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Executive summary



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The Internet has profoundly shaped our world and has changed our lives in both big and small ways. The technology change around us has happened both quickly and imperceptibly. The very first connections between computers nearly fifty years ago have been transformed into a wave of connectivity that covers the planet. New devices and innovations have given us more ways to harness the power of connectivity wherever we go and have given us functionality we could never have imagined.

We shouldn't underestimate the fundamental changes that faster, more affordable access to the Internet has already brought and will continue to bring to humanity. The question is whether we are ready for what's coming next.

Now is a big moment for the Internet. As we engaged with our community in the development of this report, it became clear that people are anxious about the future of the Internet. Some see a frightening future that awaits us in a technology-driven world. There are conflicting views around whether the Internet is a positive or a negative influence and while it becomes more and more central to our

modern lives, we find that some are beginning to reject the globalised world view that it has fostered. On the other hand, communities just coming online see the Internet as "life" — as their connection to opportunity and freedom — and they want a chance to influence its future.

This report serves to remind us that humans are at the very heart of the Internet. It reminds us that every one of us has a stake. Recognising this responsibility, the report suggests that we need to begin to think differently to acclimatise to the changes we are seeing. Just as the Internet is a mirror to society, we must better understand that it will reflect both the good and the bad that exists in the world. Most importantly though, this report reasserts our belief that the Internet belongs to everyone and that, as its custodians today, we all have a duty to shape its future.

Our hope is that the insights and recommendations put forward in this report will play a role in helping us all to set the Internet on the path that best serves the needs of an evolving society in the years to come.



Report background

In 2016, the Internet Society launched a project to better understand the forces of change that will shape the Internet over the next five to seven years. We engaged with a broad community of Members, Internet Society Chapters, experts and partners. We conducted three global surveys and two regional surveys that generated more than 3,000 responses from 160 countries. We also interviewed more than 130 Internet experts and users, and hosted more than 10 roundtables.

Through these surveys and interviews, the community identified six key forces — or ‘Drivers of Change’ — that will have a profound impact on the future of the Internet in the years to come:

- **The Internet & the Physical World**
- **Artificial Intelligence**
- **Cyber Threats**
- **The Internet Economy**
- **Networks, Standards & Interoperability**
- **The Role of Government**

The Drivers encompass technological, economic, regulatory, security and network related challenges for the Internet of the future. In all cases, each force of change is inextricably tied to the other Drivers — for example, we fully expect to see an expansion

of the role of government in Internet decision-making as a consequence of result of growing and ever more serious cyber threats. Or, we can see that standards and interoperability are crucial to the future of the Internet of Things. In the hyperconnected world of tomorrow, these Drivers of Change will be increasingly interwoven, presenting ever more complicated social, economic and policy challenges for society to grapple with.

While these six Drivers of Change are interesting and important, what was clear from the outreach conducted was that the global Internet community is looking at these Drivers through the lens of three areas of impact. These are:

- **Digital Divides**
- **Personal Freedoms & Rights**
- **Media & Society**

These Areas of Impact are consistent with the Internet Society’s mission to put the user at the centre of the equation when considering the future of the Internet. The ability for a user to connect, speak and share, as well as to innovate, choose the services and information they want to access, and trust the network, will all be impacted by the Drivers of Change.

For example, while the Internet of Things (IoT) will certainly influence the future Internet landscape, our community was focused on the implications of IoT for security or privacy (Personal Freedoms and Rights). And just as all sectors of the global economy will be transformed by the Internet, the question for us is whether this transformation will bring about *global* benefits or whether some parts of the world will fall further behind (Digital Divide).

Both the Drivers of Change and the Areas of Impact highlight the challenges and opportunities that users, communities and societies will face in the immediate future. And as the Drivers of Change and Areas of Impact were further discussed, and the breadth of the challenges and opportunities considered, some overarching themes were identified:





- There is a sense of both optimism and disillusionment about the future promise of the Internet.
- The rise of nationalism is challenging our basic notions of global interconnectedness and threatens to fragment the global Internet.
- Civil Society is seen as more important than ever, but support for it is seen to be declining.
- The Internet must remain user centric for it to be trusted and for its future potential to be realised.
- Addressing cyber threats should be *the* priority — it is critical for individual safety and for the future Internet economy.
- New thinking, new approaches and new models are needed across the board, from Internet policy to addressing digital divides, from security approaches to economic regulation.
- Multistakeholder approaches to Internet policy will become ever more relevant in a world in which the physical and the digital worlds converge and as the cross-border nature of Internet challenges becomes clear.
- Ethics will grow in importance as technical innovation accelerates and impacts people's lives.
- We are seeing what it means for the global Internet to reflect society; we should not be surprised that bad behaviours from the offline world are seeping into the online world.
- The core values and technical properties of the Internet remain as important as ever.

Conscious of the need for a way forward to address the challenges before us, we conclude the report with a set of recommendations derived from input from our community. These offer a basis on which policymakers, technologists, business persons and activists can act — as soon as possible — to ensure that the future Internet remains user centric, that it upholds and reasserts our freedoms and rights and that it continues to work for the benefit of all.



Drivers of Change

We can expect the world to change fundamentally over the next five to seven years with the convergence of the **Internet and Physical Worlds** and the deployment of the Internet of Things (IoT). When everything that can be connected is connected, whole economies and societies will be transformed. Services will become more efficient and data driven, providing new ways for us to interact with the world around us. However, increased security threats and device vulnerabilities, as well as incompatible standards and a lack of interoperable systems, could well undermine the technology's promise. Without appropriate safeguards and deliberate efforts to ensure transparency and user control, IoT could drive data collection and use in ways that further undermine privacy.

The advent of **Artificial Intelligence** (AI) promises new opportunities, ranging from new services and breakthroughs in science, to the augmentation of human intelligence and its convergence with the digital world. While there is significant hype about the possibilities that AI may bring, voices of concern about its unfettered development without appropriate human-centred safeguards are growing. In particular, ethical considerations must be prioritised in the design and deployment of AI technologies. We must ensure that humans remain in the “driver's seat” and that serendipity and choice are not undermined.

Perhaps the most pressing danger to the future of the Internet is the rising scope and breadth of **Cyber Threats**. As new technologies such as AI and IoT increase our dependence on the network, the severity of security challenges and vulnerabilities grows in parallel. At the same time, the continued success of the Internet as a driver for economic and social innovation is tied to how we respond to these threats. Insufficient attention to security will undermine trust in the Internet. Indeed, human safety is at stake. Stakeholders must do more to mitigate cyber threats — we may need to consider new accountability, incentive and liability models to encourage stakeholders to dramatically increase cybersecurity readiness and reduce vulnerabilities.

Yet, we cannot afford to let the ‘securitisation’ of the Internet, and our digital lives, run rampant: there is a very real threat that online freedoms and global connectivity will take a back seat to national security. Given the growing pressure from cyber threats and security challenges such as terrorism, the ease with which our open societies and our freedoms and rights could become subordinate to pervasive surveillance regimes facilitated by AI and IoT should not to be underestimated.



How we manage the deployment of IoT and AI, and how we address the growing cyber threat will determine whether we reap the benefits of what one community member called the next industrial and technological “Renaissance”. We are on the verge of a technological transformation that will disrupt economic structures and force businesses to think and act like technology companies as billions of devices and sensors connect to the network. The hyperconnected **Internet Economy** that results will see traditional industries morphing, emerging economies thriving and new market leaders from around the globe driving innovation and entrepreneurship. Yet, it is far from clear whether this technology-driven disruption will favour the existing Internet platforms or bring greater competition and entrepreneurship. Stakeholders will need to work together to ensure that they are appropriately equipped to adapt to the economic and social pressures the new Internet economy will bring.

This state of change will also shape the evolution of **Networks, Standards and Interoperability** and the architecture of the Internet. A proliferation of connected systems and mobile devices will result in ubiquitous connectivity requiring greater bandwidth and interoperability. The network edge will become more complex with large numbers and types of devices connecting to multiple new services, such as IoT; and, the nature of transit will change with the increasing use of CDNs, caching and other specialised services that flatten the network hierarchy. Taken together, the evolving

edge and decline in transit may put pressure on the general-purpose Internet and its ability to support competition, and ongoing evolution and innovation. Additionally, developers are increasingly relying on proprietary standards which will be a barrier to innovation and interoperability. Open standards development will need to evolve to ensure standards are still relevant in a world of competing proprietary systems.

Finally, governance models and policies must evolve. As the Internet grows and expands into more areas of our economy and society, **Governments** will be faced with a host of new and complex issues that will challenge all aspects of their decision-making. Their responses to these challenges will impact not only freedoms and rights and the economy, but also the Internet itself. New technologies and game-changing business models will force governments to work differently — today’s structures and policies will be quickly outdated. Internationally, cyber security issues will drive global governance discussions for the foreseeable future, with governments pressured to make decisions that could undermine the open and distributed global governance of the Internet. Populist trends around the world will undermine decades of interconnected policy goals in ways that could fragment the core architecture of the Internet and undermine its global promise. Despite broad recognition of the need for multistakeholder approaches to Internet policy, the awkward dance between multistakeholder and multilateral approaches to Internet policy at the international level will continue.



Areas of Impact

While the future of the Internet depends on how technology, policy and economic factors play out, it was clear that our community was focused on the implications of these changes on some key vectors — Personal Freedoms and Rights, Media and Society, and the Digital Divide — the Areas of Impact.

Data shows that, while we still have a long way to go, the **Digital Divides** as we have historically defined it — those who have access to the Internet versus those who do not — is closing. Yet, the threat of new divides will emerge in the future, driven by developments in technologies and networks, as well as by the lack of economic opportunity and cyber readiness. As the Internet continues to transform every sector of the global economy, the digital divides of the future won't just be about access to the Internet, but also about the gap between the economic opportunities available to some and not to others. These new divides will not only deepen disparities between countries — in particular, between developing and developed nations — but also within countries.

Perhaps most worrying is the increasing likelihood of a security and trust divide: cyber threats will continue to multiply and users who lack the skills, knowledge and resources to protect themselves and their data will be far more likely to become victims of cybercrime. Thus, we will see a divide emerge between the security “haves” and the “have nots”. Addressing this digital security divide will be critical to realising the full potential of the future Internet.

The future of the Internet is inextricably tied to people's ability to trust it as a means to improve society, empower individuals and enable the enjoyment of **Personal Freedoms and Rights**. Younger users and those in developing countries are particularly optimistic about the future of the Internet and the ability to use the technology to better their lives and create their futures. Yet, the Internet also brings challenges to human rights like privacy and free expression. Technologies like Artificial Intelligence and the Internet of Things will enable the generation and collection of enormous amounts of information about individuals that can be analysed in ways that are deeply personal, raising the potential for a “surveillance society” to emerge. At the same time, these technologies and applications also provide the potential to enhance these personal rights and freedoms, but only if ethical considerations steer technology development and guide their use.

We worry that as the scope and severity of cyber threats continues to grow, and as global Internet platforms are used to deliberately spread disinformation, users will lose trust in the Internet. Governments are under increasing political, economic and social pressure to respond to cyber threats, terrorism and violent behaviour online. Measures that may be intended to secure cyberspace will increasingly undermine personal rights and freedoms. Without a change of course, personal freedoms and rights online may well be nearing a point of irreversible decline.



The relentless march towards ever greater levels of connectivity will continue to bring new shifts in **Media and Society**. Emerging technologies and the growing interconnectedness of our economies will continue to shape social practices, how communities are formed, how opinions are shared. As the Internet evolves further, we can expect it to bring new pressures that will impact our interaction across the converging online and offline worlds in new ways.

The changing media ecosystem will continue to evolve, bringing new voices, but also less trust. While democratising access to information, the whirlpool of information and misinformation that exists online is raising real concerns about the long-term effects of new trends such as fake news. Unfettered extremism online and uncivil behaviour that breaks social conventions will erode social cohesion, trust in the Internet and even political stability.

Beyond this, as AI and automation change the labour market and displace some jobs while creating new ones, an economy that is more and more data-driven will create challenges for accountability and transparency. The lines between public and private sectors will blur and considerable anxiety may be created in the short term as people worry about the future of work and whether they have the skills to succeed in the new economy. It will be critical for society to plan for these disruptions in order to protect against the negative consequences they bring for people and communities.

Recommendations

In the Drivers of Change and Areas of Impact, the community identified a range of future challenges and opportunities. To help decision-makers address those challenges and benefit from the opportunities, the Internet Society asked its community to also suggest ways forward, solutions and other approaches for governments, businesses, civil society and other stakeholders to consider.

Some of the recommendations are targeted at specific stakeholders; others are designed to provide general food for thought. In all cases, the recommendations are focused on things that can be done now to rebuild trust in the Internet and to ensure that the users, individuals and citizens of the future can fully benefit from the socioeconomic opportunity the Internet can bring.