



Internet Society Global Internet Report

Consolidation in the Internet Economy

How will consolidation impact the Internet's technical evolution and use?



Introduction

Consolidation is not a new phenomenon, but often a natural evolution as industries and markets mature.

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Executive Summary

The Internet is changing. From the underlying infrastructure to the way users engage, it is evolving in many ways.

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Introduction

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In 2017, the Internet Society published a comprehensive study to better understand the forces of change that will shape the Internet over the next five to seven years: [The 2017 Global Internet Report: Paths to Our Digital Future](#). These forces, or “Drivers of Change,” were identified through extensive consultations with experts in and out of the Internet Society’s global community. The drivers encompass technological, economic, regulatory, security, and network-related opportunities and challenges for the Internet of the future. Among the driving forces our community identified was the Internet economy.

Specifically, the community identified a concern that a lack of competition and increased market concentration could have severe implications for the Internet’s technical evolution and use. Our goal for this new report was therefore to explore trends of consolidation in the Internet economy, guided by the central question: *Are there trends of consolidation in the Internet economy, and if so, how will consolidation impact the Internet's technical evolution and use?*

Consolidation is not a new phenomenon, but often a natural evolution as industries and markets mature. Opportunities to reduce costs, expand market share, and enhance scalability are intrinsic incentives in any economic domain where companies acquire competitors or incorporate parts of the production chain. This is also true for the Internet economy, where we’ve seen some trends of consolidation in various markets. These are understood as growing forces of concentration, vertical and horizontal integration, and shrinking opportunities for market entry and competition.

The fact that a few corporations dominate large parts of the Internet is not news. Today, a handful of actors play a significant role in our increasingly-connected societies. In this context it’s important to consider what the implications of those trends are, not only from an economic perspective but also in terms of how they may shape the Internet in coming years.

What became evident throughout this work is that consolidation in the Internet economy raises a much more complex set of issues than what the popular press typically covers. Investigating trends of consolidation is indeed a challenging task because its impact is a complex story of benefits and threats. **As policymakers and other decision makers read this report, we hope they begin to understand this nuance, which manifests**



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Foreword by Andrew Sullivan, President and CEO, Internet Society

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The Internet Society develops its Global Internet Reports to bring significant features of the Internet's evolution to the attention of the global Internet community. The report normally contains some recommendations about the topic, proposing action to be taken or avoided as the topic and conditions warrant. This year, we examine the topics of concentration and consolidation on the Internet.

There can be little question that the Internet is facing change due to concentration and consolidation. The two patterns are linked but nevertheless distinct. We can observe the patterns at several levels:

- Transit on the Internet is consolidating. Long-haul transit operators are becoming fewer but larger because of mergers and acquisitions. Even in access provisioning, some jurisdictions are seeing fewer, larger ISPs and consolidated offerings across the market.
- Delivery of standard Internet services is consolidating in large providers. For several years now, for example, most Simple Mail Transport Protocol (SMTP) traffic has come from just a few mail service providers, who provide that service for a very large percentage of Internet users, including businesses. Similarly, the Domain Name System (DNS) services were historically operated in a highly distributed way. Today, a small number of large providers serve the domains of most commercially-significant domains on the Internet, and actual resolution of names (turning the names we click on into numbers that connect between computers) is often provided by a small number of resolvers. The DNS protocols are even changing in a way that reinforces this trend.
- Infrastructure, both to operate services and run applications, is increasingly provided in cloud and edge computing environments. These services deliver to even the smallest customers capabilities that were once available only to the largest operators, if they were available at all.
- Web applications and platforms, which are built atop the public Web but usually depend on proprietary APIs, appear to function as near monopolies. They are subject to rock star economics, where only the largest and most famous profit.



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Executive Summary

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The Internet is changing.

From the underlying infrastructure to the way users engage, the Internet is evolving in many ways. The Internet Society's 2017 report foresaw a hyperconnected Internet economy, one in which no sector of the economy or part of society would be untouched by technology. Among the other questions it posed, the report also asked if this technology-driven disruption would favour the existing Internet economy players, or usher in greater competition and entrepreneurship. In the 2019 report, the Internet Society explores the evolving Internet economy further. It examines the growing presence the Internet platforms have in the Internet economy, and what the implications might be for society, innovation, competition, and the economy, as well as the Internet's broader architecture.

In the 2019 report, the Internet Society asks whether the Internet economy is consolidating and, if it is, what the implications might be. From the dominance of Facebook in social messaging, Google in search and Amazon in online shopping, the largest Internet platforms are capturing fundamental human interactions. This dominance, and the finances and reach that accompany it, enable the platforms to extend their influence and reach into new market spaces, from autonomous vehicles, to AI, to cloud services and beyond. This leverage built on unprecedented network effects, vast troves of user data, business agility, and regulatory freedom that few other companies enjoy.

In this report, the Internet Society recognises the incredible convenience these platforms provide the Internet user. At the same time, the Internet Society also recognises the concerns that are being voiced about this dominance, and about the responsibility these companies have to society and economy. The 2019 report explores these issues by examining five key trends and themes that emerged from extensive engagement with the Internet Society community, and surveys and interviews with experts, thought leaders and influencers.

The first trend is what we call the evolution of "[total service environments](#)." The Internet platforms have evolved in providing a range of communications, entertainment, and productivity and lifestyle services and tools designed to be incredibly convenient. In essence, these environments provide default one-stop shops



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How We See the Internet

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Defining how we at the Internet Society see the Internet is an important first step. When we think about the Internet, what comes to mind for many of us is something beyond the technology of the Internet itself. By definition, the Internet is a technical system: a communications infrastructure that enables networks around the globe to interconnect. It's a network of networks. That said, over the past two decades, the Internet has come to mean far more than just the technology. With more than 4 billion people online today, the Internet is now an integral part of the social and economic fabric of many communities around the world.

In the text below, we identify the important properties that make the Internet such a powerful platform and describe what this means for the users of the Internet. [This framework will help to guide us in considering the questions of consolidation in the Internet economy.](#)

The Internet Society capitalises the term "Internet" to differentiate the global Internet from generic "internets," which can refer to any interconnected group of computer networks.¹

Fundamental properties of the Internet

In the history of humankind, few technologies have resulted in such widespread social and economic change in a relatively short period of time. Growing nearly 900% from 400 million in 2000 to more than 4 billion users today,² the Internet has had an unprecedented impact on economies and societies around the globe.

Conversely, the impact of the Internet on society has also transformed how we use the Internet. It is no longer just the home of email, static webpages, and discussion boards. Today's Internet is so much more. It's a dynamic space for collaboration, commerce, and expression. Video currently accounts for more than two-



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What Is Consolidation?

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Consolidation in the Internet Economy

The **Internet economy**, as understood in this report, is broadly defined as the economic activities that either support the Internet or are fundamentally dependent on the Internet's existence. This section presents an overview of current trends of consolidation in its affiliated markets, including growing forces of concentration, vertical and horizontal integration, and fewer opportunities for market entry and competition. The purpose is to give an overview of different markets, and to provide the analytical basis for the following sections that look closer at how these trends may influence the Internet's evolution.

Organised around three separate but closely linked economic domains ([Internet Applications](#); [Access Provision](#); and [Service Infrastructure](#)) this section is intended to provide a snapshot of various markets, and to describe how they relate to the Internet as a whole. As such, it is not intended to provide an in-depth economic analysis, nor is it exhaustive in terms of encompassing all relevant markets and services. Rather, it provides a starting point for further discussion.

Internet Economy

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Takeaways & Observations

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Key Features of the Consolidation of the Internet Economy

This section looks more closely at some of the features of the consolidation of the Internet economy. We uncovered 5 key features during the course of the research, which raised a broad span of issues, including how consolidation might shape the user experience, its impact on innovation, to how governmental or other stakeholders might respond to it. While not exhaustive, the list of considerations below helps us understand how consolidation trends in the future might impact the Internet and its users.

Total Service Environments



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Conclusions and Questions for the Future

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In this report, we have investigated trends of consolidation in and across different layers of the Internet economy, and how they may impact the evolution and use of the Internet in the future. We conducted this analysis through the lens of [how we at the Internet Society see the Internet](#). We specifically investigated the impact of consolidation on the Internet's fundamental properties¹ (or invariants), including interoperability, collaboration, flexibility, accessible, permissionless innovation, and the notion of global reach. Because we believe people are at the centre of the Internet, we also explored the impact of these trends on people's abilities to connect, to share, and to innovate.

While [this investigation enabled us](#) to better understand some [key features of consolidation](#), as well as the [impact of emerging trends on the development of the Internet and its use](#), it generated more questions than answers. To paraphrase Socrates, we know now that we know (almost) nothing. Unlike most of our previous reports, therefore, we conclude without a clear set of findings or policy recommendations, but rather with an even longer set of questions that we think demand clear answers and rigorous data before we can formulate clear evidence-based recommendations for responses. We feel strongly that hasty governance interventions to consolidation trends, especially from a policy perspective, could lead to unintended consequences and harms for the Internet and its users.

Most popular press coverage of consolidation fails to dive deep enough to fully grasp the issue. Our hope is that this report will help policymakers and other decision-makers understand that digital consolidation involves a complex set of issues, and that policy responses to consolidation will impact different layers of the Internet. Responding to consolidation trends in one field without considering how these trends echo and reverberate in other fields or layers could lead to unintended and damaging consequences for the Internet and economic development.

In order to build the evidence base we believe is crucial to develop a more thorough, comprehensive understanding of digital dominance and its consequences, we have identified some questions to provoke thought. **These questions also suggest ways to mitigate the negative effects and foster the positive impact of consolidation:**

- What are the relevant indicators for assessing the impact of consolidation over time? What metrics are available, and how can the Internet community collaborate to monitor trends over time?



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The 2019 Global Internet Report reflects comments and insights from across the Internet Society community and well beyond, including global and regional partners, Internet pioneers, and experts around the world. We appreciate the extensive contributions of Chapters, Organisation Members, individual members, and staff who shared important perspectives for this report.

The report was developed by a small team led by Constance Bommelaer de Leusse and Carl Gahnberg, following the strategic guidance of Andrew Sullivan, Sally Wentworth, Olaf Kolkman, and James Wood. Matthew Shears and Anri van der Spuy, consultants for the Internet Society, served as core members of the team, providing expertise and vision, and serving as lead writers together with Maria Farrell. We greatly appreciate their extensive work and contribution to this project. Special thanks to April Froncek and Mat Forc for their commitment, expertise, and invaluable guidance in bringing this project to completion, as well as to Mark Buell and Robin Wilton for their commitment to this initiative.

We also thank DiploFoundation for their support in data collection and analysis, and our four regional partners for organizing roundtables and producing reports: The Centre for Internet and Society; Research ICT Africa's Digital Policy Project; Diálogo Regional sobre la Sociedad de la Información (DIRSi); and Fundação Getulio Vargas (FGV).

Thanks to our staff subject matter experts for their invaluable comments and suggestions: Steve Olshansky, Ryan Polk, Jane Coffin, Konstantinos Komaitis, Christine Runnegar, Raquel Gatto, Verengai Mabika, Shernon Osepa, Karen O'Donoghue, Dan York, and Ceren Unal. We would also like to thank the Internet Society's community engagement team for facilitating dialogues and other outreach with our global membership, and our IT and communications teams for their support in creating the online and print versions of the report, as well as promotion, media outreach, and many other activities for its launch. Thank you to our web design partner Yoko Co., editor Allison Cross, and writer Maria Farrell. Finally, thank you to those who participated and shared their insights in the [Future Thinking interview series](#).



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Methodology

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The topic of consolidation and concentration in the Internet economy, along with these trends' impact on innovation and evolving competition, consumer and data protection laws in general, and the Internet's architecture in particular, is a complex one to research, analyse and understand. Indeed, in 2017 and 2018 an increased number of popular and academic works in different sectors and disciplines have prodded the topic from a variety of angles (many of which are cited in this work where relevant). But none of these have focus on the impact of these trends on the Internet's multifaceted architecture – and this is an important finding in itself for the report. By failing to investigate trends in and across the application, services, and access layers, existing work on these trends is lacking a comprehensive understanding of the very characteristics which not only enable people to benefit from using the Internet on a daily basis, but which have also helped certain companies leverage their size to gain digital dominance.

In attempting to fill this gap and to contribute a more holistic understanding of both the existence and the impact of consolidation and concentration trends for the Internet and its architecture, the *Global Internet Report* project team adopted a multidisciplinary, mixed method approach to gather both primary and secondary data on these trends. A primary objective of the research design was to elicit and gather opinions and perspectives from the global Internet community (Internet Society members and staff, Internet policymakers, technologists, academics, business leaders, and others around the globe) about the key forces of consolidation and concentration and their impact on the future evolution of the Internet. The analysis and consolidation of these opinions and perspectives form the core of the findings in the report.

The work was conducted in two phases. The first phase was concerned with data gathering, and the second with analysis. The two phases were iterative: as the need for more data on particular issues arose in the second phase, more research was therefore conducted.

Each of these activities, and the data points which were created by them, are briefly described below.

Phase I: Data gathering

The project team gathered community and expert input through a number of elements:



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Community Survey: Questions and Results

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In early 2018, the Internet Society conducted a global survey to gather qualitative and quantitative data from stakeholders, experts, and Internet users around the world. The survey was designed by the Global Internet Report project team based on key trends identified in the literature review .

In total, 1550 survey responses were submitted, and approximately 73% of respondents self-identified as Internet Society members. 27% of the respondents were from Latin America, with roughly the same number from Africa and Asia Pacific respectively (21%). 12% of the respondents were from North America and 16% from Europe.

These findings from the survey fed into the project team's Phase II analysis.

Survey Questions

Part 1

- **1.1 The ability to connect:** All Internet users, wherever where they live, should be able to connect to any other point to keep the Internet as a platform for innovation, creativity and economic opportunity.
 - Q: Do you feel that you can connect to anyone and anywhere on the Internet?
- **1.2 The ability to speak:** For the Internet to work as a medium for self-expression, users need to feel they can speak freely and collaborate without restriction. Private, secure and – when appropriate – anonymous communications let us express ourselves safely and securely.
 - Q: Do you feel that you can express yourself online in a safe and secure manner?
- **1.3 The ability to innovate:** The Internet was built on open connectivity and standards development. To keep it developing, so everyone can use it to innovate, we all need to be able to develop and distribute new applications and services on it.
 - Q: Do you feel you can develop new applications and services, without governmental or private sector restrictions?
- **1.4 The ability to share:** The Internet enables sharing, learning and collaboration based on fair use, and the





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Call for Papers: Special Issue on Internet Consolidation for Publication Spring 2020

The Internet Society and Chatham House are collaborating on a special issue of the Journal of Cyber Policy, on the impact of consolidation in the Internet's fundamental architecture, including structural dependencies across its many layers. All articles in the special issue will be open access.

In recent years there has been a growing debate around the influence of a few large Internet technology companies and the concentration of providers in consumer-visible and audible services. As a result, what was once widely viewed as a collective platform for limitless permissionless innovation, competition, and growth is increasingly experienced as a consolidated environment dominated by a few. The Internet Society and Chatham House are planning a special issue of the Journal of Cyber Policy, aimed at discovering the extent to which similar forces for market dominance could be affecting the Internet's fundamental architecture.

Through this call for papers, we are looking for interdisciplinary research across the fields of computer science, development, engineering, economics, mathematics, law, and political science to help us understand the extent, origins, and impact (both positive and negative) of consolidation. Researchers must produce evidence-based research, with the possibility of financial support for the collection of the relevant data.

Specific topics include, but are not limited to, the cyber policy implications of the following:

- Impact of consolidation on "digital divides" and network developments in developing economies.



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