been socialized to keep such things to ourselves when the eyes of others are upon us. How we get to that kind of etiquette, I have no idea. But the fact we have done it before, evolving over decades and centuries, shows that it can be done and what is required."

An expert in urban studies based in Venezuela observed, "We find ourselves in the middle of a digital emergency today, similar to the one we already recognize regarding climate change, and with dramatic consequences if we do not act promptly. There are two complementary fronts that should be addressed in parallel. One is information literacy. That is, disruptive educational programs (not under traditional pedagogical models) so that people are continuously (throughout life, from children to adults) developing skills that allow them a critical use of digital tools. The other aspect is the construction of socially acceptable behavior patterns to be applied to the development and use of these technological resources. Ethical codes agreed between the various social actors and gradually implemented are necessary. The goal would be to consolidate a culture toward information (infoculture) that recognizes the peculiarities of each set of actors (children, developers, teachers, officials, entrepreneurs, parents, etc.) and that regulates the relationships between all these groups."

Chris Arkenberg, research manager at Deloitte's Center for Technology Media and Communications, shared this scenario: "It's morning and I want to check in on the two major social nets I use regularly. I put on my viz lenses and their biometrics certify my identity, allowing me access – my followers only see my username, but it's just a couple layers to get to my real name. I have other nets I can use anonymously because they haven't met the 10 million-user mark that requires that I use my real ID. I scan the feed on my desktop screen as the viz lens adds additional layers. Any users with more than 100,000 follows have an overlay. If I scan it, I can see the largest nodes they're connected to on the network, for instance, I can see who they share the most and who shares them as well as their other major non-network relationships – employers, major stock holdings, military or law enforcement affiliation, etc.

"If people want to use the largest social nets, they have to be open and honest about it. In real life, actions have consequences and it's clear that this was needed in our digital lives as well. That's how socialization and mores work. In 2035, I can pull a layer that shows their network and how information and content move across it, tracking it all the way back to the originating source. Along the way, each of the nodes (i.e., accounts) is marked with trustworthiness, transparency and history ratings. It's a great way to determine where information comes from, how it moves across the network and gets amplified, and whether or not it's objectively credible or malicious.

"When I start to interact with another user's post – for instance gazing at it or starting to comment or annotate – some will show emotional indicators. These are mostly a mix of animated emojis rendered directly from the poster's face, but some include videos and livestreams. Once people understood how much communication is physical and embodied and how much of that is removed from a primarily textual medium online, they started to add more ways to signal emotions and body language. Then the services adopted it. You can even use the viz lenses to stream your face and EKG readings from your scalp. It's a start at actually being able to see in a person's eyes how they feel about something shared on the network, how they react to an insult or compliment and how the information highway is often an emotional roller coaster. So far, this has started to noticeably reduce the amount of trolling and griefing. And, with user transparency and traceability, it's much harder to insult someone with anonymity.

"There are consequences, and the network can see it all. And, of course, these days the network is also part of the real world and all the physical touchpoints around us that connect to the net. It's not a centralized, government-mandated social credit system. It's just society and sociology and norms and mores and the consequences of violating them finally starting to take form online."

Christopher Savage, partner and cyberlaw specialist at Davis Wright Tremaine, responded, "People will learn to identify clickbait and propaganda more effectively by 2035 than they do today. We were spoiled, in a sense, from roughly 1940 through roughly 1990, in having a national and largely responsible, reasonable set of media outlets. All of that splintered with the growth of the internet and social media, and we are still learning how to separate wheat from chaff, etc. Once new norms arise regarding these issues, the online/digital world will be much more civilized and hospitable."

Valerie Bock, principal at VCB Consulting, wrote, "I hope that by 2035 we will have become sufficiently familiar with online meeting spaces that a rich set of cultural norms will have replaced the 'anything goes' craziness which started with the advent of large scale online anonymity and pseudonymity. Children will have been taught that the other person in a digitally mediated conversation is just as human, with feelings just as deep, as the kids they talk to on the playground. (Except, of course, in those cases where they are speaking with a robot. I'd like to see

cultural norms developed around those conversations as well, involving 1) the preservation of a respectful tone, just to keep those muscles in good shape and 2) some sort of intermittent reminder, akin to the beep on a recorded line, that one's interlocutor is not actually human.) We will be mostly known by our real names and/or persistent, traceable pseudonyms in our digital conversations in quality venues, and hence will be less likely to spew angry words into what is no longer a void but is, instead, a valued, shared space where a welcoming, patient, kind tone of expression is expected. More of us will have had long-term practice in developing such a conversational tone, even in writing, and more will be aware of the common pitfalls where voice tone is missing – hence less likely to use sarcasm without explicitly making it clear that that is what we are doing."

Stephan G. Humer, Fresenius University of Applied Sciences in Berlin, said, "Despite all the difficulties, the trend of digitization is a positive one, because people want the continuous improvement of their lives and digitization can help them do that, just as industrialization did before. There will be a better digital culture, a more diverse internet and a broader usage of digitization. We will see more socio-technical knowledge and more holistic designs in digital technology. The internet will be more interweaved with our lives, there will be fewer gaps where digitization hasn't been thought about at least once and there will be better solutions for a better life."

Deanna Zandt, media technologist and author of "Share This: How You Will Change the World with Social Networking," said, "I wrote a book about this back in 2010. While I didn't foresee Russian troll farms and how many people were willing to attach their names to their abusive behavior, I still see a future where our digital tools create meaningful collective participation and the ability to hold power accountable. I still believe we create empathy when we share our stories. How could we improve one aspect of making that happen? I think we need to focus on digital literacy and understanding the impact of what we do online. I suspect Gen Z and even younger folks already understand much more than folks my age. When I used to teach workshops and give talks explaining how the neuroscience of digital interaction works, people were always sort of dumbfounded. Teaching and training each other in intentional ways should be part of a larger media literacy/criticism effort, and rather than demonizing the tools themselves as hopeless, we can and should learn and have agency over what we choose to do with them."

Howard Rheingold, a pioneering sociologist who was one of the first to explore the early diffusion and impact of the internet, wrote, "Between now and 2035, more and more people become more and more disillusioned by Facebook, and new regulations by governments around the world begin to enable people to port their friendship networks to other online venues. The widespread use of synchronous and asynchronous media and educational dissemination of

knowledge of how to use these free media then leads to a kind of renaissance of mass-creatorship, similar to the way the web originally grew."

Dan Caprio, founder and CEO of The Providence Group, a privacy and security firm based in Washington, DC, said, "I hope the golden rule will be back in vogue in 2035."

3. Constructing effective communities

A significant number of these experts outlined their dreams about the kinds of internet-enabled communities that could emerge by 2035. Among the traits they seek in those online spaces: activities that diminish social inequalities; groups in which participants' main focus is on collecting, organizing, publishing and archiving useful, reality-based knowledge; healthy debates that create trusted centers of knowledge; discourse in which evidence prevails over arguments that come from those with status and emotionally-compelling material; contributions from AI and machines complement and smarten up the contributions of humans; clampdowns on antisocial behavior that suppresses people's interest in contributing; and a global culture of lifelong education built around people supporting each other's growth.

Melissa Sassi, the Global Head of IBM Hyper Protect Accelerator, commented, "In 2035 I see a world where underserved and underrepresented communities have a greater role in creating, making and doing in both the tech entrepreneurship space and computer science in general. This will result in a more people-centered internet that is truly for the people, with the people, and by the people, implementing the true vision of Vint Cerf – the father of the Internet. I see tech playing a role in each and every industry and in all aspects of our lives. This will be a world in which people are trained, skilled and ready to make meaningful use of the internet to drive economic, educational, health care and agricultural outcomes. Many problems could be diminished, including alleviating the need for tactical, operational and repeatable tasks that could be handled by artificial intelligence. E-government services could replace time-consuming manual and repeatable tasks that lack accountability, transparency and ease. Blockchain and digital assets could alleviate challenges associated with inflation relating to faulty monetary policies and/or federal banking institutions. The world could be connected to the internet and have the access, skills and utilization of tech necessary to drive the aforementioned outcomes.

- I see a world where there's greater diversity and inclusion in tech, including the builders and the users.
- I see a world where people transition from solely being users of technology into people who create, make and do, empowered by technology and the skills that go along with such empowerment.
- I see an informed society when it comes to rights, civic duty, volunteerism, collaboration, communication and leveraging tech to inspire and empower others.
- I see a world where people understand healthy online habits; this may include attention to emotional intelligence, screen time, addiction and elements that could be seen as unsavory.
- I see a world where organizations at all levels, both public and private, put greater effort into data protection, privacy and security that eradicate ransomware and other

information-security breaches from nefarious characters looking to exploit vulnerable people, systems, policies and technology.
- This is a world in which companies begin to manage data-protection, privacy and security through technological solutions and rely less on training and policy writing alone."

Stephen Downes, an expert with the Digital Technologies Research Centre of the National Research Council of Canada, wrote, "In a nutshell: I hope to see communities that are supportive and not toxic. To be clear: This is a *really* high bar, and a lot of things have to fall into place for this to happen. There has to be an increase in productivity through automation, there has to be some measure of a more equitable distribution of wealth and there has to be social resistance to the politics of fear and division. Let me be clear that I do *not* think this is achieved by the creation of community through segregation. That has never worked. If we simply separate people into distinct interest groups, whether they're based on language, religion, culture, favourite TV show, etc., we do not eliminate toxicity, because, first, these groups clash with each other, and second, because factions inside the segregated groups begin to develop and clash with each other. So, I do not foresee a segregated digital environment in the future. If we go in that direction then we have failed utterly to create something that is 'new and improved.'

"What I would envision is a 'community of communities' model, where there is an easy and fluid transition from one community to another, where a person can maintain membership in multiple communities, where communities are dynamic, self-organizing and self-forming, and where these communities are characterized not by barriers between 'inside and outside' but rather by the active connections and interactions between members (thus it becomes impossible for an outsider to disrupt a community, because there isn't a 'space' they can invade, but it becomes easy for members to come and go, because membership requires nothing more than interaction).

"Such a community is more like a circle of friends than it is a place, though the circle might habitually meet in a certain place. But what makes the circle work is that the members can build a community directly and select a new place if the old place isn't working for them, or to arrange the timing of their gatherings so people can't simply interrupt them, though the circle meets publicly enough, in an open place, so as to allow for serendipity and fluidity of interaction. This works only if there is more than one place they can meet, only if there's a variety of different settings with different affordances, so they could meet at a cafe, a gym, a bar, a swap meet, a hockey game – whatever suits their interests and affinities.

"In this network of digital circles of friends, people are not limited to talking and physical activities; they can play games, co-author documents, make movies, whatever. One of the attractions of TikTok is the way it has made these sorts of interactions (through, for example, the 'duet') seamless and intuitive. And in the 'new and improved' digital realm of 2035, these

interactions and their outcomes create genuine benefits and impact; communities cooperating together can generate flows of resources to create social infrastructure, and their deliberations feed into, and become a part of, community decision making.

“Many years ago, when I was first hired at my current employer, I used my inaugural lecture to pitch a concept of what I called a 'budget simulator' to capture this idea. To be sure, I was young and idealistic at the time, and thought it could really be implemented within my tenure. The idea was that people could join and each would get their own personal budget simulator where they could plan out the federal government budget: what would be taxed or collected, how much, where the money would be spent, and on what priorities. It's the sort of thing that could start as a simple spreadsheet but become much more detailed as more people became interested and as people's interests narrowed. The community part occurs where people contribute on given line items, given priorities, wherever. People can exchange ideas, argue with each other, negotiate, etc. They can draw on a sea of resources from economists, universities, Statistics Canada, and in these communities they can offer justifications or explanations for their particular decisions.

“There are no 'set' communities, but rather, a fluid mechanism to create a circle around a topic (not through some formal process, the way Google+ set it up, but by simply informally interacting with each other). Obviously, people could influence each other, but there would be no way to influence everybody. An idea, to be successful, would have to pass through from context to context on its own. And, ultimately, each person would manage their own budget simulation, to whatever degree of detail they felt comfortable with. It's not a 'vote' – it's just an expression of preferences. It wouldn't be a vote because there's no real way to vote on budgets when there are so many different versions of the same thing. Each factor has an impact on the other; what revenues are collected directly impact what is spent, and different methods of collecting and spending impact what can be collected and spent, and so on. That's why federal budgets are hundreds, maybe thousands, of pages long. But somewhere in there, there is a consensus – a way of expressing what would make the most people the most happy (or maybe there are several ways of doing this) and these consensus can be better and better known, and over time – even without a formal process – it becomes difficult to justify actually managing the federal budget in a way that varies from the consensus, and thus the budget simulator effectively becomes the decision-making body for the budget.

“Now this is probably in the far future, but maybe by 2035 we have the framework of such a system; we have the self-organizing decentralized communities, and we have personal tools like a budget simulation engine, and we have moved away from centralized social networks.

“By 2035 we can see how these systems could become the way we make decisions moving forward, not just on national platforms, but globally, and not just for finances but for laws and social policy

generally. And we are beginning to ask what it would take to make such a system work effectively to reach *good* decisions. And we're talking about education and open access to learning resources plus the ability of each person to be able to envision and work toward social policy that not only helps them but also helps others – what has been called in the past 'enlightened self-interest'."

David J. Krieger, director of the Institute for Communication and Leadership, based in Lucerne, Switzerland, responded, "The fundamental norms and values of a data-driven global network society in which decisions on all levels and in all areas are based on evidence instead of position, intuition, bias and so on are: connectivity, the free flow of information, communication, participation, flexibility and transparency. These values are the norms guiding digital life and practice insofar as they underlie the construction of networks in business, education, health care, science and politics.

"These network norms require new forms of regulation and organization – no longer can there be top-down command and control communication; bottom-up, self-organizing governance frameworks are needed. Government must become *governance*. If we take the example of education, learning analytics will gather and evaluate with AI all data involving a student's learning activities, which include social activities, sport, etc., and will derive the optimal course of studies for this particular student including not only content, but methods, learning path, etc. This personalized educational journey will begin in primary school and proceed throughout the individual's lifetime, including on-the-job training, continuing education and all other learning activities regardless of institution or employer. The data will belong not to the educational institution alone but also to the student who has a say in how the data is used. Schools will be self-organizing networks including students as stakeholders. They will be regulated not by economic or political priorities but by the governance regime established by all the stakeholders following the norms of connectivity, the free flow of information, communication, participation, flexibility and transparency. The state plays only the role of auditor to ensure the governance regime is fair and effective."

David Weinberger, senior researcher at Harvard's Berkman Center for Internet and Society, commented, "One of the most remarkable developments over the past 20 years or so has been the shift to thinking of learning as a public activity. Increasingly, keeping what you learn private looks like selfishness. If you have a question, you might as well ask it in a public place so that others can find the answer. If you know how to do something, you might as well write it up and post it. I hope that we find ways to bind this knowledge together more formally and openly than accessing it via search engines.

"Search engines are great, but – underneath at least – the Google search engine is *their* 'knowledge graph,' a web of knowledge in which each piece is ultimately connected to every other.

It is loosely structured, unlike a database, so everything in it can have as many connections as it needs. Now imagine a knowledge graph that is not owned by any one entity that can easily connect to other centers of knowledge so that it's constantly growing and becoming enriched with more connections. What a glorious resource it could be! It would have to be easy to filter so that groups that want a version free of what they consider to be prejudices could be accessible. And, of course, it would have to have an open license so it can be used as a source without having to request permission. There are bunches of efforts in this direction already. The Underlay project, the WikiData project affiliated with Wikipedia, the fledgling Open Global Mind come to mind. This would be a great project for the world's libraries and librarians to oversee."

Bruce Bimber, a professor of political science and founder of the Center for Information Technology and Society at the University of California-Santa Barbara, suggested, "I'd like to see legislatures and courts realize that 'incitement' works differently online than in physical spaces. It works faster, with global reach. We have to rethink the fact that we now tolerate societies tearing themselves apart online because we are stuck in a 1970s-era conception of speech and communication. I would like to imagine a world online where free speech is understood in a much more nuanced and relevant way. Shouting 'fire' in a crowded theater in the real world is understood to pose a threat and is not protected by free speech principles. The same is true for racial slurs, and 'fighting words.' At this point, shouting 'fire' in online theaters is tolerated and social media companies bear no responsibility for people issuing racial slurs and fighting words inside their business operations."

Deirdre Williams, an independent internet governance consultant, said, "In 2035 my youngest grandchild will be turning 14 and I, if I am still around, will be 88. Because of the familiarity with diversity bred by 'digital life,' both of us will feel happy and relaxed in the world we live in. I will feel perfectly comfortable living inside a White skin in a majority Black-skinned country – in fact almost invariably that is how I feel currently – and she, in her brown skin, will feel at home in a country still predominantly White but where there is nothing unusual about 'looking different' because the difference is no longer marked as being of significance. Both of us are female, but this will be neither an asset nor a liability. There will no longer be a distinction between her 'developed' birth country and my 'developing' country of residence. The philosophy and the language will have changed. Variations on the term 'developed' will have become old-fashioned, will almost have been forgotten. The world will have learned to accept difference as normal.

"There will no longer be bullying attempts by some countries to force all countries to emulate them. The mindset will have changed toward tolerance, sharing, collaboration. There will continue to be disruptive (in the old-fashioned sense) elements, but these will be smothered by peaceful peer pressure. The global population will be settling into a phase of collaboration, facilitated by

'digital life,' while at the same time celebrating the specialties, the individual differences between people and people. This will all happen because of the propinquity enabled by 'digital life.'"

Eugene H. Spafford, leading computer security expert and professor of computer science at Purdue University, responded, "I see the possibility for community service hubs. These would be digital points similar to the ways in which citizens can telephone the numbers 211 or 411 or 911 in the United States and get a seamless connection to community and government services. Hubs could allow anyone in need of health care, education, social services, child care, civil information or simply someone to chat with to connect to useful information. A combination of AI and in-person response would result in connection to an appropriate point of contact – or actual delivery – for the service. What we do now with web searches, back-and-forth email and phone calls would instead be an integrated service. People would only need to know one address to contact for services."

Deana Rohlinger, professor of sociology at Florida State University focused on media, digital participation and politics, said, "If I throw out a lot of contemporary knowledge regarding political behavior online – not to mention digital inequity – and try to think about a shift that is possible (although it will probably not be widespread), my vignette would go something like this:

> "It is a typical morning for Fatima. She took her morning run, showered and is ready for coffee and the news of the day. She instructs her smart home, Victor, to display the morning news and different groupings of topics appear on the screen. She asks for a closer look at the headlines related to local politics. She notices that county officials are talking about raising taxes again for local schools and she wants to know more. She asks Victor to give her a summary of the proposal and the superintendent of schools pops up on the screen and briefly outlines schools' needs, the average cost of the tax hike per household and a timeline for spending. Fatima then asks Victor to open the link providing her an economic summary of current school spending in the county. A series of visuals with a voice-over gives her a picture of school spending in the county for the last 15 years, including a comparison to demographically and economically similar districts in the state. Finally, she instructs Victor to take her to the live community chat on this topic. She wants to hear what others are saying.
>
> "A gallery pops up and she can see, among others, her friend Gina in her kitchen. Gina's kids are getting their lunches ready for school as Gina tells listeners about her limited support for the tax increase. She says that her children's school simply needs a tech upgrade. Another parent whose children go to the same school chimes in that the science labs could really use some new equipment. Fatima listens to the debate over school until the community discussion ends at its designated time. The automated moderator signals

that a summary of the conversation will be sent to the district and schools mentioned. Fatima decides she will vote for the increase."

Paul Jones, emeritus professor of information science at University of North Carolina-Chapel Hill, offered this scenario: "She is not as she appears to be, but then no one is these days. Everyone changes themselves in various ways almost daily. Yet – somewhere beyond the physical, visual and tactical modifications chosen – each of us keeps something of the original. What we see and hear and feel now is more than a projection. Something nearly solid carrying with it (her in this case) even the illusion of a subtle scent. The Presence Module is by now very sophisticated, making virtual and augmented realities of 15 years ago seem like 8-bit graphics must have looked to her parents. These were retro-amusements but not something that could compare to the way we do things now.

"We can't be sure where she is in the world, in her other physical being, the one that requires various bio-up-keepings – things like sleep and food and the like. How she appears now may have even been recorded ahead of this meeting, not just for playback but for interactions, for a multitude of possibilities of actions and reactions. There are rules, of course, but who really follows those? They change from country to country in any case. But the norms are fairly simple and mostly followed. And each Apparition, as they are called, has to be linked to a fleshy mate, however tangential the resemblance. One-to-one. Or so say the laws. That everyone agrees upon, at least socially and legally. Yet like the legendary sailors and traveling salesmen, some perform several different lives at the same time or almost the same time, visiting virtual port after port to cavort and work out con games.

"She seems well-prepared, not just in having the facts – those are simple to come by – nor in arguments – those, too, come easily thanks to templates, but with the ease in which our meeting is conducted. She listens, or so it seems. Of course, she has access to our body states. She knows who is zoning out or alert. Or, so she thinks. So much of that can be handled by our own Apparitions who, while not completely autonomous, have a couple of tricks of our own unique to us."

Perry Hewitt, chief marketing officer at data.org, a platform for partnerships to build the field of data science for social impact, commented, "If I could envision one area with a new and improved digital experience, I am hopeful for education. Ideally, U.S. universities will become less selective and more expansive in their missions, developing collaborations and technologies that can reach more students with core content and partner for in-person local delivery and engagement. At the same time, the definition of a 'student' in higher education must change from our mental model of 18- to 22-year-olds on a physical campus. Even today, that's a minority of undergraduates. As jobs require more-sophisticated use of technology (and the critical thinking, humanist concerns needed

for ethical deployment), by 2035 there should be an ingrained path for lifelong learning. Digital educational spaces must provide:

- Effective content delivery;
- Online/offline learning opportunities;
- Peer community engagement in safe spaces;
- Meaningful evaluation; and
- A self-learning capability where learning gains and challenges improve the model."

Calton Pu, professor of computer science, software chair and co-director of the Center for Experimental Research Systems at Georgia Tech, wrote, "A vision for a 'new and improved' digital realm of 2035 would be an information civilization where most people can easily see and understand factual information through improved digital spaces. The distinction of facts from opinions would help reduce the propagation of misinformation and disinformation. This fundamental change will improve our physical and mental health, as well as bring social, economic and political benefits.

"Of course, people will be entitled to their own opinions, but they should know when their opinions conflict with the facts (e.g., a flat world and vaccine hesitancy). One of the important reasons for the success of information civilization is the adoption of factual information as building blocks. Facts make good foundations on which to build; they do not crumble easily.

"We are at the dawn of information civilization. Although it seems impossible to imagine a life without digital spaces, the internet was created only about 50 years ago. The benefits of digital life have only begun, primarily on the physical dimensions, e.g., the same logistics infrastructure that helped us live through the pandemic. Deep inside, most humans remain unaware of the fundamental distinction between factual information and misinformation. They think everything is just a matter of opinion and each person is entitled to his/her/their own opinions.

"This 'barbaric' view that downgrades factual information to be deemed lesser than opinions is clearly visible in the difficulties of convincing a higher percentage of people to take COVID-19 vaccines. The facts are very clear: 1) The vaccines are very effective, including against the more infectious new variants; 2) Very rarely do they have serious side effects, if any; and 3) They are needed for achieving herd immunity and to stop the next generation of new variants from arising. Despite these well-known and well-publicized facts, there are more vaccines in the U.S. than people who want to take them, even as the pandemic rages and grows around the world. The vaccine hesitancy is a concrete instance of a question sometimes asked in the media: 'How do we convince people to believe in science?' That apparently innocuous question misses the whole point of science and the distinction of facts versus opinions. By definition, scientific skepticism would

not 'believe' in science, which is built on facts. There are very few benefits to have people 'believe in science,' which would be an opinion easily changed."

Daniel Castro, director of the Center for Data Innovation, wrote, "I expect education technology that delivers personalized learning experiences. Classrooms today are outdated, and Zoom has only helped parents firsthand see the challenges with synchronous learning models. A massive investment in ed tech could help transform the U.S. education system. By 2035, social media platforms will give users more choice. This will give people more control over their data, and also how they interact with others. For example, more choice over what is shown in their timelines or what appears in their recommendations. More choice over whether to see only vetted news sources or whether to see labels about the veracity of content. Better connectivity will also transform physical space, leading to more augmented and virtual reality. The same debates we have today about social media will map onto these virtual spaces. And email will be dead."

Evan Selinger, a professor of philosophy at Rochester Institute of Technology, wrote, "By 2035, I'd like to see a new and improved way of approaching local social networking. I'd like to imagine that new techno-social arrangements will be created with better local governance mechanisms; perhaps they can bring about needed reform that's harder to institute at scale. With local newspapers withering away and specialized groups on the leading social media platforms having the burden of depending on companies with checkered histories, services like the one Nextdoor provides initially seemed promising, on paper at least. But the reality, as critics contend, is that public interest communication on services like Nextdoor all too often is subverted through the amplification of racial and class prejudices, the spread of dangerous misinformation, a spirit of meanness and pettiness and other damning problems. In other words, the toxic features of large-scale social media appear to be replicated in the local varieties."

Eileen Rudden, co-founder of LearnLaunch, responded, "By 2035, we will have a better perspective on the value of in-person and virtual experiences and interactions. The pandemic has accelerated this trend by forcing people to try more digital experiences than they might have in the past. Digital education will be much more prevalent and accepted in 2035, especially in college, graduate school and corporate training. This will result in more access to education for those who are working and with families. More universities will adopt the online student support innovations of South New Hampshire University, Western Governors University and Arizona State University. At the high school level, students will have broader access to courses not offered in person at their school, again leading to broader access. Relationships between teachers and students and among students themselves will continue to be of primary importance, and in-person education will be considered the gold standard for relationship building, even as relationships are supported online."

Theresa Pardo, senior fellow at the Center for Technology in Government at University at Albany-SUNY, commented, "A new and improved digital realm would be one in which we are able to identify and eliminate the sources of structural racism, in particular those that result in minority health disparities. In this new and improved digital realm, data is collected, managed and used in ways that help ensure we have a full understanding of structural discrimination of all kinds and that we use that data, along with expert knowledge and community engagement, to create continuous processes of evaluation and refinement of relevant policies and programs to ensure that disparities of all kinds are identified, understood at their source and then eliminated so we can achieve health and social equity. Our research has shown that race and ethnicity data is often not collected by health care providers, in many cases, at all, and when collected, it is often not usable across county systems, throughout a state and at the national level."

John L. King, a professor at the University of Michigan School of Information Science, observed, "The biggest change could come from giving those who have little or no 'voice' fuller access to the public square. These people have mental and/or physical reasons they can't participate at present. By 2035 it will become more possible to dial-in the means to incorporate them without doing violence to them. The rest of us will confront a more pluralistic world than we've known, but this seems to go in the right direction. I'm specifically looking forward to the growth of assistive technologies that will help people avoid being shut out of liberating activities as readily as they have been in the present and past."

Ray Schroeder, senior fellow at the University Professional and Continuing Education Association, commented, "We are at the tipping point at which we can see a majority of learners engaging online. The flexibility and personification of learning online using AI technologies will change the way that we teach and learn. Already, we are seeing a growing community of adult learners who are seeking upskilling, reskilling and career-changing credentials in online programs. Already, Coursera and other massive online programs are thriving. They are turning real profits. As such, their field will grow and grow. Surveys of workers show that they seek professional development. As we move into the Fourth Industrial Revolution, we will see expanded online learning and development. It will be increasingly self-paced and adaptive."

Chris Labash, associate teaching professor of information systems management at Carnegie Mellon, said, "I would love to see a digital space devoted to intellectual exploration of considering the prevailing point(s) of view with alternative ones. Universal basic income is an example. The prevailing point of view here in the U.S. was (before COVID-19, at any rate) that it was not affordable and it was unattainable, unfair, unsustainable, rewarded laziness and violated our Puritan work ethic. Research (and now experience) shows that's just not true. Perhaps by engaging in a wider consideration of all the facets of an idea, we can challenge our own biases and come to a

more thoughtful and balanced understanding of ideas, and so engage in more intelligent dialog around them."

A Chinese social media researcher wrote, "There could be some innovative technologies that help individuals to team up in peer-to-peer ways to generate a higher level of intelligence or social consciousness to help information getting into order in a way that will not torture or confuse the common public, especially the young generations."

A North American research scientist commented, "We will be working in a virtual 3D space that will give people around the world access each other. This will broaden our understanding of our role in the world; we will become more understanding of different groups and races."

Ian O'Byrne, an assistant professor of Literacy Education at the College of Charleston, said, "Our digital futures will be fluid, deictic, and ambiguous in nature. New as-yet undeveloped literacies, technologies, and practices will soon take root. This requires a continual re-examination of the knowledge, skills and dispositions utilized as we read and write the web. We need our schools to create cognitively flexible individuals that are nimble enough to handle any digital contexts while being empowered to create new possibilities."

Karl M. van Meter, research sociologist and director of the Bulletin of Sociological Methodology, wrote, "Of course, better education and better information exchange for all people is necessary to improve global well-being, and by 2035 the two together will greatly improve the contribution of the internet to society in general and, at the same time, damper the deleterious aspects of the internet."

Stephen Abram, principal at Lighthouse Consulting, predicted, "Once the issue of systemic bias in 'big data' is addressed we will see some massive improvements in discovery of 'new' ways of viewing things. For example, moving beyond the Western and White bias in genomic data, we have opportunities to understand disease and consumer health at a plateau heretofore never really mined. On the political front, it might be beyond 2035 that we can hope for diverse points of view to be able to be seen in social data – rather than the U.S.-centric bipolarization in thought to one informed by many communities' experiences."

Thornton May, futurist and co-founder of the Digital Value Institute, noted, "With everyone and just about everything online, the 'cost of knowledge' has never been lower. Thomas Jefferson almost bankrupted himself buying books. In 2035, access to knowledge will be free or negative cost (i.e., philanthropic institutions will pay people to remove ignorance in critical areas). With so many folks on the 'past middle age' stage of the demographic curve, there is a huge body of knowledge that can be tapped. I envision significant improvements in the digital ability of

someone to raise their hand and ask for help. Think a knowledge version of Go Fund Me pages. The dark side of digital is misinformation and the ability of personal-agenda-obsessed 'fringers' to slow legitimate knowledge accumulation.

"Many individuals currently ages 18 to 34 have never really experienced great leadership and benefited from the tutelage of exceptional teachers/professors. Think of transitioning the nation's 'nursing homes' into skill accelerators/mentoring spots for younger people (instead of the 'places people go to die'). Could we tap the collective genius of the just-now-retiring extraordinary leaders/teachers and use it to assist the next generation?"

Scott G.K. MacLeod, an associate professor of educational leadership at the University of Colorado-Denver, said, "There are many ways to imagine a better world online, many of which are already in the process of development, including a free, universal education offered by organizations like the World University and School (WUaS), which envisions free universal education through people-to-people wiki teaching, and MIT's well-known OpenCourseWare. In addition, universal basic income (UBI) programs and experiments are emerging globally in a quest to help end poverty. Health promotion is also becoming more widespread, as more programs than ever are now connecting professional medical and mental health services to those with no such resources in their communities or no ability to attain such services in person.

"The following initiatives may have a big impact as they develop further: 1) A realistic virtual Earth, a mirror world for everything – and especially actual-virtual, physical-digital developments and conversation. 2) A single, open cryptocurrency backed by most of 200 countries' central banks, such as the Pi public-access digital currency network, could help end poverty in concert with other positive economic developments such as universal basic income experiments with each person receiving a Wikidata PIN number for distribution questions as well as a device for accessing this. 3) The World University and School – like MIT's advanced Open Courseware in its four languages and Wikipedia in its 300 languages – but in each of 200 countries and in the 7,139 known living languages; a free online university offering high school, college-level and graduate school degrees."

Rajnesh Singh, chair at Asia Pacific Regional Internet Governance Forum, commented, "A 'new and improved digital realm' will only come into being when 'the last girl in the last village' is connected online and she is able to participate in the digital realm in a safe, secure and empowering manner. Reflecting on where things are at right now, it should be obvious that we have a very long way to go."

A professor based in Australia responded, “The internet is thoroughly owned by and operated out of the first world. The first world has a standard of living that has been obtained through the relentless exploitation of underdeveloped nations. Now is the time for things to change. It would be amazing to use a peak product of the developed world to redress the disadvantages suffered in developing nations. There are one-to-many tutoring systems like Khan Academy, but many forms of technical knowledge and skilling can only really be successful if enacted through more personalized and direct one-to-one training that may emerge through advances in VR and AR by 2035. Mixing this with an Uber model would be very interesting. I would love to be able to mentor/tutor individuals in the third world, but since I know my health would be challenged greatly by living conditions there, I would have to do so via the internet. It would be a true marvel.”

4. Empowering individuals

A share of these expert respondents argued that a better digital sphere would empower individuals, granting them privacy and control over their data and improving their interactions with and access to government and health services, businesses and other entities. They also seek a world where the decisions people make about what information and which people to trust are enabled by newer kinds of tech tools like blockchain; localized mesh networks; digital passports; virtual and augmented reality; digital "credit unions" that facilitate online interactions; supportive AI and bots; privacy "nutrition labels" for online activities; encryption; data cooperatives; new kinds of customized filtering that will enable personalized health care and learning opportunities; algorithmic health care diagnoses; simple language translation interfaces and digital twins of humans that could help them be more productive.

They also hope different kinds of groups can be brought into being, including citizen juries to bring collective insights to legislative and rule-making processes – and even, eventually, make their own decisions outside of formal government processes.

Toby Shulruff, senior technology safety specialist at the National Network to End Domestic Violence, wrote, "In 2035, digital life will be even more deeply interwoven in people's lives; the online experience will not intrude on the moment in physical space or social time. As I walk through a park, I will be able to note available traces of those who passed that way before, maybe even glimpses of their (freely shared) stories. I will also be able to connect my present moment experience to other data about the weather, the prevalence of songbirds, the seasonal blooming of flowers and the position of my specific location above the inner movements of the Earth and also see it extend relative the stars above. I will have available to me at any time meaningful, context-rich information, but I will not have it thrust upon me by notification dings, advertisements or nudges toward purchases or political leanings. Mostly, I will not be distracted by the technology, the information. I will be able to be present with those around me, if I choose, and also with the environment around me. In the moments I am online I will be able to choose how I am seen and experienced. No one will have more information about me than I myself have, no one will use data or my presence in a space to coerce me into a course of action they prefer. I can create, share and engage with other people."

Mark Surman, executive director of the Mozilla Foundation, a leading advocate for trustworthy AI, digital privacy and the open internet, predicted, "By 2035, most of us will belong to a new kind of bank, trust or credit union, one that holds our data and represents our interests with the companies and government agencies we interact with online. Legally, this new kind of trust would be sworn to put our interests first. Practically, it may not only hold our data but also offer us 'personal AI' that can negotiate and manage automated decisions on our behalf. It could sort

through obvious problems like scams and misinformation. And it could go much further in figuring out which products and services most match our desires and our interests, moving our data around and allowing it to be used/not used with the same power and grace that corporate AIs use our data against us today."

The co-founder of a global association for digital analytics commented, "By 2035 cloud computing will have ceased to exist, replaced by low-level personal servers and mesh networking. Online surveillance and profiling will be replaced by individuals' personal control of their own data, accessible to companies only through mediated broker services in which the consumer is paid directly for access to their personal profile. There will be widespread use of small-scale AI that is directly owned by and serves each individual to provide a defensive net around their data and personal control of social/civic services. Politicians will no longer vote to determine laws – there will be direct citizen voting on all laws via secure digital services (not that I think this ideal is likely to occur)."

William L. Schrader, board member and advisor to CEOs and previous co-founder of PSINet Inc., said, "Due to climate pressure, money pressure, virus pressure, etc., this evolution will not occur by 2035. We need better encryption globally that can be accessed on people's platforms of choice by any individual who chooses to share their beliefs. If any of you still have hope, then wish for the educated to continue to educate their families, share their thoughts, exchange ideas peacefully and not filled with hate, and visit the world. Digital space will remain ungovernable. But *nothing* can stop the encryption teams around the world from building and deploying untouchable and unreadable digital spaces. *Nothing*. People will find a way to communicate, privately, with those with whom they wish to share ideas, no matter what any government wants."

Micah Altman, an MIT-based researcher in social science and informatics, observed, "Today's digital world, however marvelous, is daunting to even the most technologically sophisticated. I imagine a world in which individuals have agency over and visibility into the information collected from them or about them; automated decisions and algorithms are more transparent and explainable, and digital platforms are more accountable to the societies in which they function. Imagine if every 'app' came with a privacy 'nutrition' label showing, in a straightforward way, what information was shared, and with whom; where you could obtain a meaningful explanation for any algorithmic decision that affected you."

Alexander B. Howard, director of the Digital Democracy Project, predicted, "In 2035, I'll be able to renew my passport at the State Department or my driver's license online using a virtual call with a staffer, a faceprint, and a physical token to confirm my identity, instead of facing a months-long backlog and a physical trip to an office. In 2035, I'll be able to securely access and update my medical records using my health band from wherever I am, without blocking and formatting

issues, and choose personalized genomic therapies which mitigate the risks of diseases from environmental pollution or genetic predisposition. My vital signs will be monitored by sensors in my health band that a doctor can review but will be inaccessible to the insurers which wish to raise my premiums after a historic data protection law that banned dynamic pricing in health care in the crude ways that car insurers once did using remote monitoring of vehicles in 2021."

A military leader specializing in understanding the impact of social information systems wrote, "In a democratic and free society, I can imagine a digital public sphere in which each of us possesses a certified/verified online identity whose metadata and data we control fully. Fake/alternate identities will be available, but they will be clearly marked as such and we will understand that whoever is using a fake/alt-ID is doing so for particular reasons. There will still be the ability to fake this new 'Real ID' of course, but it will be rare enough, and difficult enough that it will take a great deal of effort, time and money to do so. This will not necessarily be a good for refugees, because immigration will now involve being issued a Real ID, but so long as we don't tie such ID to all forms of commerce, it might be tolerable. Such an infrastructure can only exist, of course, in a benevolent state with no interest in controlling its citizens. In such a scenario, we might escape some of the weirder/wilder problems of people saying things in the digital public sphere, but, honestly, the people shouting the loudest right now are real, identifiable people, and we can't know if they actually mean the crazy stuff they say or if they are saying it for attention, power, money or due to some other motivation. This scenario won't solve problems arising from the actions of such individuals, but it might tamp down the swirl of misinformation created by adversarial state and nonstate actors. As a folklorist, I don't think misinformation is going to go away in such a scenario, because misinformation did just fine before any kind of digital public sphere, and it will continue to do just fine within one, but we might be able to return to something more like a pre-internet moment, in which we were not all seized by the latest bit of misinformation. To be clear, the 'pre-internet moment' was a historical oddity in which mass media dominated the American, and many other, information landscapes."

Carolyn J. Heinrich, professor of public policy, education and economics at Vanderbilt University, said, "The practices across states are widely varying, with some exceptionally good and exceptionally bad. We could use this kind of information to make significant improvements across all states (e.g., identify best models nationally and share information on how to implement them). By 2035 we could look across states and localities to determine best practices/approaches to helping people get the information they need and access to services and resources. This could be done across a range of areas, e.g., access to public health insurance, school registration and so forth. For example, we are doing a study now to look at how people access information about the COVID-19 vaccines and get vaccinated."

Christina J. Colclough, founder of the Why Not Lab, wrote, "I believe in a world where collective data rights have paved the way to the formation of data stewardship institutions. For workers, these 'worker data collectives' can act as a way to break the monopolisation of truth created by vast power asymmetries between those who hold data and those who don't. For citizens many such stewardship arrangements can coexist, allowing citizens to pool their data into institutions that they chose. This all requires new governance structures and new enforcement, monitoring arrangements."

Adam Nelson, software development manager at Amazon, said, "I would hope to see extra-national jurisdictions where information rights are protected without concern about where people are physically, nor through which jurisdictions the data flows to create digital spaces that connect us. The Westphalian system is propagating itself online and it requires constant pressure to keep it from consuming all of the available space."

Andrew Wyckoff, director of the OECD's Directorate for Science, Technology and Innovation, commented, "I'd like to see ubiquitous computing (the Internet of Things) augmented by edge computing and next-generation AI that results in data flows being overwhelmingly local as process and feedback occurs at the data source or in near proximity. This change will recast the debate over data flows as the bulk of data will not be personal but will be engineering data, and its localised state will return control of data to a micro level of individual people and businesses. The torrents of data will be analysed with homomorphic encryption that will preserve privacy and thwart surveillance while enabling system optimisation that will drastically reduce the environmental impact of humans, save lives and strengthen democracy at a very local level."

Brock Hinzmann, co-chair of the Millennium Project's Silicon Valley group and a 40-year veteran of SRI International, said, "Imagine a world in which we are able to see and feel the 'emotional' state of our social and natural environments just as we see the state of weather and road traffic today. City governments would be able to see and measure progress in the public's satisfaction with government services, in environmental change, in sense of well-being and so forth in real time. Machines, animals and humans could all understand each other's beliefs, desires and intentions more clearly than they can today, avoiding so much miscommunication of same."

Liz Rykert, retired president and founder of Meta Strategies, noted, "There could be a universal digital passport that would track a person's preferences about digital privacy, include their citizenship and vaccination status and be accessible to whomever they want to share it with."

Peter Suber, director of the office for scholarly communications at Harvard University, commented, "I'd like to see decentralized social media that allow people to post, share and read

messages in large online communities without any of us having to sign up for an account with or support large corporations. For this, we need small modular and interoperable social media tools, preferably open-source and following open standards. The platforms are notorious for surveilling us and violating our privacy, yet when we 'volunteer' information about ourselves in an attempt to fine-tune our content streams, they are very slow and ineffective learners. I want tools that are good at learning and that use the resulting information about me only for fine-tuning my stream, and not for any other purpose. I want much better tools to help me see more of what I want to read and less of what I don't want to read. I realize that these tools will have to learn a lot about me. But if they work well, I'd be happy to load them up with personal information about my preferences. … When I choose to act on that information, I'd like tools to help me find bubble-breaking sources that I might have been overlooking (as opposed to boycotting on purpose)."

Rob Reich, associate director of the Human-Centered Artificial Intelligence initiative at Stanford University, said, "We need greater pluralism and decentralization in our digital spaces. I hope that we will champion more-decentralized technical infrastructures and (perhaps through antitrust) aim to create more competition and choice for users rather than a broader political economy and technical infrastructure that creates powerful dynamics for centralization and scaling platforms and products to billions of users."

Kate Carruthers, chief data and insights officer, University of New South Wales-Sydney, wrote, "I would like to see the use of dark patterns outlawed and the digital advertising industry regulated to stop their egregious tracking of individuals. I would like to see governments implement legislation and regulations as code that would enable digital service delivery. I would like to see design thinking and service design underpin all digital services both private and government. I would like to see telehealth be an improved reality with AI/ML detection capabilities. I would like to see education to be a true hybrid model with seamless handoffs between on- and offline with AR and VR as mature technologies that are easy to use. I would like to see seamless connections between online and offline; work from anywhere. Retail could be all online, with online capabilities for perfect fit and measure of clothing and increased ability to buy custom-fitted clothing."

David Eaves, a public policy entrepreneur and expert in information technology and government at Harvard University's Kennedy School of Government, predicted, "More technology will be regulated like utilities, with clear, universal rules so that users are not – for example – wrestling with understanding how their data might or might not be used."

Steven Miller, professor emeritus of information systems at Singapore Management University, said, "I wish that I could make one declaration that I don't want any provider of digital services or spaces to attempt to sell me anything unless I specifically ask for that type of input and across all

the digital places I visit, the clutter of advertising junk disappears. I hope it gets easier for us to manage our plethora of passwords and login credentials, though in a way where digital identity theft becomes near impossible. This would be beneficial to all, and especially so for those who are already ages 60 and older. I hope that the day comes when customer service chatbots can actually answer most of my questions, especially questions that are not the simplest or most common things."

Randall Mayes, instructor at Duke OLLI, futurist and author, predicted, "I envision an advanced version of blockchain or Etherium which will store genomic data and electronic health records, smart contracts and provide micropayments for individuals' data and reduce cybercrime."

An entrepreneur based in the American South commented, "A better world online for me is a world that has an army of protection for its users that is determined by its users. Each platform creator is responsible for what they allow their platforms to become over time. Each platform leader/creator has to solve for questions such as whether or not the platform they have created can be a safe haven for children, people with mental health issues, the elderly and/or others with expressed interest to have more privacy and or visibility into how their data is used. It's a world of inspiration, design, creativity and hope. Each individual has their unique voice in this space and can heard in constructive ways. These platforms enable users the ability to easily navigate their unique digital life experience with fewer concerns. It is a world where individuals can learn more about themselves, if they choose. It is a world where the mind is valued and nurtured, a career or passion can emerge or grow, healing can take place, therapy can be administered, business can flourish, exploration happens and access to resources is abundant. It is a world that allows individuals to filter through some of the harmful digital experiences with more ease."

Meredith P. Goins, a group manager connecting researchers to research and opportunities at U.S. laboratories, wrote, "I hope by 2035 there will be an improved wealth redistribution online in which people are paid by platforms for uses of their likeness, their writing and their personal content instead of the internet billionaires profiting from them. There should be better infrastructure, so all individuals have high-speed access, and internet access should be price-regulated – we shouldn't have to pay $150-plus per month. Platforms should ask individuals if I want to be tracked (my answer is no), they should ask if they can use people's data (my answer is no). People should have a right to maintain their privacy instead of the government and big business taking it away. The internet should be more secure. Cybercrimes are exposing far too many data breaches, and none of our information is secure. Why do we bother putting our data on the internet if others can steal it and use it inappropriately? This isn't the Wild West of the early internet anymore. We have had this tool for over 50 years. Why are we acting like it is new? Firm data-sharing rules and regulations should be made that must be followed by all."

Frank Kaufmann, president of the Twelve Gates Foundation, said, "I expect the improvement in coming years to arise from the social environment in which the digital realm is situated. When digital life, blends and integrates more fully into the infinite sphere of love and purpose found in family life, the 'digital realm' will begin to yield wonders we have not even begun to imagine. Rooted in what social reality does digital life happen?"

Jeff Johnson, longtime Silicon Valley tech veteran now working as a professor of computer science at the University of San Francisco, commented, "See my scenarios from 1996, some of which have been realized and some of which have not: http://cpsr.org/prevsite/publications/newsletters/issues/1994/Fall1994/johnson2.html/."

Politics and governments can be improved by 2035

Many of these experts share the hope that politics and governments will finally get the digital upgrades many have been hoping for and predicting since the early days of the internet.

Beth Simone Noveck, director of the Governance Lab (GovLab) and its MacArthur Research Network on Opening Governance, said, "Fifteen-plus years ago I wrote this potential-future scenario that is yet to be realized: Imagine a world in which, not only are citizen juries mushrooming all across the country to harness the collective imagination to the legislative and rule-making processes, but juries and groups of all kinds increasingly make their own decisions about issues in economic and civic as well as political life.

"In the same way that the State defers to the 'self-regulatory' decisions of associational bodies – such as journalists, physicians and lawyers, or Congress enacts legislation made by the consensual agreement of industry and public interest groups, or federal agencies defer to negotiated rulemaking through technology – it is possible to imagine that groups will have power not only to consult with existing political structures, but also to make their own laws to which the state can defer. For every bill proposed in Congress (or state legislatures, for that matter) and for every regulation proposed on the regulatory agenda of federal agencies, an online citizen jury would be convened to serve for a short period in shepherding the proposal to its resolution.

"This does not necessitate creating a deliberative fourth chamber or a centralized deliberative process but, rather, introducing distributed and decentralized input into political decision making. The elected legislature will continue to make the final decision to ensure that lawmaking does not become so decentralized and fragmented so as to be ad hoc, but a new mechanism of collective accountability will be introduced to give citizens greater input in setting the agenda for lawmaking and produce greater accountability to a wider constituency. In this vision, ordinary people join citizen juries and serve for varying lengths of time depending on the jury to which one is assigned.

Participation is an alternative to traditional jury service. In case requiring participation is not enough incentive to overcome personal impediments, participation might also earn a tax credit or trigger other financial incentives provided by government and industry. Imagine earning bonus points for civic participation.

"It can take place from the courthouse but also from home via the internet or in interstitial spaces, such as bus stops or subways platforms, using networked kiosks to join and visualize the jury, connect with other members, view information about an ongoing proposal and provide feedback: the so-called 'deliberative bus stop.' It is not deliberative in the sense of being a place for talking but, rather, a place for reasoned input via the computer screen. Reasoned input might take the form of working with visual diagrams, directing an avatar or other more efficient but equally critical forms of shaping opinions. The computer kiosk might output, for example, a card (like a subway ticket) that the user could insert with a PIN number to track the progress of an initiative and participate in the life of the group. …

"A small amount of demographic information would be collected from each public participant in order to create groups that are diverse and pluralistic. The staff members and other professionals working on a proposal (i.e., agency officials and congressional staffers) become part of and report to the group. They speak to and are accountable to everyone in the group, which acts as an oversight team. When questions arise, they are put to the group. The group can deliberate in real-time or asynchronously. They can also participate in research, work and drafting, taking advantage of the screen to share assignments effectively. Groups might appoint a reporter or rotate the role of reporter, blogging about the work of the group to a collective policy weblog. Groups might appoint a representative or rotate the role of representative, who collaborates with the other small groups assigned to that proposal. That representative might take the form of an avatar, for example, that is 'played by' different or all members of the group. …

"Currently, lawmakers make proposals too late in the game for input to be meaningful; citizens react viscerally and vociferously without the benefit of adequate information or channels to make a difference in policymaking. Yet politicians and public alike worry about how to exploit the internet to create meaningful public consultation. They worry even more about relinquishing power to the public to make its own decisions, organize its own discussion and build participatory groups of the kind we have seen emerging through such efforts as Meetup and MoveOn. If the state takes groups seriously, policy discussions – whether of congressional bills or agency rulemaking – might take place online, encouraging groups to engage in positive and proactive activities. This can take the form of officially sanctioned citizen consultation exercises organized both online and off. But, in addition, such citizen participation in lawmaking might be the result of decentralized and self-generating action taking place in the blogosphere and in groups of all kinds.

"This is a first step in the transition from consulting the public to engaging the public. There is much to flesh out if we are to develop a system of 'deliberative bus stops' to connect people using the networked screen to groups to create greater political accountability. The details require extensive planning, collective imagination and experimentation. But crucial is the suggestion that we have and will soon have the tools and the widespread access to them to enable people working in groups to participate effectively in governance. However, these socially engineered mechanisms for citizen consultation are not nearly as interesting, complex and potentially worthwhile as the emergent, self-organizing, diverse and fully voluntary groups we also want to promote."

Michael H. Goldhaber, an author, consultant and theoretical physicist who wrote early explorations on the digital attention economy, wrote, "In the U.S., as well as in other countries that have some form of constitution supposedly allowing electoral democracy, the constitutions have not kept up with changes such as globalization, the rapid pace of technological change, intentional manipulation by antidemocratic forces, growing reliance on a technocratic elite, increasingly monopolized corporate hegemony, the state's growing police powers and other problems. In addition to all those, the growth via the internet of what I originally termed 'the attention economy' has furthered a new kind of inequality. Democracy requires that everyone can somehow have a voice in the broad conversation as to what changes should take place. However, the details of many kinds of popular change can be quite hard to decide, since each little detail can lead to different overall outcomes for some fraction of the populace. This demands more involvement than most people might have patience or time for.

"With practically everyone connected via the internet, the solution may be tens or hundreds of thousands of citizen groups each focusing narrowly on one slice of one issue, yet interacting also with other groups dealing with connected concerns. The necessary learning to participate usefully in each group would be developed within the group so that the ones with prior expertise or educational attainment would not dominate over those with less."

Alexander B. Howard, director of the Digital Democracy Project, predicted, "In 2035, I'll be able to sit virtually in the gallery of my city, state and national legislatures in a public metaverse, watching holograms of representatives in meatspace debate with the legislators physically present and participating in drafting bills or oversight hearings in collaborative workspaces that show the impact of proposed changes to codes and regulations, from cost to societal changes."

Daniel S. Schiff, a Ph.D. student at Georgia Tech's School of Public Policy, where he is researching AI and the social implications of technology, shared this scenario, "In 2035, political life online has embraced innovations in digital and participatory democracy, recently coined as 'Democracy 3.0.' Given shifts in life owing to the pandemic of the 2020s, and the expansion of

remote work, governments in the United States have increasingly relied on the digitization of citizen contact and engagement to solicit feedback and drive decision making.

“City councils in both large and small cities now connect regularly with the public via tele-town halls and policymaker Q&As, allowing citizens to directly engage with local political leaders. In state and federal policy, it is now common for thousands of citizens to join monthly meetings to discuss policy issues of the day, engage in participatory budgeting and vote on proposals for city councils and government agencies. Skilled facilitators work with online breakout groups to systematically explore issues, educate participants and gather citizen feedback, and political leaders have started to embrace and promote these developments.

“Through these platforms, citizens also elect Neighborhood Liaisons to represent them in more extensive discussions, aimed at tackling some of the most ‘wicked’ problems where individuals may hold divergent preferences and values. Volunteer moderators from participants' local communities also assist with encouraging constructive dialogue and reaching out to individuals who are flagged by AI systems as engaging in hateful speech or misinformation, a strategy that has found some success.

“These new spaces represent creative public-private hybrids, as governments' tentative use of platforms like SeeClickFix, NextDoor and FixMyStreet in the 2020s has expanded into full-blown partnerships. Now, citizens can indicate their concerns and preferences about local, state and federal policy for issues as small as fixing potholes to as large as submitting concerns about the environmental practices of giant technology companies. Scholars have noted that citizen attitudes about political life, social cohesion and government responsiveness are stronger than they have been for nearly a half century. Nearly 60% of adult citizens are members of these platforms, overwhelmingly using their true identities in their profiles, and non-citizens are also encouraged to participate, at least in some U.S. states. Moreover, federal and state coordinators have established programs to reach out to low-income, minority and vulnerable groups, and the participation gap in Democracy 3.0 platforms has closed considerably in the last four years. Citizens are now ‘bowling together’ again, well, over the internet at least.”

Anna Andreenkova, professor of sociology at an institute for comparative social research, noted, “Direct democracy – voting for issues/solutions rather than delegating decisions to mediators (representatives) – is one great opportunity offered by the digital world. Direct public influence in decisions will require that the public take on more responsibility. A second trend I see as possible is a movement away from people choosing to live in large cities, stopping the seemingly unlimited growth of urbanization. Cities’ roles in serving as community and cultural centers will be more developed. Just as the ancient Greeks did, we will come to our agoras, large public gathering spaces in which we meet, discuss, take a meal together and gain new cultural

experiences. People will also travel in order to change their spaces and stay for a longer time in order to experience differences in life and culture rather than doing quick trips to the well-known tourist attractions highlighted in travel books. And maybe in 20 to 25 years all national borders will be open and barriers such as visas, government permissions and other forms of control over freedom will be forgotten."

Henning Schulzrinne, an Internet Hall of Fame member and former CTO for the Federal Communications Commission, said, "Better support for local communities would be helpful. For example, local communities should be able to easily set up systems to record and index community government meetings, from town councils to school boards to committees, and make it possible for citizen journalists to inform their community. Also, for local (municipal, county, state) candidates, there should be better ways to inform voters of their record and platform."

Thomas Streeter, a professor of media, law, technology and culture at Western University, Ontario, Canada, wrote, "Routine access to legal institutions to resolve disputes, settle contracts, etc., is currently organized in a way that favors the wealthy and those with elite social connections. A legal system could be created that offers itself as a service available to ordinary people, where guidelines and procedures are available via easy-to-understand websites and online forms presented at a sixth-grade reading level, and judges could organize their courtrooms around the schedules of citizens rather than the other way around. Ponderous legal documents such as mortgage contracts that are hundreds of pages long and legislation too long for any legislator to read before voting on it, should become a thing of the past. Trying to digitally automate the law is *not* the way to do this; rather, the goal should be using digital technologies to foster easy access for everyone, from citizens to legal personnel. This is a huge communication problem, not necessarily one for AI to solve."

A principal architect for one of the world's leading technology companies predicted, "2035 could be revolutionary. The pandemic compressed a decade's evolution of communication technology down into a few months in 2020. Before it, streaming media and real-time communications were evolving independently, offering a choice of either large-scale *or* low latency. That changed as the technology distinctions blurred and applications emerged enabling both large-scale and low latency. This manifested itself in massive online courses and interactive meetings with over 100,000 participants as well as online events and streaming/real-time hybrids. The impact of this technology revolution made itself quickly felt. During the 2020 U.S. election season, we saw this technology harnessed by groups such as the Lincoln Project that were able to bring more people together in a single meeting (over 100,000) than the total margin of victory in the battleground states. By 2035 it seems quite likely that we will see interactive meetings with 1 million-plus viewers, turning 'interactive podcasting' into a viable alternative to today's news media. In addition to the positives of this there are, of course, potential downsides – mass rallies

will become much less expensive to put on and allow demagogues to get their messages out more easily."

Amali De Silva-Mitchell, futurist and founder/coordinator of the Internet Goverance Forum's Dynamic Coalition on Data-Driven Health Technologies, said, "In a perfect future 2035, there is tremendous opportunity for advances in affordable, universal eHealth and mHealth to support traditional health care service. An ideal would be to have person-specific health service delivery to an ultimate state of perfection. It will include:

1. The use of lasers, holograms, nano technologies and other minimally invasive technologies (causing no pain) to diagnose medical conditions.
2. Pharma care that is patient-specific, affordable and timely in development, to meet cures for new and existing health issues.
3. Wearables and supports that identify and monitor personal health risk.
4. Public health tools that allow for management of public health with no lapse in time.
5. Data collection and use that is unbiased, risk-free, private and secure."

John Lazzaro, retired professor of electrical engineering and computer science, wrote, "By 2035, medical care delivery in home settings will be the norm. A standardized hardware, software and communications platform will be manufactured at scale, and sent to patients as a tool for well-care. Costs will be comparable to mass-market consumer electronic products. Components of the platform will include clinical-grade vital signs monitoring, point-of-care diagnostic kits and a medicine cabinet of the most common generic medications. Each component will be under a digital 'lock-and-key,' dispensed only upon digital orders from a physician. I'm just old enough to remember primary care physicians who made house calls to patients too sick to visit an office. The pandemic led us to revisit the concept of medical care delivered in a home setting, this time via digital technology that was unthinkable in my youth of rotary phones and wringer washing machines. Since the pandemic came with no warning, there was no time to craft hardware and software tools customized to the remote medical care at scale."

Karen Yesinkus, a digital services professional, presented this scenario: "Julie is 5 years old and is visiting on her own with her elderly grandmother, June, while her parents are away. June wears a wristband with her profile, history and health care records digitally recorded, encrypted and available in the event of a health crisis. A pendant around June's neck records vitals and transmits to the wristband to include with her previous digital records. The wristband and pendant both have geo-tracking. Because the band and pendant constantly communicate and analyze incoming data with the digital records, etc., a determination is made if there is an impending condition that will cause a crisis or occurring emergency. Emergency, mental health or other professionals and services are notified based on the analysis. All contacts (POA of records, relatives, etc.) within the

programming of these devices are notified through redundant means to ensure everyone is aware and on same page. In this scenario, if young Julie's grandmother starts suffering the signs of a stroke, she or health care providers may be alerted in order for her to arrive at the hospital 36 hours in advance and be treated successfully. Her father and her mother would be notified via phone, email, text and a universal health care portal that securely transmits voice messages from professionals and doctors, and they can confer with each other. This scenario could be available to all citizens, but government, legislators, physical and mental health professionals, social services and law enforcement must coordinate for these types of best outcomes."

Thomas Lenzo, a consultant and community trainer and volunteer in Pasadena, CA, predicted, "I hope for two improved digital realms. 1) Connected medical tech and records: The low-cost components we have today should be able to communicate with each other and to a central database that individuals control (and share as appropriate), and there should be just one electronic medical record about me. Right now, I have a digital watch, digital scale and a blood pressure cuff. They all track my data and store it on themselves. Meanwhile, my primary care physician, dentist, eye clinic and pharmacy each have their own online databases that I can access, but they cannot share with each other. 2) A universal translator: I'd like one that is lightweight, body-worn, long-life and works in real-time conversations. I have been a volunteer first responder for more than 20 years and I have been in many situations where victims did not speak English. I am in Southern California, where there are 200 different languages."

Courtney C. Radsch, journalist, author and free-expression advocate, said, "In 2035, people who are ill are able to get excellent virtual health care, with all of their information readily accessible and aggregated for the health care. The provider will know if there are prohibitions on using any health or well-being information for any reason other than the voluntary provision of care, with safeguards in place to protect against misuse or data breaches. The digitization and learning made possible by these developments enables new types of treatment and proactive well-being approaches that serve a wide range of communities."

Brooke Foucault Welles, an associate professor of communication studies at Northeastern University, commented, "In my 2035 fantasy, we build on the best of the COVID-19 year of hybrid and geographically-dislocated life to develop thriving hybrid communities where people can be physically and virtually co-present. People are freed from the constraints of physical space, yet they are still able to engage with them as they want. People are able to live where they are most physically, socially and emotionally fulfilled and study or work in the place that best meets their intellectual, financial or career needs. Physical spaces would be rendered more accessible by digital technology, but not rendered obsolete. Indeed, in this alternate-future we might get more diverse social networks and more diverse information ecosystems as work, school, family and friends are not so fully geographically co-dependent. A queer young person from a deeply

conservative town might be able to attend public school in a more affirming district in another state. Or a young couple might be able to raise their kids down the street from grandparents while working for a company headquartered on the other side of the country."

Monica Murero, associate professor and director of the E-Life International Institute at the University of Naples, wrote, "I imagine an improvement in the active techno-participation of seniors – those currently 55 years old – and the rise of technology assisting them with health, administration, house management and social life needs. I also expect to see significant changes in education and more home-centered, digitally-connected humans. I see this process interacting and merging with local (analogical) realities such as meeting people at the local store and in other socialization spaces, especially in online micro-realities (communities) that are more and more connected."

Jessica Fjeld, assistant director of the Cyberlaw Clinic at Harvard's Berkman Klein Center for Internet & Society, said, "I hope that by 2035 there will be regulation of the techniques that are used to drive people's addiction to their devices, so that people will be better able to take advantage of digital technologies while also disconnecting."

Jerome Glenn, co-founder and CEO of The Millennium Project, predicted, "A duplicate cyber version of ourselves that has been generated from future full-body scanning can improve medical diagnosis and allow for the testing of various treatments to determine which is the best for our real, biological bodies. Thousands of tests could be done in a very short time to get the exact, unique treatment. Computer simulations of our bodies seem inevitable."

5. Changing economic life and work

A notable number of the expert respondents made the case that by 2035 advances in the digital public sphere could boost economies and ease the transition to a new world of work. They often mentioned the benefits they expect that better digital spheres might bring to economic development and people's transition into new kinds of work and into old kinds of work that have been transformed by the rise of the internet. The nature of jobs will also change, they believe, because remote work will become a norm, technology will evermore-deeply move into the workplace as aids to (or replacements of) workers and more people will become eligible for more kinds of jobs.

Tammy Katsabian, postdoctoral researcher at the Labor and Work-life program at Harvard Law School, observed, "Just as smart technology has been used to influence other basic distinctions in the workplace that we could have not imagined 50 years ago, 14 years from now the basic logic in the capitalist economy that seem inevitable – owners and products, workers and suppliers – can also be changed. Technology will enable it to be more flexible, communal and collaborative in its nature. In other words, the future utopian workplace will be a type of new innovative collaboration.

"The future utopian workplace will be flexible in its organization and based on multiple connections. It will be less formal. It will resemble a collaborative greenhouse of innovation. In this manner, the capitalist view of traditional hierarchical relationships between employee and employer will be transformed. Furthermore, smart technology will be used differently to challenge the basic employee-employer dynamic. This will enable new and old actors to participate and influence conduct in the workplace in a manner that will benefit workers, customers and society as a whole.

"This reality is not irrefutable. The utopian workplace will be based on two current trends that smart technology has brought to modern life and workplaces. The first is the flexibility and blurred nature of the well-known traditional distinctions in the workplace, and the second is fast and multiple online connections. To understand the potential of this type of revolution, all that is required is to examine the numerous collapses of classical distinctions that smart technology has created so far, as well as the new connections and definitions it has enabled.

"Over the course of the Web 2.0 revolution, information and communication technology (ICT) has already changed our basic concept of working time and space and enabled people to connect to work easily from a distance, communicating with employers, peers and clients in varied time and space. Similarly, the emergence of platform economy and platform-based work has changed the traditional relationships between employee and employer and generated more complex, flexible

and numerous relationships between platform owners, suppliers (whether defined as independent contractors or employees) and numerous clients who can now easily and directly reach a worker through such platforms.

“Big data has also altered work. It has enabled employers to easily enter the private and professional spheres of employees, process all the data therein and gain a relatively accurate image of their private behavior and habits. Because of this, previous basic distinctions between the private and public realms of employees have also blurred.

“Finally, the use of artificial intelligence and robots in the workplace – both as workers and as supervisors of human workers – has challenged the classical understanding of the workplace community, and furthermore, it has created new connections between people and AI.

“Thus far, most of these trends have been used as part of the capitalist system to benefit employers who own technology. However, technology itself is neutral, and the flexibility, blurriness and numerous connections that smart technology creates and enables can be used by workers for the good of society. We just need to get it right.

“In the utopian future, workers and trade unions will have a genuine right to access technology in the workplace context. The importance of equal access to technology is slowly being acknowledged worldwide, as part of the wish to develop digital rights. Alongside this, diverse labor rights have evolved.

“Already in Germany today, trade unions have the right to influence – and in certain cases even veto – the emergence of smart technology in the workplace in cases where it might negatively influence labor rights. This right tends to view technology suspiciously and limit its conduct, thus technology is compelling us to evolve another basic labour right: positive access to technology. This can be used in a manner that will empower the workers’ role in the workplace as well as the participation of other relevant sides, such as clients, human rights organizations and environmental organizations. Furthermore, it can lead to new versions of workplace community and management.

“A platform can, for instance, enable clients not only to directly access workers but also to ‘supervise’ workplace conditions and ensure that suppliers enjoy basic rights, including a decent salary and genuine rest time. Moreover, the ability to use big data in the workplace will be provided to the workers’ representatives, who can use it to acquire knowledge on the general voices and needs of the worker community in the workplace. This knowledge can be used to have a general notion of wage gaps in the workplace, or even in a specific sector that contains several

workplaces, with the different roles and shifts considered. In addition, big data can be used to acquire knowledge on the possible and actual influences of the workplace on the environment.

"ICTs will be used to enable workers to work from a distance, as well as to enable new actors such as trade unions and human rights organizations to participate in the workplace's ongoing conduct. Thus, for instance, ICTs can enable environmental organizations to participate and influence the workplace's outcomes when they may influence environmental issues.

"Finally, the future designs of robots and AI can be programmed to consider the needs of these numerous relevant sides – not only employers' needs but also those of workers, clients, and society as a whole (e.g., women's rights and environmental issues)."

Terri Horton, work futurist at FuturePath, LLC, shared this future scene: "It is 2035, and the unfolding of the future of work is dynamically underway. The workplace and how we work – fundamentally transformed by technology, artificial intelligence and the pandemic of 2020/2021 – is fluid, equitable and inclusive. It is 80% remote and facilitates the integration of work-life harmony for most.

"While most work alongside and are managed by algorithms, there are several opportunities for human collaboration, culture and community-building embedded into the worker experience. A significant amount of work takes place in the metaverse. Holograms transcend hybrid workspaces, meetings, conferences and client events. AI Alexa-style managers driven by a human-centered culture lead with empathy and emotional intelligence, prioritize well-being, performance, growth and development, engage workers and empower them to thrive."

Kenneth A. Grady, a lawyer and consultant working to transform the legal industry, said, "The pandemic has been the cataclysmic event pushing change. Employers and employees have proved that for many jobs, work can be detached from physical location. We have just touched the surface of the benefits of this change. Although some businesses will retreat to traditional work-from-the-office structures as the pandemic recedes, others will push forward with work from home.

"The impact can be significant. Where people choose to live, what constitutes a commute, changes to congested cities and thousands of other items all will see the effect of people untethered from offices. As remote work increases, pressure for better digital tools and online spaces will increase. In the competition for the best employees, perks such as fitness centers, free cafeterias and massages could give way to better work-from-home tech. Being able to change jobs without changing where one lives, allowing children to stay in the same school, could become a new measure of work satisfaction."

Don Heider, executive director of the Markkula Center for Applied Ethics at Santa Clara University, wrote, "Recently the Business Roundtable (representing CEOs of America's largest corporations) made a significant change, shifting from stating that the primary point of a corporation is to maximize shareholder value to stating that corporations must consider how they treat customers, how they treat their employees and how they support their local communities while at the same time increasing shareholder value. In the U.S., technology seems inexorably linked with for-profit companies, thus only if companies take this statement seriously can there be progress made. Using ethical decision making as a guide, companies can transform themselves into organizations that truly help people rather than simply trying to maximize profit. If venture capitalists and private equity firms also begin taking ethical behavior into account, this could be transformational."

An American innovation lab's director emeritus commented, "I think we have to understand the effects on the pandemic and technology's reaction to it. Although I don't agree with him a lot, I think this quote from Marc Andreessen is pretty smart: 'Permanently divorcing physical location from economic opportunity gives us a real shot at radically expanding the number of good jobs in the world while also dramatically improving quality of life for millions, or billions, of people. We may, at long last, shatter the geographic lottery, opening up opportunity to countless people who weren't lucky enough to be born in the right place.'"

Jeremy West, senior digital policy analyst at the Organization for Economic Cooperation and Development (OECD), wrote, "In 2035, the online world will be far more interoperable, making digital life even faster and easier to navigate. You will not have to leave your music app to buy concert tickets for the artist whose song is playing, for example, or to brag to your friends that you just got them. The experience will, in other words, be more like what Chinese ecosystems such as WeChat already are, but without all the functionality necessarily being owned and controlled by the same entity as it is in the case of WeChat."

Stowe Boyd, managing director and founder of Work Futures, wrote, "I'm sharing a glimpse at the future of work in a persona vignette set in 2028 titled 'Carla Paredes in the Cab':

1. Fact 1, it's 2028.
2. The protagonist is a woman – Carla Paredes – 27 years old, certified in various augmented-reality classifications, like drone pilot, school backup, hotel front.
3. Considered college but in 2021 took an aptitude test and was offered drone pilot training; she worked for a few years driving trucks and delivery vehicles remotely until more-autonomous delivery systems were perfected – highways, doors, warehouses, etc. – and people were no longer needed.

4. Worked as school backup but lacks education to do more than herd kids around.
5. Worked as hotel 'front' – the front desk, concierge and bell desk, but those jobs were trimmed as travelers grew used to fewer personnel in hotels and relied on AI-based services.
6. Considered working as a sex 'surrogate' – inhabiting a sex 'bot' – and passed the aptitude test, but took a social augmented reality editor job, and is now being retrained as remote home care admin.
7. En route in a driverless car.
8. Heading to a retraining day.
9. The day is mediated by personal and professional AI.
10. The retraining is a month-long experience negotiated by a worker's council, a government labor agency and her former workplace.
11. She had been working as a contracted editor filtering fakery on a social AR service. Her actual employer is a work platform partly owned by her workers' council and otherwise funded by the government's Right to Work Bill of 2021, administered by the state of New York.
12. The emergence of workers' councils came after the job riots of 2023.
13. She's now being retrained with new AIs as a remote home care administrator a la CareHome."

Ellery Biddle, projects director at Ranking Digital Rights, predicted, "The movement for workers' rights in various areas of the tech sector – click labor, gig work, digital-first delivery work – is growing and may be much stronger and celebrating big wins by 2035."

Maja Vujovic, owner/director of Compass Communications in Belgrade, Serbia, said, "The gig economy already has all the technology it needs to thrive. What it lacks is a more flexible legislation and an upgraded fiscal framework worldwide. Gig workers are connecting all the dots and are being empowered to espouse their unsolicited entrepreneurial status. As proprietors of billions of smart devices, computers, vehicles, drones, etc., they already own the means of production or service.

"If we keep our eyes and our minds open and our star innovators' greed in check, gig work will prove the most viable way to reduce and, in time, rectify economic inequalities everywhere. Such workers will have negotiated better terms of work by 2035. This will turn the present-day precariat into a stable class with a highly adaptable and thus sustainable business model. Comprehensive apps will sprout that will be able to tackle many diverse gig categories simultaneously. They will

automate micro-taxation and provide finely customizable gig alerts cutting across sectors and industries."

Robert Cragie, senior principal research engineer with Gridmerge Ltd., predicted, "Post-pandemic, the attitude to workplace will change, with both positive and negative effects. A positive effect could be the revitalisation of communities in rural areas that have long suffered from the drain to cities and the build-up of other local spaces that focus on a different dynamic. Collaborative work hubs based more on locality than profession can provide a stimulating environment for many workers, allowing interaction between people from different professions who would not normally speak to each other. As the focus is more on the *local*, there would be a better sense of community, and if there are local issues it is likely people would work together to resolve them. This could translate into politics whereby more of our political representatives come from the grassroots instead of the elite."

Jeremy Foote, a computational social scientist studying cooperation and collaboration in online communities at Purdue University, responded, "I would love to see an internet that advances people from the Global South and other groups left behind. The internet's affordances of open, borderless education combined with jobs that can be performed online can be transformative. An internet that enables people to participate more fully in the global economy is an incredible boon to the world."

A professor of public administration based in the U.S. South said, "The move to broader adoption of work from home (WFH) will likely reshape cities. If WFH becomes a norm it may be the impetus for better high-speed connectivity to penetrate communities that do not currently have good access. Small towns in places such as in the Midwest may become more attractive places to live due to lower costs of living, lower population densities and the like, also boosting economies across the country."

An executive with an African nation's directorate for finance for development wrote, "By 2035, universal access to all online services will be a reality. Access to energy and the internet for all will be funded in all countries to enable online lifelong education and access to an online specialist for universal medical assistance."

A user-experience designer based in Boston predicted, "By 2035 work from home – or wherever you want to work – will be the norm. Office buildings will be reinvented to serve a better purpose. The changeover to having millions more digital nomads who work wherever they want to work, no longer tied to a physical location, will give workers new freedoms. It will also interrupt workforces because if labor is cheaper in one part of the world than in other parts, the cheaper regions will get more business and more jobs. This will be somewhat driven by how well-educated

and trained a local populace is, but that offset will gradually disappear as education also becomes increasingly digital and more equitably distributed. Online voting will make democracy more accessible to a wider range of people. Medical attention in the form of virtual visits will make medical care easier to obtain."

A consulting business communications analyst commented, "Trends to watch tied to business, but also to be widely implemented in other sectors:

- Adoption of graph databases and data standards, taxonomies and ontologies, for example, XBRL, a global framework for exchanging business information; global LEIs [legal entity identifiers] offering standardized legal reference data; and authentication APIs that allow people to manage user identity.
- Cryptocurrencies in the global-remittance space and central bank digital currencies.
- Alternatives to credit reporting-based wealth profiles such as Equifax, Experian and TransUnion; plus, the availability of digital doubles and alternate personas.
- Hyperlocal, data-driven journalism.
- Exascale graphics processing units (GPUs), quantum networking and quantum computing."

A technology professional based in North America predicted, "In 2035 the continual rollout of electronic payment and ordering will foster innovations in the delivery of goods and services. It will lower costs and increase competition while raising flexibility in employment and other markets. It will be hindered by poor security, theft of financial assets and slow-moving government initiatives."

Melissa R. Michelson, professor of political science and dean at Menlo College, shared this scenario: "It's 2035, and it's time for the annual meeting. Before the pandemic, folks flew in from around the world to attend – allowing for the benefits of a face-to-face gathering, but with significant impacts on the climate due to the use of fossil fuel-based transportation. During the pandemic, meetings were held virtually, mostly via Zoom, but this was unsatisfactory. Folks had issues with their connections, and Zoom fatigue made meetings tiresome. Aside from formal sessions, there were few and dissatisfying ways to network informally as had previously taken place in hallways, at receptions and at meals.

"In a new and improved digital world in 2035, we will have found a way to gather to change ideas and conduct business virtually in ways that are engaging and that allow folks to make new connections and socialize. Now that digital meetings are so productive and enjoyable, we're able to move forward in our professional lives without burning fossil fuels or negatively impacting the planet. And we can sleep in our own beds at night."

Amy Sample Ward, CEO of the Nonprofit Technology Enterprise Network, said, "I would love to see digital tools enabling accessibility in a diverse way through everyday life. Digital wallets via devices that are affordable and accessible used for ease, as well as a way to navigate around physical disabilities that could make carrying a wallet or getting out cash or credit cards difficult. Options to navigate a customer service situation like going to the post office, buying dog food, or shopping for new shoes via devices as desired for folks with diverse challenges with waiting in line, carrying heavy items, handling loud or overwhelming situations, or otherwise to make the experience more efficient. Even a general acceptance that digital forms of participation are equal to (and not a lesser or additional request) non-digital participation, from work to education to social life."

Amy Gonzales, an associate professor of communication and information technologies at the University of California-Santa Barbara, wrote, "Ensuring that job searches, education, health care and other everyday activities do not require that people have access to the internet will be important to mitigate inequalities caused by widespread ICT adoption.

"We must create and protect information redundancies (i.e., use both 'paper' AND 'plastic'); a new and improved digital realm should still also retain many of the organizational processes of a non-digital realm. Unlike many other information innovations widely adopted over the past 100 years (phones, radios, televisions), the upkeep costs of digital computing are much higher. Thus, we must not assume persistent digital access for all, especially not expecting that everyone can accomplish activities that require a large screen or substantial amounts of data."

6. Altering "reality"

A considerable number of these experts focused their answers on the transformative potential of artificial intelligence (AI), virtual reality (VR) and augmented reality (AR). They say these digital enhancements or alternatives will have growing impact on everything online and in the physical world. This, they believe, is the real "metaverse" that indisputably lies ahead. They salute the possibilities inherent in the advancement of these assistive and immersive technologies, but also worry they can be abused – often in ways yet to be discovered. A number of respondents also predict that yet-to-be envisioned realms will arise.

Andrew Tutt, an expert in law expert and author of "An FDA for Algorithms," predicted, "Digital spaces in the future will be so widely varied that there will not be any canonical digital space, just as there is no canonical physical space. A multitude of new digital spaces using augmented reality and virtual reality to create new ways for people to interact online in ways that feel more personal, intimate and like the physical world will likely arise. These spaces will provide opportunities to experience the world and society in new and exciting ways. One imagines, for example, that in the future, digital classrooms could involve students sitting at virtual desks with a virtual teacher giving a lesson at the front of the room.

"There will be future digital concerts with virtually limitless capacity that allow people to watch their favorite bands in venues. And through AR and VR, people will take future 'trips' to museums that can only be visited today by buying plane tickets to fly half a world away. Unlike the experiences of today, which are tightly constrained by limitations of physical distance and space, these offer an opportunity to create a more engaged and interactive civil, political and artistic discourse. People are no longer prevented from meaningfully taking advantage of opportunities for education, entertainment and civic and political discourse. These opportunities will not eliminate the problems that digital spaces today confront.

"A fundamental reorientation around these new types of spaces – one in which we impose shared values for these types of shared spaces – will be necessary, but the multiplication of opportunities to interact with friends, neighbors and strangers across the world may have the salutary effect of helping us to be better citizens of these digital spaces and thereby improve them without necessarily changing the fundamental technologies and structures on which they rely."

Mark Lemley, professor of law and director of the Stanford University program in Law, Science and Technology, said, "We will live more of our lives in more – and more realistic – virtual spaces."

Mark Deuze, professor of media studies at the University of Amsterdam, the Netherlands, wrote, "The foundation of digital life in 2035 will be lived in a mixed or cross-reality in which the 'real' is intersected with and interdependent with multiple forms of augmented and virtual realities. This will make our experience of the world and ourselves in it much more malleable than it already is, with one significant difference: By that time, almost all users will have grown up with this experience of plasticity, and we will be much more likely to commit to making it work together."

Shel Israel, author of seven books on disruptive technologies and communications strategist to tech CEOs, responded, "By 2035 AR and VR are likely to fit into fashionable headsets that look like everyday eyeglasses and will be the center of our digital lives. Nearly all digital activities will occur through them rather than desktop computers or mobile devices. We will use them for shopping and to virtually visit destinations before we book travel. They will scan our eyes for warnings of biologic anomalies and health concerns. We will see the news and attend classes and communicate through them. By 2045, these glasses will be contact lenses and by 2050, they will be nanotech implants. This will be mostly good, but there will be considerable problems and social issues caused by them. They will likely destroy our privacy, they will be vulnerable to hacking and, by then, they could possibly be used for mind control attempts.

"Positives for 2035:

1. Medical technology will prolong and improve human life.
2. Immersive technology will allow us to communicate with each other through holograms that we can touch and feel, beyond simple Zoom chatting or phoning.
3. Most transportation will be emissions-free.
4. Robots will do most of our unpleasant work, including the fighting of wars.
5. Tech will improve the experience of learning.

"On the dark side of 2035:

1. Personal privacy will be eradicated.
2. The cost of cybercrime will be many times worse than it is today.
3. Global warming will be worse.
4. The computing experience will bombard us with an increasing barrage of unwanted messages."

Jamais Cascio, distinguished fellow at the Institute for the Future, shared this first-person 2035 scenario: "Today, I felt like a frog so I became one. Well, virtually, of course. I adjusted my presentation avatar (my 'toon') to give me recognizably ranidaean features. Anyone who saw me through mixed-reality lenses – that is, pretty much everybody at this point – would see this froggy

version of me. I got a few laughs at the taqueria I went to for lunch. It felt good, man. My partner, conversely, had a meeting in which she had to deal with a major problem and (worse) she had to attend physically. To fit her mood, she pulled on the flaming ballgown I had purchased for her a few years ago. The designer went all-out for that one, adding in ray-tracing and color sampling to make sure the flames that composed the dress properly illuminated the world around her from both her point of view and the perspective of observers. She said that she felt as terrifying as she looked. When mixed reality glasses took off late in the 2020s, most pundits paid attention to the opportunity they would give people to remix and recreate the world around them. Would people block out things they didn't want to see? Would they create imaginary environments and ignore the climate chaos around them? Turned out that what people really wanted to do was wear elaborate only-possible-in-the-virtual-world fashion. Think about it: what was the big draw for real money transactions in online games? Skins – that is, alternative looks for your characters. It's not hard to see how that could translate into the non-game world. You want to be a frog? Here are five dozen different designs under Creative Commons and another several hundred for prices ranging from a dollar to a thousand dollars. You want to look serious and professional? This outfit includes a new virtual hairstyle, too. We sometimes get so busy trying to deal with the chaos of reality that we sometimes forget that the best way to handle chaos is to play."

The founder and director of a digital consultancy predicted, "AR and VR technologies will do more to bring us together, teach us about distant places, cultures and experiences and help us become healthier through virtual diagnostics and digital wellness tools. I suppose what I'm really envisioning is a future where the entities that provide digital social services are reoriented to serve users rather than shareholders; a new class of not-for-profit digital utilities regulated by an international network of civic-minded experts. I would like to envision a digital future where we assemble around communities – geographical or interest-based – that provide real support and a plethora of viewpoints. This is really more of a return to the days before Facebook took over the social web and development from there."

A leading professor of legal studies and business ethics responded, "The expectation that persistent metaverse experiences will be more widespread by 2035 isn't a prediction, it is a certainty given current development and investment trends. I have wonderful experiences in the digital space of World of Warcraft, which started in 2004. With the huge investment in metaverse platforms, I expect that more people will have that kind of social experience, extending beyond it simply being used for gaming. But that doesn't mean that digital life will be better or worse on average for 8 billion people in the world."

A distinguished scientist and data management expert who works at Microsoft said, "In 2035 there will be more 'face-to-face' ('virtual,' but with a real feel) discussion in digital spaces that opens people's minds to alternative viewpoints."

Sam Punnett, retired owner of FAD Research, said, “A better world online would involve authenticated participants. It isn't too far-fetched to imagine that 15 years from now we will have seen a broad adoption of VR interfaces with a combination of gesture and voice control. After many years of two-dimensional video representation and its interfaces, technology and bandwidth will advance to a point where the VR gesture/voice interface will represent ‘new and improved.’ Watch the gaming environments for more such advances in interface and interaction, as gaming most always leads invention and adoption.”

Seth Finkelstein, principal at Finkelstein Consulting and Electronic Frontier Foundation Pioneer Award winner, commented, “If virtual reality improves akin to the way that video conferencing has improved, VR gaming will be awesome. We have the ‘Star Trek’ communicator now (with mobile phones). If better sensing of body movement was combined with additional advances in head-mounted display and audio, we'd have something like a primitive ‘Star Trek’ holodeck.”

A professor of computer science and entrepreneur wrote a hopeful, homey vignette: “Wearing augmented-reality hardware, a child is learning by doing while moving – launching a rocket, planting a tree, solving an animal-enclosure puzzle in a virtual zoo. In the next room, a sitting parent is teaming with colleagues across the globe to design the next version of a flying car. Grandpa downstairs is baking cookies from the porch Adirondack chair by controlling – via a tablet and instrumented gloves – a couple of chef-robots in the kitchen. While Grandma, from an adjacent chair, is interacting with a granddaughter who lives across the country via virtual-reality goggles.”

Victor Dupuis, managing partner at the UFinancial Group, shared a shopping scenario, writing, “You are buying a new car. You browse cars by using a personal Zoom-type video tech, then switch into a VR mode to take a test drive. After testing several EV cars from different manufacturers, you simultaneously negotiate the best possible price from many of them. You settle on a choice, handle a much more briefly-structured financial transaction, your car is delivered to your front door by drone truck and your trade-in vehicle leaves in the same way.

“Between now and 2035, digital spaces will continue to improve the methods and efficiencies of how we transact life. Financial decision making, information interpretation, major personal and home purchases, all will be handled more efficiently, resulting in reduced unit costs for consumers and the need for companies to plan on higher sales volume to thrive. On the negative side, we are eroding relationally because of an increased dependence on digital space for building relationships and fostering long-term connections. This will continue to erode the relationship aspect of human nature, resulting in more divorces and fractured relationships, and fewer deep and abiding relationships among us.”

Advances in AI can be crucial to achieving human goals

Alexa Raad, chief purpose and policy officer at Human Security and host of the TechSequences podcast, said, "In 2035 AI will increase access to a basic level of medical diagnostic care, mental health counseling, training and education for the average user. Advances in augmented and virtual reality will make access to anything from entertainment to 'hands-on' medical training on innovative procedures possible without restrictions imposed by our physical environment (i.e., geography). Advances in the Internet of Things and robotics will enable the average user to control many aspects of their physical lives online by directing robots (routine living tasks like cleaning, shopping, cooking, etc.). Advances in biometrics will help us manage and secure our digital identities."

A foresight strategist based in Washington, D.C., predicted, "Probably the most significant change in 'digital life' in the next 14 years will be the geometric expansion of the power and ubiquity of artificial intelligence. I consider it likely that bots (writ large) will be responsible for generating an increasing portion of our cultural and social information, from entertainment media to news media to autonomous agents that attend our medical and psychosocial needs. Obviously, a lot can go right or wrong in this scenario, and it's incumbent upon those of us who work in and with digital tech to anticipate these challenges and to help center human dignity and agency as AI becomes more pervasive and powerful."

Peter B. Reiner, professor and co-founder of the National Core for Neuroethics at the University of British Columbia, proposed the creation of "Loyal AI," writing, "As artificial intelligence comes to encroach upon more and more aspects of our lives, we need to ensure that our interests as humans are being well-served. The best way for this to happen would be the advent of 'Loyal AI' – artificially intelligent agents that put the interests of users first rather than those of the corporations that are developing the technology. This will require wholesale reinvention of the current rapacious business model of surveillance capitalism that pervades our digital lives, whether through innovation or government regulation or both. Such trustworthy AI might foster increased trust in institutions, paving the way for a society in which we can all flourish."

Paul Epping, chairman and co-founder of XponentialEQ, predicted, "The way we think and communicate will change. Politics, as we know it today, will disappear because we will all be hyperconnected in a hybrid fashion: physically *and* virtually. Governments and politics have, in essence, been all about control. That will be different. Things will most likely be 'governed' by AI. Therefore, our focus should be on developing 'good' AI. The way we solve things today will not be possible in that new society. It has been said that first we create technology and then technology creates us. At that point, tech will operate on a direct cognitive level. Radical 'neuroconnectivity'

has exponentially more possibilities than we can imagine today; our *old* brains will not be able to solve *new* problems anymore. Technology will create the science that we need to evolve.

"Digital spaces will live *in* us. Direct connectivity with the digital world and thus with each other will drive us to new dimensions of discovery of ourselves, our species and life in general (thus not only digital life). And it will be needed to survive as a species. Since I think that the technologies being used for that purpose are cheaper, faster, smaller and safer, everyone can benefit from it. A lot of the problems along the way will be solved and will have been solved, although new unknowns will brace us for unexpected challenges. E.g.: how will we filter information and what defines the ownership of data/information in that new digital space? Such things must be solved with the future capabilities of thinking in the framework of that time; we can't solve them with our current way of thinking."

Heather D. Benoit, a senior managing director of strategic foresight, wrote, "I imagine a world in which information is more useful, more accessible and more relevant. By 2035, AIs should be able to vet information against other sources to verify its accuracy. They should also be able to provide this information to consumers at the times that make the most sense based on time of day, activity and location. Furthermore, some information would be restricted and presented to each individual based on their preferences and communication style. I imagine we'll all have our own personal AIs that carry out these functions for us, that we trust and that we consider companions of a sort."

Sam Lehman-Wilzig, professor and former chair of communications at Bar-Ilan University, Israel, said, "I envision greater use of artificial intelligence by social media in 'censoring' out particularly egregious speech. Another possibility: Social media that divides itself into 'modules' in which some disallow patently political speech or other types of subject matter, i.e., social media modules that are subject-specific."

An expert on the future of software engineering presented the following scenario: "A political operative writes a misleading story and attempts to circulate it via social media. By means of a carefully engineered network topology, it reaches trusted community members representing diverse views, and – with the assistance of sophisticated AI that helps to find and evaluate the provenance of the story and related information – the network determines that the story is likely a fabrication and damps its tendency to spread. The process and technology are very reliable and trusted across the political spectrum."

Jerome Glenn, co-founder and CEO of The Millennium Project, predicted, "Personal AI/avatars will search the internet while we are asleep and later wake us up in the morning with all kinds of interesting things to do. They will have filtered out information pollution, distilling just the best for our own unique self-actualization by using blockchain and smart contracts."

Dweep Chand Singh, professor and director/head of clinical psychology at Aibhas Amity University in India, said, "Communication via digital mode is here to stay, with an eventual addition of brain-to-brain transmission and exchange of information. Biological chips will be prepared and inserted in brains of human beings to facilitate communication without external devices. In addition, artificial neurotransmitters will be developed in neuroscience labs for an alternative mode of brain-to-brain communication."

An ICANN and IEEE leader based in India proposed a potential future in which everything is connected to everything, writing, "Our lives, the lives of other humans linked to us and the lives of non-human entities (pets, garden plants, homes, devices and household appliances) will all be connected in ways that enhance the sharing of information in order for people to have more meaningful lives. We will be able to upload our thoughts directly to the internet and others will be able to download and experience them. The 'thoughts' (experiences, sensory information, states of mind) of other non-human entities will also be uploaded. Among these online thought-objects, there will also be 'bots' (AI thought entities), and the internet will become a bus for thoughts and awareness. This will lead to stunning emergent properties that could transform the human experience."

A futures strategist and consultant warned, "Within the next 15 years, the AI singularity could happen. Humanity can only hope that the optimistic beliefs of Isaac Asimov will hold true. Even in the present day, some AI platforms that were developed in research settings have evolved into somewhat psychopathic personalities, for lack of a better description. We might, in the future, see AI forecasting events based on accumulated information and making decisions that could limit humanity in some facets of life. Many more jobs than present will be run and controlled by this AI, and major companies will literally jump at the nearly free workforce that AI will provide, but at what cost for humanity? We can only hope as we wait and see how this technology will play out. AI lacks the human element that makes us who we are: the ability to dream, to be illogical, to make decisions based on a 'gut feeling.' Society could become logic-based, as this is the perception that AI will base its decisions on. Humanity could lose its ability for compassion and, with that, for understanding."

7. Tackling wicked problems

Some of these expert respondents wrote of their hope that digital interactions and tools will be essential parts of global efforts to tackle grand challenges such as climate change, defending human rights and addressing pandemics. They often foresee – or advocate for – changes in the way knowledge is generated and applied.

Marcus Foth, professor of informatics at Queensland University of Technology, exclaimed, "My biggest hope is that eventually global social and environmental crises such as COVID-19 and climate change will create enough stimulus for *strategic essentialism*, that is, for humankind to forget about its petty differences and come together to tackle the wicked problems that are at stake, urgent and pressing. COVID-19 is not so much just a health challenge, it's a political challenge. Climate change is not so much just a science challenge, it's an economic challenge. While the world at large and national leaders are still putting most of their hope into the STEM field, the real challenges cannot be tackled whilst maintaining an ideological belief in technological solutionism. The underlying issue – as old as humankind – at the core of our chronic inability to really shine and build the scale of ingenuity needed to face what's coming for us, is *governance*. Perhaps there are some weak signals at the internet's 2035 horizon that point to new models and approaches of more-than-human governance that are more collaborative, fair, just, ethical, inclusive and able to care for our planetary health and well-being."

Greg Sherwin, an active leader in digital experimentation with Singularity University who earlier engineered many startups, including CNET and LearnStreet, said, "The challenge of digital life is that information is increasing exponentially and our ability to process it fails to scale. This leads to gross oversimplifications of people, their conditions, their ideas, their perspectives. Nobody has time to listen when a billion people are asking to be listened to. I envision the creation of 3D and exploratory worlds that help people build better presence, understanding and empathy, aimed at small subsets of people whom we listen to in order to dig deeper. This could never be done at scale, however. Worlds like this could result in better engaging with humanitarian aid in response to an international crisis of climate change and/or global migration in a faraway territory. But it would require participants to focus on themselves and filter everyone else out, unlike the modern temptation to go viral and expose as many as possible to as little as can be understood as possible."

Rich Ling, a professor of media technology at Nanyang Technological University in Singapore, responded, "There are two critical areas we need to address. Digital mediation and digital technology can be used to address these. The first is the environment and the second is social/racial divides. My sense is that digital technology and AI can contribute to solving climate change. AI can help to provide the resources we need in a more environmentally sustainable way.

AI systems have the potential to provide better management of resources. AI systems can help us to produce and transport things more efficiently and with fewer environmental consequences. Similarly, I think that digitally-mediated communication can help to reduce social barriers. We have seen how social media has been used to fan the flames of racism and hate over the past few years. I have the hope that social media will also become a tool with which to reduce these barriers. Its use in the educational system during the pandemic has shown that social media can be used in the project of social development. It is clear that face-to-face education has its advantages. However, supplementing this with remote education increases the reach of the system. Education is known as one of the ways to reduce intolerance. Thus, the growth of remote education can be a positive force in the reduction of social/racial divides."

Jonathan Grudin, principal human-computer design researcher at Microsoft and affiliate professor at the University of Washington, wrote, "Seventy-five years ago, in my public school in a small rural village, we learned about the United Nations, a significant institution covered regularly in the news. We collected money for UNICEF and devoted much of one year to the International Geophysical Year. Today, attention to such global cooperation is minimal. There is no reason not to reestablish such a consciousness, and, forced by climate change consequences that put us on a long list of endangered species, we must. We must, and digital technology will be central, informing and engaging young and old much more directly and effectively than was done through print media 75 years ago. The digital space will not be difficult to design, finding solutions will be challenging and reaching consensus on enacting them will be the most difficult in a contentious era. We could do it now if Xi Jinping, Vladimir Putin, Joe Biden, the European Parliament and others decided it was time. They haven't or can't, but they or their successors will. You can bet on it, because if they don't there will be no one to collect your losing bet."

Brian Southwell, director of the Science in the Public Sphere Program at RTI International, wrote, "By 2035, we could be experiencing the richness of human connection in a sustainable way that avoids the worst excesses of fossil fuel use. We could use technology to raise up important voices that wouldn't be otherwise heard. We could discover possibilities for vibrant community development in areas of the world that currently are struggling economically."

Sonia Livingstone, a professor of social psychology at the London School of Economics and Political Science, wrote, "The digital world would be much improved if we could prioritise human rights as an overarching principle and consult the public using careful, respectful and rights-respecting mechanisms. My focus is primarily on children's rights in a digital world and I urge that it is time for adults to listen to the voices and experiences of children, as they committed to do when all countries worldwide except the U.S. ratified the United Nations Convention on Rights of the Child. Children are independent rights holders, agents in a digital world, and their views challenge the lazy assumptions of adults in ways that demand and deserve attention. Their input

already improves the digital world and would improve its governance if only we didn't routinely ignore, marginalise, speak for, neglect or postpone attention to children. They account for a third of the world's population, and a third of its internet users. Stop talking as if 'people' are all ages 18 and older."

A tech CEO, founder and digital strategist said, "I suspect we will continue to see global improvement associated with pervasive network access. We will see ongoing improvements in collaborative capability, distribution of information, effective monitoring of global natural and technical systems, etc. At the same time, we have urgent issues that have so far not been well addressed: e.g., climate change, global health challenges (potential pandemics) and the uneven management and distribution of resources. A better world online depends on how well we address these issues. By 2035, I would hope to see increasingly effective collaboration to address these and other challenges, with increased widespread digital literacy and emphasis on critical thinking. This is my 'expansive' thought: We can remedy the misuse of social media and email to spread falsehoods and practice cultural manipulation and we could have smarter and better uses of social media – support for our best efforts and intentions – versus the current fog of ignorance and polarizing conflict."

James Hendler, Director of the Institute for Data Exploration and Applications and the Tetherless World Professor of Computer, Web and Cognitive Sciences at Rensselaer Polytechnic Institute, wrote, "Imagine if a community organizer in, say, Bangalore could discover a solution that had worked for a problem in Baltimore, discover and interact with those who'd made it happen and figure out how to adapt it to their local issue (with appropriate cultural changes). All of this despite language and culture difficulties. It is well within the realm of possibility to do this sort of thing today as one-offs, as domain-specific solutions in certain areas, or with significant resources – but not easily, not cheaply and not at the local level. The creation of such 'social machine' software is a vision that has been around for a while. It is motivating research work and is likely to be available in the next decade."

Annalie Killian, vice president for strategic partnerships at sparks & honey, based in France, commented, "Health interventions and food supply chains could be hugely transformed through improvements in digitization. Algorithmic doctors online could diagnose and treat common ailments or provide maternal care, pediatric counselling and eldercare all from the comfort of home and, through a series of referrals, combine house visits by community physicians on an as-needed basis whilst also plugging patients into communities of care and social support – often the thing people need most. As far as industrial farming is concerned, imagine how smart sensors and smart demand/supply projections could manage food supply chains on a much more local scale in which supply and demand is better matched, there is less travel to distant domains, the process is

less wasteful and less damaging to soil and water, and we could reclaim industrial farmland and restore forests to sequester carbon emissions.

"Given the climate change crisis, by 2035 the acceleration of digital interaction should, in theory, allow for a lot less friction in terms of moving ideas, people and goods in a global economy and it should democratize access to education, health and economic participation for millions of people in underdeveloped countries, whilst also bringing the costs down of things like health care in developed countries (in theory, if the incumbents in the system were to cooperate rather than trying to maintain their fiefdoms). I wonder if Digital Life/Lives is the right term. We will remain human, with physical needs connected to our emotional and spiritual needs, so our lives will not be entirely digitized, but much of our interactions with the world will be. I think this will give rise to the premiumization of the physical. It will be more expensive and less accessible and become the new luxury."

A professor based in Australia wrote, "With global warming looming as a severe destabilising influence in the world, it is a very high priority to use advances in the tools available on the internet and IoT to provide fine-grained, timely information on the state of microenvironments."

A researcher working in the field of global humanitarianism shared this 2035 scenario: "Knowledge economies are emerging and growing more rapidly in the Global South than anyone predicted back in 2021. Refugees and migrants are able to safely and effectively access information and operate online along their journeys, supported by a rise in peer-to-peer networking that also facilitates a global crackdown on human trafficking and sexual and labor exploitation and enslavement. As fossil fuel use rapidly declines in the Global North, the use of smart-home systems exponentially increases per-capita energy efficiency. A major percentage of households in the Global North are now contributing energy to the grid and have backup energy storage capacity to support both household and communitywide resilience to disasters and blackouts. The Global South is benefitting directly from its production and use of energy-efficient, low-water and low-waste technologies, while also experiencing greater levels of stability due to the limitations placed on information weaponization, cyberattack and other digital war-making activities through the Fifth Geneva Convention. Global corruption and organized crime are no longer as able to move money, as human trafficking ceases to be such an exploitable venue. The new blockchain and digital currency regulations make dark money harder to hide and serve to rein in the rampant mining of e-currency."

Gary A. Bolles, chair for the future of work at Singularity University, said, "Imagine this: When they are young, every citizen participates in tech-enabled community activities that enable heterogenous groups of youth to solve community problems. They do the same with youth from other countries. As young adults, every citizen participates in a digitally-enabled year of public

service, requiring them to meet others outside their current community and support problem-solving for an affected population in that other community. When they are older, every citizen in every community uses collaborative tools to involve and empower others to identify and solve community challenges, support others with personal challenges and gain support from others. Community-anchored meetups bring people together from across the socio-economic spectrum who might never have met otherwise. Families collaborate to share strategies for solving problems ranging from enabling their children to go to college to prioritizing community issues to be solved. And communities across the country and around the world share their effective strategies. These tools exist today, but they are not widely known, easily transferable or readily scalable. But these are all solvable problems."

John Battelle, co-founder and CEO of Recount Media, wrote, "[By 2035] we will have choices for engagement at scale that do not depend on platforms as we understand them today."

Raashi Saxena, project officer at The IO Foundation and scientific committee member at We, The Internet, urged, "We need to embed human rights in our infrastructures. Being able to define a clear list of digital harms is the first step. We need to move toward defining Digital Rights and compile them into a Universal Declaration of Digital Rights (UDDR). This document would act as a technical reference for future technologists, the next generation of human and digital rights defenders, so that technology is designed and implemented in ways that proactively minimize digital harms by 2035. As data becomes an increasingly powerful economic, political and social force, programmers are emerging as the next generation of human and digital rights defenders. The big missing piece in our digital lives is to ensure, to the very least, the same degree of protections that we enjoy in our real-life interactions. This is not possible now due to the nature of the current implementation of infrastructures, products and services. For example, laws are enacted aimed at protecting citizens and their data, but they are not structured in a way that ensures their compliance in a transparent, burden-free and standardized manner."

A veteran investigative reporter for a global news organization said, "People of like minds, experiences and identities have always used the internet to create micro-communities of interest. I expect them to continue to be able to use it to find one another; that is one of the great legacies of the rise of the online world. There will be fora for constructive engagement and strategies for combatting climate change, endemic corruption and inequality. Encryption will never be broken despite all attempts of repressive and ignorant politicians to do so. I hope that 'healthy' online activities are not forced underground. If that happens, there will be much more serious global challenges. Online censorship and surveillance will not go away, but the next digital generation will at least be more conscious of how to circumvent them."

An anonymous respondent said, “There will be real-time matching of displaced people with housing.”

Timothy L. Haithcoat, deputy director of the Center for Geospatial Intelligence, said, “I hope for unbiased AI/ML used to compile health, income, economic, ethnic, age, gender and other inequity indices so that society could move on from arguing whose data is better to addressing the facts and discussion of real ways of mitigation for society to move forward.”

A strategist, business analyst and project manager based in the Caribbean chose to make a doleful prediction: “In 2035, worldwide, governments are attempting to break encryption to follow and punish criminals, but simultaneously opening people up to hounding for their public commentary. Authoritarian governments are leaning toward the Russia/China style of localised, firewalled ‘internet,’ which is not actually connected to the rest of the world and is more like a local wide-area network. Platforms are fighting, winning and ignoring the reasons they are having to deal with antitrust cases while limiting the entry of meaningful competitors by monopolising computer resources. The cost of access will skyrocket worldwide as the economic dislocation following the COVID-19 pandemic ravages poorer countries and as large wealthy countries drain human resources. When Facebook launches its own currency, numerous small countries will collapse economically. All of the above and cancel culture will lead to further offline radicalisation.”

8. Closing thoughts

The following respondents wrote contributions that consider the range of issues societies confront.

David Bray, inaugural director of the Atlantic Council Geo Tech Center, wrote, "Across communities and nations we need to internally acknowledge the troubling events of history and of human nature and strive externally to be benevolent, bold and brave in finding ways wherever we can at the local level across organizations, sectors or communities to build bridges. The reason why is simple: we and future generations deserve such a world.

1. We must give voice to those who are asking and providing ideas regarding how we can fix issues of injustice systemically. Specifically, if enough positive #ChangeAgents start raising these questions, ideas and possible solutions to 'what comes next' for the decades ahead – and, most importantly, what social institutions will allow for the plurality of human co-existence and encourage peaceful resolution (and forgiveness) of disputes – then perhaps we have a lasting chance.
2. We must focus on positive solutions to ensure that diversity, inclusion and justice are cornerstone values. The importance of focusing on being positive #ChangeAgents is essential. Giving in to hate removes our ability to empathize with others and strive to find the common humanity in us all.
3. We must build bridges across different groups, we cannot be a house divided; this includes bridges to those who hold different views or views that challenge our own. As Abraham Lincoln once said: 'I don't like that man; I must get to know him better.' If we only take the time to get to know people we like, then we reinforce an age-old human paradigm of 'us versus them' and miss the opportunity to try and find a merit of compassion or insight even in people we might not agree with in principle.
4. We must find ways to benefit multiple groups, not just groups we self-identify with. We must build bridges, interact and engage, with different groups and individuals. We must engage with each other as mutually interconnected humans and embrace the reality that each of us were born, were infants and toddlers, had a series of life experiences that shaped us, and we will die. In these experiences, humans are all the same and part of 'an escapable network of mutuality.'
5. We must work across communal groups and help build a world in which different ideas and people can coexist. Over the centuries of history, both during the historical moments where people came together and during historical moments where people were treated unjustly, polarized or divided – throughout these moments, human nature itself has not changed. We humans can do both wonderful, inclusive actions and we can do the opposite. For the connectedness of us all and our shared humanity, we must find ways to correct injustices at home and abroad as a small planet of 7.7 billion people (up from 5.3 billion people in 1990 – 2.5 billion in 1950 – and just 1.8 billion 100 years ago, in 1918).

6. We must identify what choices we are making that are disconnecting ourselves from others versus connecting ourselves with others, and then act on better choices to produce healthier and more inclusive communities. So far 2021 has been a year of turbulence. We are facing historically systemic and new challenges as societies that need positive solutions. If you have ideas for action-oriented, positive solutions to address these issues we need to amplify your voice."

David Porush, writer, longtime professor at Rensselaer Polytechnic Institute and author of "The Soft Machine: Cybernetic Fiction," said, "Instead of trying to regulate speech and truth beyond what's already enshrined in the Constitution of the United States, including all its case law rulings, we should leverage the unique attributes and advantages of the digital commons both to unleash it for the common good and to help it evolve to a place that foments and inspires less evil (hatred, incitement to violence, mob formation and mobthink). What are those advantages? Its almost infinite and evolving power and flexibility for enabling 'telepathy'; and its generation of human and material wealth. (Caveat: I live in Silicon Valley, which is a distorting bubble.) So, go another way instead of struggling with regulations and legislation that try to define fake news from true (think of the misguided premises at the bottom of that) or put corporations on the hook to regulate speech (I can't imagine a corporation developing that interest or expertise in a manner that benefits the common good – it's an oxymoron).

1. Entrepreneurship and the profit motive can get us a good way there on its own, and I believe it is. But if a government wants to help, it can if it must pass a Digital Commons Infrastructure bill on the lines of DARPA [Defense Advanced Research Projects Agency], aimed at rewarding smaller, even individual innovation without ideological presuppositions or pre-conditions except that an invention provably, empirically makes material life better and produces better outcomes. Sort of like literacy and air conditioning. These should be more sociological than technological. The future MySpaces and SecondLifes and Facebooks and Instagrams and Reddits, with fiscal rewards for unleashing good.
2. Create a detailed new Zion, the utopian vision of a world where everyone can potentially share or get inside everyone else's head space. This is aspirational, yes. Find the map to that new world by using the vast worldwide internet thingy as a laboratory for experimenting with what works and giving dollars for it.
3. Imagine and describe the evils that will arise in that new Zion, new genres of cybercrime that will inevitably be committed there like mind control, grievous invasion of privacy, cultural genocide (the real cancel culture), identity theft or erasure at the existential level, and others not yet imaginable. Science fiction has already done a lot of this dystopian imagining for us. Listen to it, as some corporations are, to come up with new, cool profitable things. Enact laws to erect rails that guard against the new power steering and the new speeds thus afforded our souls. Erect cities of refuge.

4. Reward the inspirational art made possible by the new telepathic, virtual media. Display it prominently in the Digital Commons.
5. Make the inward, private moment more possible and precious as the Digital Commons imperializes and shrinks it."

Srinivasan Ramani, Internet Hall of Fame member and pioneer of the internet in India, does not see much progress by 2035, writing, "The internet does not have mechanisms to prevent mischief. It is a dangerous place for the naive user. It keeps millions from taking advantage of its benefits because they hear about frauds and worse crimes and choose not to go online. Every civilized society has evolved mechanisms to control crimes on the road, like banditry. However, we continue to allow viruses, malware, ransomware, etc., on the internet.

"We treat phishing as a white-collar crime, but it ought to be treated as if it is as dangerous as armed robbery. Consider an analogy. No one allows you to fly a plane without stringent rules and regulations. Why should we not follow similar practices in allowing people to use the internet to avoid causing harm to others?

"I also think the internet is not robust enough to keep working through natural calamities to help us. We need it all the more during a calamity, but that is when it fails. Cellphone towers run out of fuel, or a tornado can take them out, and there is not enough redundancy to provide continued working after the loss of a tower in a locality. Internet cables in some global locations are sometimes swinging dangerously between buildings. A hurricane can bring them down. The predecessor to the internet was sold to the government on the promise that it would work even after a nuclear attack, but the internet today needs much less than a nuclear attack to let you down. The internet is not safe for young students; it has bullies, criminals, corruptors and drug peddlers on it. We have not made available mechanisms to give vulnerable users a safe haven on the web. But, after all of this, I think we can make progress toward solving these problems. I am enough of an optimist to believe we will."

Wendell Wallach, senior fellow with the Carnegie Council for Ethics in International Affairs, commented, "I imagine an internet that functions more as a public utility, with true democratic multistakeholder participation in its governance. It would be best if there was a leading not-for-profit platform, but this raises the challenge of how such a platform would be funded, be innovative, and therefore a worthy competitor to the for-profit platforms. Unfortunately, we will probably witness the problems posed by digital life handled very different from country to country, with more authoritarian governments building robust forms of surveillance. The EU is trying to take the lead toward enacting ethical constraints. The picture in the U.S. is worse as it defaults to corporate self-governance, which has been totally ineffective. At the moment I am less than

hopeful that present proposals in the U.S. to enact meaningful constraints on the digital oligopoly will succeed."

Garth Graham, longtime communications policy activist with Telecommunities Canada, said, "The environmental movement is experiencing a shift in attitudes away from governance as closed systems of top-down external control and toward ecologies or open systems of distributed control. We are learning that we are not separate from the systems we inhabit, and that our attitude that we can manage them as external agents is largely useless. What can this mean in terms of digital space? It can mean a shift to understanding that distributed systems are local and that the social structure of distributed systems is community.

"Community can emerge whenever groups of autonomous individuals ask themselves, 'At this moment, what can we do to work and learn together?' What the individuals in those groups have in common is a need to learn their way forward. That need can occur in social circumstances whether the primary motivation driving integration is private profit or public good. A 'society' based on the autonomous right of the individual to act in the context of community (that is to say – to commit to action or 'to connect') is not one that is necessarily structured around the existing concepts of commercial, governance and civil sectors.

"Community is about integrative social relationships, as well as locality. Any social network that is characterized by high degrees of self-organizing interdependence is behaving as a community. As social networks, communities are primarily concerned with reciprocity or mutuality in addressing common objectives and needs. The rules that pattern the behaviors of a community relate directly to the immediate circumstances of its relationships to the ecology of mind that it inhabits.

"Community is nothing more than an agreed set of rules for behaving consistently in resolving problems of daily life that are located in a common set of circumstances. If those circumstances are related to the performance of a set of tasks, then the rules that cause self-organizing action to address those tasks are commonly referred to as practices. There is an energy to be found in community that is attractive."

Fernando Barrio, a senior lecturer in law and business at Queen Mary University of London, wrote, "An improved digital realm would be one:

- Where companies that are already making billions do not break their promises to users (and sometimes bend or break the law) to increase their profits a few more billions.
- Where companies don't use their power and vast resources to profit from the infringement of people's rights and successfully exert undue influence on policymakers, when not doing so would still allow them to have a very healthy financial situation.

- Where there is a robust and clear regulatory framework geared toward the respect of human rights, so freedom can flourish within clear rules.
- Where the value of technological services and companies is measured primarily by the positive impact they have in people's lives and not only by their financial valuation."

Ebenezer Baldwin Bowles, an advocate and activist, wrote, "2035. New and improved? Fourteen years from now I can see 3D printed houses and furnishings for the homeless. Compassionate avatars to guide the confused or hapless through the maze of digital applications for healing goods and services. Holograms on-demand to soothe loneliness and listlessness. The union of silicon and carbon to repair damaged physique and psyche. I offer this scenario: In 2035 digital life devolves into fragmented subcultures. From the top, reaching outward and downward in all directions, public arms enclose and squeeze the populous. The embrace is cold, indifferent. The Everyman is nudged into a perpetual maze of circular requirement. And confusion. And punishment. Citizens become more and more entangled in a digital web of misdirection. Malicious overreach by the Collective A-nom-o-nym pitches citizenry into a benumbed state of resigned passivity. A fear. A calculated mess. Tech leaders, unable to contain rampant digital consciousness – their Web is now beyond any one or any group's understanding – shuffle Bitcoins back-and-forth in a cynical dance of accumulation. Besotted by grandiose delusion, they retreat into cocoons of material wealth and fragile isolation. On the outskirts, gathered in Alt Collectives, creative AI-Luddites withdraw from the norm to craft insulated digital cells, weaving together hope and rebellion into a far-flung but determined community. Without a recognizable center, strung out on the margins, they contrive to discover ways to overcome fragmentation. 'Be mindful,' they chant."

Alan S. Inouye, director of the Office for Information Technology Policy at the American Library Association, responded, "We need a broad reconceptualization of public interest and service organizations, not just focusing on digital space per se, but on their full missions and the means to address these missions, both in the physical and digital worlds. Of course, there is no practical way to do this, and so we will continue an evolution in the years to come. Just as with newspapers beginning a decade ago, and now underway with liberal arts colleges, this evolution will be challenging for many sectors – and likely quite messy, with blood on the floor. Perhaps the best we can do is to try, as much as possible, to keep our eye on achieving the missions of these institutions, not how to optimize digital space by itself. Most public-interest and service organizations were designed for the analog (physical) world, not digital space. Institutions such as schools, universities, libraries, churches and many others were designed and established many decades ago, if not centuries ago. Then with the advent of digital space in the last several decades, that space was overlaid on top of these long-time physical institutions. And many of these physical institutions are quintessentially local (think public libraries), not initially designed to connect horizontally very much (in contrast to the internet/web). Given how institutions evolve, this state

of affairs is not surprising. Nevertheless, it means that these institutions are not well situated or architected for an increasingly digital world."

A former executive at a national funding initiative commented, "The thermodynamics of the present trends are truly awful, even if one considers both 'bad guys' and 'countervailing agents.' It adds up to a Nash equilibrium (there is no incentive to deviate from the initial strategy), similar to what led to so many species' extinctions in the past when niches changed this much. (See Robert May's 'Stability and Complexity in Model Ecosystems.') Having funded the key guy who led to Facebook's new AI, and having seen their recent plans, I am evermore worried. The only way out would be a higher level of consciousness, focus and design intelligence, which is possible but is an uphill struggle at best. These issues are so much easier for people with normal backgrounds to understand than climate change is, and our failure to network enough to save our lives on that one. … Well, it is irrational to give up, but even less rational to feel secure right now."

Gus Hosein, executive director of Privacy International, commented, "In 2035 we will still try to create a sense of shared space perhaps through constantly-on connections with others, e.g., families and friends having ephemeral and constant sharing of spaces. I do think the creation of communities of mind will continue to develop at the rate they have been within the current-platform internet. There will be political groups, extreme and not; communities promoting change, progressive and conservative; religious groups, new and old; all the diversity of the world. They will be harder to escape and avoid and they will get deeper into our identities. Physical-world fragmentation could very well continue as a result. Not all of this is bad. People have found new ways to learn and practice over digital exchanges (e.g., language, exercise, meditation, new skills). But isolation will be harder to navigate; it will be exacerbated and undermining. We will become lonely and uncertain how to connect or whether we can."

Wolfgang Bibel, artificial intelligence pioneer and professor emeritus at Darmstadt University of Technology, commented, "The issues you are raising [about the future of digital spaces and their role in democracy] are of extreme importance for the future of our states. This complex problem has political as well as technological aspects, thus any satisfactory solution could only be achieved in a combination of political and technological problem-solving methods (the latter ones having demonstrated their extremely successful solution-generating power in the past decades). Current practice and habits prevent such a combination. Political scientists – and politicians at that – know little or even nothing about technological methods in any detail while IT scientists know little or nothing about political goals, constraints and virtues to be taken into account for such a solution. It is this gulf separating two different worlds in our societies which has led to the deplorable aspects experienced with digital spaces. Community forums may be seen as a very beginning, but certainly not more than that. Bridges over such wide gulfs need a much deeper methodological basis. Its establishment is hard work. Let us start working on building solid

bridges between these different worlds in order eventually to arrive at satisfactory solutions to the observed problems. As people dislike any changes in fundamental structures such as those entrenching the separation of those different worlds, it is an open question whether those bridges will eventually be established by 2035 or not. Of course, I am not claiming that just building bridges is all that is needed to improve the current situation in digital spaces. The frustration indicated in the described scenario is one of the phenomena in our societies which need also to be addressed, independently and in quite a different manner."

Charles Ess, emeritus professor in the department of media and communication at the University of Oslo, said, "My 2035 ideal would begin with the reiterated sense of our identity and selfhood as relational autonomies. We will have rights to conscientious objection, dissent, freedom of expression and so on as members of thriving social-democratic societies and thereby we have a sense of positive freedom resting on our thorough interdependence upon one another and the larger, 'more than human' webs of social and ecological relationships. Much of the 'green shift' will be accomplished and critical progress will be made in repairing and restoring the ecosystems we have plundered with such catastrophic results over the past two centuries. This will entail high levels of equality – starting with income and gender equalities – that are further accompanied by very high levels of trust in our sister and fellow citizens as well as in our education, health care, political institutions and our diverse media institutions, starting with strong public-service media. In this cultural/social/political/ecological environment – in these large contexts – internet-facilitated communication of all sorts will have been established as public goods at national and international levels within Scandinavia and the EU. This means gaining funding for new infrastructures and support for democratically determined forms of education and regulation.

"Education must go far beyond the generic sorts of 'digital literacy' that tend to focus on basic how-to's of digital technologies. A robust and democratically/humanistically-oriented digital education includes attention to digital media alongside other media that remain centrally important. Diverse media technologies entail diverse affordances, styles and capacities for thought and expression and so forth. This education would begin with a thorough examination of the role of freedom of expression in service to democratic societies, norms, processes and so on. This would include an understanding of the classic limits to freedom of expression – i.e., its forms, such as hate speech, defamation, and any speech that does not contribute to open and informed democratic debate and deliberation. Such well-educated citizens could largely be trusted to recognize and respect the boundaries between democratically oriented freedom of expression and merely destructive speech, and thereby have a better sense of how to engage more fruitfully in democratic deliberation.

"There will be reporting of and sanctions for the occasional scoundrel, neo-Nazi propagandist, etc., who intentionally steps over these lines (which, of course, are constantly under negotiation and

contest). Both informal and formal forms of reporting and, if need be, sanctioning would be ordered (e.g., fines and, worst-case, in sentencing to genuinely rehabilitative facilities such as those that currently operate in Norway and the surrounds).

"These sorts of communicative environments would help us realize the best possibilities of these communication technologies, much as was hoped for in the early days of the internet and computer-mediated communication. Those early utopian visions of the internet have taken a beating over the last decade and more in the contexts of an ever-growing digital authoritarianism, surveillance capitalism, the dark web, etc. My experiences over the last decade in Scandinavia, however, tell me that positive digital environments remain real possibilities, given the needed conditions. However, if only relatively niche domains such as these are established, an open question remains as to how these internets or social media as 'public goods' would relate to the digital realms of the larger world, as shaped and defined far more by digital authoritarianism and/or surveillance capitalism. But I can hope and, perhaps trust, that the sorts of informed, capable, equal and engaged democratic participants I envision as participating in such social/public spaces will thereby be as well-equipped as anyone to tackle such issues, among others, in responsible and democratically-viable ways."

Mark Davis, associate professor of media and communications at the University of Melbourne, wrote, "Despite all of its emerging downsides, the internet remains a wonderful canvas. With a deadline of 2035, we could easily remake that canvas. But first a conversation has to be had about the *offline* world. Yes, different groups have different values, but what commonly held standards do we share as a planetary community of shared destiny, public accountability and empirical verifiability, and how do we then (re)build a digital network infrastructure that reflects and supports those standards? Specific solutions involve nationally-based regulatory frameworks that encourage investment, innovation, commercial and civic diversity and freedom of expression in the context of a renewed adherence to agreed standards of public good. International charters of online governance might do similar work at supranational level. Is the internet a failed social experiment or an opportunity? One way of thinking about this is to suggest that we have just about reached digital rock bottom. The rapid spread of COVID-19 disinformation, the hijacking of digital political conversation by international hacker groups, the online coming together of hate groups from white supremacists to QAnon conspiracy theorists that led to the invasion of the U.S. Capitol in 2021, the millions of dollars spent by fossil fuel companies to support online anti-science disinformation on global warming, the division of the world into digital haves and have nots, the subjugation of entire populations to facial recognition and other surveillance technologies, combined with the ever-growing wealth of tech companies who profit from all this, suggest a system that is deeply broken. Whatever mechanisms are used, we need to work collectively to reimagine digital networks as a genuinely useful infrastructure for creative global connectedness and the fostering of hope."

Andrea Romaoli, an international lawyer expert in AI and a leader of the United Nations Global Compact, responded, "Digital life offers high potential to help the world recover from pandemic damages. The way it should be accomplished is through transformational governance, a resilient and sustainable process that emphasizes the one sovereignty that matters, which is the sovereignty of human rights in all spheres, including technology. As a way to strengthen the UN SDG 16.4 for peace, justice and strong institutions, there must be improved working relationships with national police authorities, judicial institutions and investigative units through collaboration. Actions can be taken to empower women globally by teaching them how to manage nongovernmental organizations that work along with governments to promote humanitarian goals and more-effective laws to protect refugees, women and children. Leadership by women is not optional. Leadership by women is a matter of survival for the planet. Sustainability depends on the care and assertive vision of women: halting violence, preserving natural resources, ensuring equality among human beings and loving the future generations and working to guarantee the only sovereignty that matters – the sovereignty of life. Sustainable actions contribute to the resilience of business strategies and to the life of the planet."

Grace Wambura, media relations associate at DotConnectAfrica, based in Nairobi, said, "I imagine living in Shared Planetary Life Spaces where our digital life will always be on, a world where individuals are in control. The best knowledge, tools, resources and opportunities to succeed could be accessed freely. And, using a universal interface, everyone could run their entire Expandiverse from everywhere."

About this canvassing of experts

This report shares the second of two sets of results emerging from a series of questions posed in the 13th "Future of the Internet" canvassing by Pew Research Center and Elon University's Imagining the Internet Center. The first report covered expert responses to the question of whether online spaces can be improved by 2035.

In the canvassing, participants were asked to respond to several questions about the tone and impact of the online environment and the trajectory of activities in the digital public sphere that have recently been raising deepening societal concerns. Invitations to participate were emailed to more than 10,000 experts and members of the interested public. They were invited to weigh in via a web-based instrument that was open to them from June 29-Aug. 2, 2021. Overall, 862 people responded to at least one question; 434 responded to this question and their answers are covered in this report. Results reflect comments fielded from a nonscientific, nonrandom, opt-in sample and are not projectable to any population other than the individuals expressing their points of view in this sample.

The *entirety* of this particular report is based upon these participants' responses to the following prompt, which was the final question of several that were asked of this group:

> ***We invite you to imagine a better world online:*** *What is one example of an aspect of digital life that you think could be different in 2035 than it is today? We invite you to create a vignette of something you would like to see taking place in a "new and improved" digital realm in 2035. Your example might involve politics or social activities or jobs or physical and mental health or community life or education. Feel free to think expansively and specifically.*

In order to understand the context of these responses, it is important to note that participants were asked to respond to the following sets of questions *before* the question that generated the answers covered in this report.

> ***The evolution of digital spaces by 2035:*** *This canvassing of experts is prompted by debates about the evolution of digital spaces and whether online life is moving in a positive or negative direction when it comes to the overall good of society. Some analysts and activists are fearful about the trajectory of digital activities; others are less concerned about the things that are happening. So, we start with a question about the way you see things evolving.*

The question: *Considering the things you see occurring online, which statement comes closer to your view about the evolution of digital spaces:*

- *Digital spaces are evolving in ways that are both positive and negative.*
- *Digital spaces are evolving in a MOSTLY POSITIVE way that is likely to lead to a BETTER future for society.*
- *Digital spaces are evolving in a MOSTLY NEGATIVE way that is likely to lead to a WORSE future for society.*
- *Digital spaces are not evolving in one direction or another.*

Results for this question regarding the current evolution of digital spaces:

- **70%** said digital spaces are evolving in **ways that are *both* positive and negative.**
- **18%** said digital spaces are evolving in **a mostly negative way that is likely to lead to a worse future for society.**
- **10%** said digital spaces are evolving in **a mostly positive way that is likely to lead to a better future for society.**
- **3%** said digital spaces are **not evolving in one direction or another.**

The following quantitative prompt and research questions of this study were:

Bettering the digital public sphere: *An Atlantic Monthly piece by Anne Applebaum and Peter Pomerantsev, "How to Put Out Democracy's Dumpster Fire," provides an overview of the questions that are being raised about the tone and impact of digital life: How much harm does the current online environment cause? What kinds of changes in digital spaces might have an impact for the better? Will technology developers, civil society, and government and business leaders find ways to create better, safer, more-equitable digital public spaces?*

The question: *Looking ahead to 2035, can digital spaces and people's use of them be changed in ways that significantly serve the public good?*

-YES, *by 2035, digital spaces and people's use of them will change in ways that significantly serve the public good.*

-NO*, by 2035, digital spaces and people's use of them will NOT change in ways that significantly serve the public good.*

Results for the Yes-No quantitative question regarding the current evolution of digital spaces:

- **61%** said by 2035, digital spaces and people's uses of them **WILL** change in ways that significantly serve the public good.
- **39%** said by 2035, digital spaces and people's uses of them **WILL NOT** change in ways that significantly serve the public good.

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 studies, as well as those identified in a 2003 study of people who made predictions about the likely future of the internet between 1990 and 1995. Additional experts with proven interest in the health of the digital public sphere and related aspects of these particular research topics 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, ethics, political science, economics, social and civic innovation, 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 that focus on digital life 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, Amazon, Facebook, Apple and Twitter; leaders active in the advancement of and innovation in global communications networks and technology policy, 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 welcomed others to weigh in.

> *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. Some responses are lightly edited for style and readability.*

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, 64% of respondents answered at least one of the demographic questions. Fully 67% of these 550 people identified as male, 31% as female and 1% identified themselves in some other way. Some 77% identified themselves as being based in North America, while 23% are located in other parts of the world. When asked about their "primary area of interest," 39% identified themselves as professor/teacher; 14% as futurists or consultants; 12% as research scientists; 8% as advocates or activist users; 8% as technology developers or administrators; 7% as entrepreneurs or business leaders; 4% as pioneers or originators; and 8% specified their primary area of interest as "other."

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

Charles Anaman, founder of waaliwireless.co, based in Ghana; **Anna Andreenkova,** professor of sociology at CESSI; **Peng Hwa Ang,** professor of media law and policy at Nanyang Technological University, Singapore; **Chris Arkenberg,** research manager at Deloitte's Center for Technology Media and Communications; **John Battelle,** co-founder and CEO of Recount Media; **Robert Bell,** co-founder of Intelligent Community Forum; **Lucy Bernholz,** director of Stanford University's Digital Civil Society Lab; **Bruce Bimber,** professor of political science and founder of the Center for Information Technology and Society at the University of California-Santa Barbara; **Valerie Bock,** principal at VCB Consulting; **Gary A. Bolles,** chair for the future of work at Singularity University; **danah boyd,** founder of the Data & Society Research Institute and principal researcher at Microsoft; **Stowe Boyd,** managing director and founder of Work Futures; **Tim Bray,** founder and principal at Textuality Services (previously at Amazon); **Jamais Cascio,** distinguished fellow at the Institute for the Future; **Vinton G. Cerf,** vice president and chief internet evangelist at Google; **Barry Chudakov,** founder and principal at Sertain Research; **Christina J. Colclough,** founder of the Why Not Lab; **Susan Crawford,** a professor at Harvard Law School and former special assistant in the Obama White House; **Willie Currie,** retired global internet governance leader with the Independent Communications Authority of South Africa; **Mark Davis,** associate professor of communications at the University of Melbourne; **Amali De Silva-Mitchell,** founder/coordinator of the IGF Dynamic Coalition on Data-Driven Health Technologies; **Cory Doctorow,** activist journalist and author of "How to Destroy Surveillance Capitalism"; **Stephen Downes,** expert with the Digital Technologies Research Centre of the National Research Council of Canada; **Esther Dyson,** internet pioneer

and executive founder of Wellville.net; **Ayden Férdeline,** public-interest technologist based in Berlin, Germany; **Seth Finkelstein,** principal at Finkelstein Consulting and Electronic Frontier Foundation Pioneer Award winner; **Marcus Foth,** professor of informatics at Queensland University of Technology; **Mei Lin Fung,** chair of People-Centered Internet; **Oscar Gandy,** emeritus scholar of the political economy of information at the University of Pennsylvania; **Jerome Glenn,** co-founder and CEO of The Millennium Project; **Michael H. Goldhaber,** author, consultant and theoretical physicist who wrote early explorations on the digital attention economy; **Jonathan Grudin,** principal human-computer design researcher at Microsoft; **Don Heider,** executive director of the Markkula Center for Applied Ethics at Santa Clara University; **James Hendler,** director of the Institute for Data Exploration and Applications and professor of computer, web and cognitive sciences at Rensselaer Polytechnic Institute; **Perry Hewitt,** chief marketing officer at data.org; **Brock Hinzmann,** co-chair of the Millennium Project's Silicon Valley group; **Terri Horton,** work futurist at FuturePath; **Gus Hosein,** executive director of Privacy International; **Alexander B. Howard,** director of the Digital Democracy Project; **Stephan G. Humer,** sociologist and computer scientist at Fresenius University of Applied Sciences in Berlin; **Alan S. Inouye,** director of the Office for Information Technology Policy at the American Library Association; **Jeff Jarvis,** director of the Tow-Knight Center for entrepreneurial journalism at City University of New York; **Frank Kaufmann,** president of the Twelve Gates Foundation; **Michael Kleeman,** senior fellow at the University of California-San Diego; **Hans Klein,** associate professor of public policy at Georgia Tech; **Bart Knijnenburg,** associate professor of human-centered computing at Clemson University; **David J. Krieger,** director of the Institute for Communication and Leadership; **Kent Landfield,** chief standards and technology policy strategist; **Larry Lannom**, vice president at the Corporation for National Research Initiatives (CNRI); **Mike Liebhold,** distinguished fellow, retired, at The Institute for the Future; **Leah Lievrouw,** professor of information studies at UCLA; **Sean Mead,** strategic lead at Ansuz Strategy; **Russell Newman,** associate professor of digital media and culture at Emerson College; **Beth Simone Noveck,** director of the Governance Lab; **Jay Owens**, research and innovation consultant with New River Insight; **Alejandro Pisanty,** professor of internet and information society at National Autonomous University of Mexico (UNAM); **David Porush**, writer and longtime professor at Rensselaer Polytechnic Institute; **Calton Pu,** professor of computer science, software chair and co-director of the Center for Experimental Research Systems at Georgia Tech; **Alexa Raad**, chief purpose and policy officer at Human Security; **Courtney C. Radsch,** journalist, author and free-expression advocate; **Srinivasan Ramani,** Internet Hall of Fame member and pioneer of the internet in India; **Rob Reich,** associate director of the Human-Centered Artificial Intelligence initiative at Stanford University; **Howard Rheingold,** pioneering sociologist and author of "The Virtual Community"; **Eileen Rudden,** co-founder of LearnLaunch; **Douglas Rushkoff**, digital theorist and host of the NPR-One podcast "Team Human"; **Paul Saffo,** a leading Silicon Valley-based forecaster; **Scott Santens,** senior advisor at Humanity Forward; **Melissa Sassi,** Global Head of IBM Hyper Protect Accelerator; **Raashi**

Saxena, project officer at The IO Foundation; **Doc Searls,** internet pioneer and co-founder and board member at Customer Commons; **William L. Schrader,** advisor to CEOs, previously co-founder of PSINet; **Henning Schulzrinne,** Internet Hall of Fame member and former CTO for the Federal Communications Commission; **Evan Selinger,** professor of philosophy at Rochester Institute of Technology; **Toby Shulruff,** senior technology safety specialist at the National Network to End Domestic Violence; **Mark Surman,** executive director of the Mozilla Foundation; **Brad Templeton,** internet pioneer, futurist and activist, chair emeritus of the Electronic Frontier Foundation; **Joseph Turow,** professor of media systems and industries University of Pennsylvania; **Maja Vujovic,** director of Compass Communications; **Wendell Wallach,** senior fellow with the Carnegie Council for Ethics in International Affairs; **Amy Sample Ward,** CEO of the Nonprofit Technology Enterprise Network; **David Weinberger,** senior researcher at Harvard's Berkman Center for Internet and Society; **Brooke Foucault Welles,** associate professor of communication studies at Northeastern University; **Jeremy West,** senior digital policy analyst at the Organization for Economic Cooperation and Development; **Andrew Wyckoff,** director of the OECD's Directorate for Science, Technology and Innovation; **Christopher Yoo,** founding director of the Center for Technology, Innovation and Competition at the University of Pennsylvania; **Amy Zalman,** futures strategist and founder of Prescient Foresight; **Ethan Zuckerman,** director of the Initiative on Digital Public Infrastructure at the University of Massachusetts-Amherst.

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

AAI Foresight; Access Now; Akamai Technologies; Altimeter Group; Amazon; Aoyama Gakuin University; American Institute for Behavioral Research and Technology; American Library Association; APNIC; Arizona State University; Asian Development Bank; The Associated Press; Australian National University; Brookings Institution; Berkman Klein Center for Internet & Society; Carnegie Endowment for International Peace; Carnegie Mellon University; Center for a New American Security; Center for Data Innovation; Center for Global Enterprise; Center for Strategic and International Studies; Centre for International Governance Innovation; Cisco Systems; City University of New York; Columbia University; Convocation Design + Research; Core Technology Consulting; Cornell University; Council of Europe; Data & Society Research Institute; Dell EMC; Deloitte; The Digital Democracy Project; Digital Value Institute; Diplo Foundation; DotConnectAfrica; Electronic Frontier Foundation; Emerson College; European Broadcasting Union; Foresight Alliance; FuturePath; Georgia Institute of Technology; Global Internet Policy Digital Watch; Global Village Ltd.; Global Voices; Google; Gridmerge; The Hague Center for Strategic Studies; Harvard University; Hochschule Fresenius University of Applied Sciences; Hokkaido University; IBM; Internet Corporation for Assigned Names and Numbers (ICANN); IDG; Information Technology and Innovation Foundation; Institute for the Future; International Telecommunication Union; Internet Engineering Task Force (IETF); Internet Society; Institute of

Electrical and Electronics Engineers (IEEE); IO Foundation; Juniper Networks; Leading Futurists; Lifeboat Foundation; London School of Economics and Political Science; MacArthur Research Network on Open Governance; Massachusetts Institute of Technology; Menlo College; Mercator XXI; Michigan State University; Microsoft Research; Millennium Project; Mozilla; Nanyang Technological University, Singapore; New York University; Namibia University of Science and Technology; National Autonomous University of Mexico; National Research Council of Canada; Nigerian Communications Commission; Nonprofit Technology Network; Northeastern University; North Carolina State University; OECD; Olin College of Engineering; The People-Centered Internet; The Providence Group; Ranking Digital Rights; Recount Media; Rensselaer Polytechnic Institute; Rice University; Rose-Hulman Institute of Technology; RTI International; San Jose State University; Santa Clara University; Singularity University; Singapore Management University; Smart Cities Council; Södertörn University, Sweden; Social Brain Foundation; Social Science Research Council; Sorbonne University; South China University of Technology; Stanford University; Stevens Institute of Technology; Syracuse University; Tallinn University of Technology; Team Human; The TechCast Project; Tech Policy Tank; Telecommunities Canada; Textuality; Tufts University; The Representation Project; Twelve Gates Foundation; Twitter; United Nations; University of California, Berkeley; University of California, Los Angeles; University of California, San Diego; University College London; University of Hawaii, Manoa; University of Texas, Austin; the Universities of Alabama, Arizona, Dallas, Delaware, Florida, Maryland, Massachusetts, Miami, Michigan, Minnesota, Oklahoma, Pennsylvania, Rochester, San Francisco and Southern California; the Universities of Amsterdam, British Columbia, Cambridge, Cyprus, Edinburgh, Groningen, Liverpool, Naples, Oslo, Otago, Queensland, Toronto, West Indies; UNESCO; U.S. Army; U.S. Geological Survey; U.S. National Science Foundation; Venture Philanthropy Partners; Verizon; Virginia Tech; Vision2Lead; Vision & Logic; Waaliwireless.co; Waseda University, Tokyo, Japan; Wellville; Wikimedia Foundation; Work Futures; World Bank Group Nepal; World Economic Forum; World Wide Web Foundation; World Wide Web Consortium; Xponential; and Yale University Center for Bioethics.

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

https://www.elon.edu/u/imagining/surveys/xiii-2021/hopes-for-digital-life-2035/credit/

https://www.elon.edu/u/imagining/surveys/xiii-2021/hopes-for-digital-life-2035/anon/

Acknowledgments

We are extremely thankful for the contributions of the people who participated in this canvassing.

This report is a collaborative effort based on the input and analysis of the following individuals.

Primary researchers

Janna Anderson, *Director, Elon University's Imagining the Internet Center*
Lee Rainie, *Director, Internet and Technology Research*

Editorial and graphic design

Margaret Porteus, *Information Graphics Designer*
David Kent, *Senior Copy Editor*
Rebecca Ann Leppert, *Editorial Assistant*

Communications and web publishing

Sara Atske, *Associate Digital Producer*
Kelsey Beverage, *Communications Associate*