



Strategy 2030

Wikimedia's role in shaping the future
of the information commons

OUR TEAM

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Many thanks to the hundreds of experts and Wikimedia movement members around the world who participated in salons, conversations, and interviews about the Wikimedia 2030 strategy.

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FOREWORD

A letter from the Wikimedia Foundation

Since its inception in 2001, Wikipedia has become one of the world's most popular and beloved websites—a rich source of reliable free information, written and maintained by volunteers. Today, Wikipedia is much more than a website. Wikipedia and related projects such as Wikimedia Commons and Wikidata form a global social movement: a complex network of writers, editors, researchers, photographers, academics, libraries, free culture activists, cultural institutions, and so much more. Together, we share a commitment to making free knowledge available to all.

Over the last 16 years, the Wikimedia movement has accomplished a great deal. Volunteers have written more than 46 million articles across nearly 300 languages. Each month, Wikimedia sites are accessed by more than 1.4 billion unique devices. And more than 200,000



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volunteers contribute to Wikimedia sites every month.

But there is still a long way to go. While our mission is global, Wikimedia does not yet serve the entire world. Billions of people have yet to access Wikipedia—or even the internet. Wikimedia traffic and participation skews toward North America and Western Europe, while other parts of the world are underrepresented on the platform. Efforts to spread disinformation and misinformation and enforce censorship online are increasingly sophisticated and prevalent. Now more than ever, the world needs shared human understanding, reliable information, inclusive spaces for public discourse, and advocates for free and open knowledge. That’s why, at the beginning of 2017, we asked ourselves: what should the Wikimedia movement do between now and 2030 to get closer to our vision of free knowledge for all?

The Foundation embarked on an ambitious global consultation, dubbed Wikimedia 2030, to collaboratively develop a direction for the Wikimedia movement. The discussion brought together volunteers, partners, experts, Wikimedia chapters and other affiliates, and Wikimedia

Foundation staff. Discussions took place in roughly 70 languages through live events, in person, on wiki, and more.

The goal was to form a common strategic direction for the movement—a guidepost for the work moving forward. As part of Wikimedia 2030, the Foundation commissioned research to inform conversations and contextualize trends that could affect Wikimedia from now until 2030. The resulting conversations and research from around the world culminated in a strategic vision and direction.

The contents of this report, and related briefs published throughout the strategy process, provided valuable perspective that informed our discussion and helped define our shared future. We will continue to rely on the findings in this report to open our thinking, imagine what might be next, and enlist new people and organizations in the work.

We invite you to read this report with an open and inquisitive mind. We hope that it prompts new questions not only about the future of the Wikimedia movement but also whatever movement, institution, or cause you may represent.

Finally, we’d like to express our deep

appreciation to our research partners and the authors of this report, Sarah Lutman and Jessica Clark (of Lutman & Associates and Dot Connector Studio respectively) for their dedication, curiosity, and patience.

INTRODUCTION

In 2016 and 2017, members of the Wikimedia movement took part in a global consultation to imagine the world in 2030 and the Wikimedia projects' role in it. With its vision of “a world in which every single human being can freely share in the sum of all knowledge,” the Wikimedia Foundation engaged in a global strategy development process, asking stakeholders to join the conversation and envision a future in which Wikimedia continues to expand its role in ensuring open knowledge, access, and the free exchange of information, culture, and ideas around the world.

As part of the Wikimedia 2030 strategy process, the Foundation engaged research teams to examine awareness and usage of Wikimedia projects and evolving information consumption habits. The consulting teams conducted desk research and spoke both with people familiar with and involved



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in the Wikimedia movement and expert observers who could inform the strategy process but who are not directly involved today. In one-on-one interviews, experts in geographic areas where the projects are most heavily used were asked to think about future trends in their fields and how the trends might apply to the Wikimedia movement's strategy. This particular research focused on six broad topics that seemed most likely to further or frustrate the vision for growth that the Foundation embraces.

In this report, the Foundation's staff and its consulting teams present top-level insights from this global process. Perspectives from interviewees around the world are also provided with context about their region and area of expertise. The report draws from six comprehensive research briefs, published on Wikimedia's strategy website, which address these topics:

- **Demographics:** *Who is in the world in 2030?* The report outlines global population trends, which project the highest population growth in places where Wikimedia has significant room to expand.
- **Emerging Platforms:** *How will people around the world be using communications technologies to find, create, and share information?* The report considers future technologies, from the imminent to the speculative, and examines what range of new hardware, software, and content production capabilities might mean for content creation and user access.
- **Misinformation:** *How will people find trustworthy sources of knowledge and information?* The report explores how content creators and technologists can ensure that knowledge is trustworthy and also identifies threats to these efforts.
- **Literacy:** *How will the world learn in the future?* The report forecasts that technology will transform learning and educational settings as well as expand the requirements for literacy beyond text and images.
- **Open Knowledge:** *How will we share culture, ideas, and information?* The report documents the global

“Wikipedia is the last poster child for commons-based peer production. The free software movement and various projects under it were important demonstrations but they are facing a crisis now because either they have been taken over by corporations, or there is the tragedy of the commons where many people use open projects but do not contribute money to fix or improve them. The Wikipedia movement is the only movement about true blue volunteer energy that is delivering results. Today Wikipedia is the inspiration for openness.”

POLICY/GOVERNMENT, SOUTH ASIA

“Knowledge poverty is a serious issue. Wikipedia should build a knowledge ladder to see who it is reaching and who [is] left out. And then make Wikipedia available to ones at the bottom.”

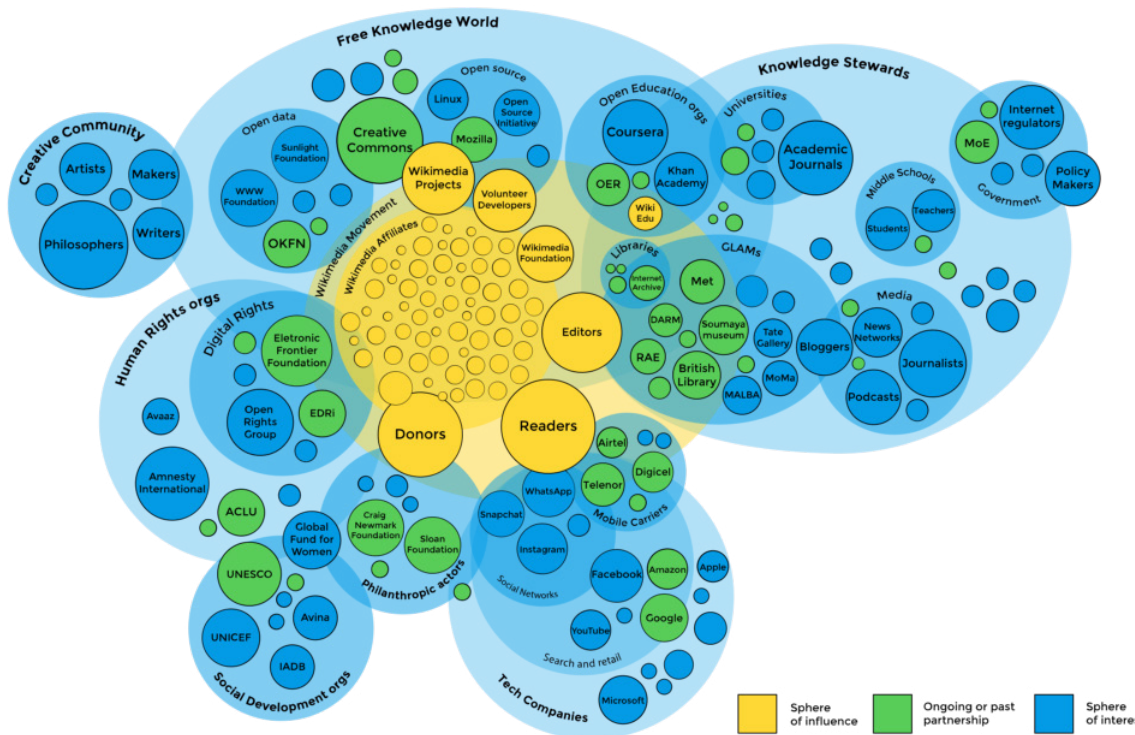
MEDIA, INDIA

“In a better future, people who are digitally literate [will become] fluent in organizing and vice versa.”

TECHNOLOGY, UNITED STATES

trend toward opening collections and archives to the public and making them freely available online, and explores ways the Wikimedia movement might partner with people and organizations to accelerate this sharing.

- **Expect the Unexpected:** *How can we know what the world will look like in 2030—and what the Wikimedia movement’s role will be in it?*



“Wikimedia should work closely with policy makers and internet regulators.”
 MEDIA, MEXICO

“Wikipedia can join the current advocacy to connect the unconnected. They are the ones that need Wikipedia.”
 MEDIA, NIGERIA

“Look at places with organic internet revolutions and making Wikimedia a player at the party, as opposed to lone ranger starting from scratch.”
 MEDIA, UNITED STATES

“The world of media monopoly is the challenge of our time. Where Wikimedia could come in in the future is as a counter-force to monopoly.”
 MEDIA, UNITED STATES

“We all can make a change and contribute to it. It’s really an idea. How do you see the world? What kind of world do you want? A power-centered world or a power-distributed world.”
 GLAM, CHINA



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The report proposes that a study of trends can never be truly predictive and introduces alternative visionary tools such as scenario planning and speculative social science fiction.

The consulting team published an ad-

ditional research brief on the future of the digital commons, examining the political and commercial forces that could lead to the contraction or expansion of the open web. Looking at the constellation of issues most important to the Wikimedia com-

munity, this brief identifies access, censorship, privacy, copyright, and intermediary liability as active battlefronts.

The fate of the digital commons is the single subject that rises above and intersects with each of the other areas of research. The commons of the future will shape the environment that ultimately fosters or blocks all of the Wikimedia projects' work. Thus, this report weaves research findings about the future of the commons throughout.

Specifically, the report highlights growing concerns across civil society about the quality of and access to open knowledge online, as well as compounding threats to the Wikimedia movement and its open knowledge allies. Between now and 2030, open knowledge advocates face headwinds that include censorship by governments and corporations, internet shutdowns, surveillance of users, information monopolies, and troubling developments such as the arrests of scholars and journalists operating in closed societies.

The Wikimedia movement is positioned to work toward potential solutions to these threats. Despite the trend

toward a “darkening globe,” some leaders see the Wikimedia movement as among the brightest hopes and most inspiring exemplars of the global digital commons.

The Wikimedia movement has immediate internal challenges to address, including adapting to an increasingly mobile internet, recruiting a new generation of volunteers, and expanding its partnerships with schools and “GLAM” organizations (i.e. galleries, libraries, archives, museums, and other cultural institutions that have access to knowledge as their mission). But Wikimedia and its open knowledge allies, working together, can lift up people everywhere, empowering communities through access and participation in knowledge creation and sharing. Across the interviews and salons, there was a clarion call for the building of this larger, more active, and multi-partner open knowledge movement.

For extended narratives, many more citations, and community discussion of the research, visit the Wikimedia strategy page that aggregates into a single web directory not only this work but also the totality of the Foundation’s strategy process: 2030.wikimedia.org.

The report concludes with an analysis of cross-cutting themes that arose from the research, as well as a set of recommendations and discussion questions for the movement and its partners. The goal of these final sections is not to close the discussion. Instead, it is to set the stage for the next phase of work for the Foundation and the movement: to move from strategies to actions that not only will preserve what has already been built, but also make the projects useful and vital for billions of future Wikimedia users.

DEMOGRAPHICS 2030

Who will be in the world in 2030?

Wikimedia envisions “a world in which every single human being can freely share in the sum of all knowledge.” But the Wikimedia projects, including Wikipedia and the other free knowledge projects like Wikimedia Commons, do not currently serve the entire globe. And realizing this vision might become even more difficult by 2030 as the global population shifts to favor areas and languages in which the projects are less used.

A country’s use of Wikimedia projects correlates directly with its economic strength. The 10 countries that generate the most traffic for Wikimedia¹ are also among the world’s 20 largest economies.² The United States accounted for 23 percent of all Wikimedia traffic in 2017, with Japan second at 8 percent. Europe and North America combined accounted for 63 percent of Wikimedia’s total traffic.

These high-traffic regions are not predicted to see the highest rate of population growth. The global population is expected to reach 8.4 billion by 2030, a

15 percent jump from 2015. Low-income regions have a projected 35 percent growth by 2030, with Africa growing fastest at 40 percent. High-income and



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middle-income regions are projected to experience moderate growth over this period, with growth rates of 5 percent and 14 percent, respectively. Europe is expected to decline in population by 2030.³

The urban population is increasing relative to the rural population in every region.⁴ Asia and Africa were the least urbanized regions in 2015, and they are expected to experience the fastest rates of urbanization.

Wikimedia must focus on serving people in high-growth regions to respond

to these trends. Africa currently accounts for a small portion of Wikimedia traffic, but the region presents a crucial opportunity for growth as its mobile and fixed IP traffic are predicted to increase substantially.

Population growth

- The global population will grow by 15 percent to 8.4 billion people between 2015 and 2030.⁵
- The rate of growth in low-income regions will far outpace high- and middle-income regions.⁶

Wikipedia Article and Contributor Rank by Language

LANGUAGE	NO. SPEAKERS (MILLIONS)	SPEAKERS RANK	ARTICLE RANK	CONTRIBUTION RANK
Chinese	1051	1	15	8
English	1010	2	1	1
Hindi	652	3	53	42
Spanish	570	4	9	3
Arabic	422	5	19	16
Malay	281	6	29	40
Russian	275	7	7	6
French	272	8	6	4
Portuguese	262	9	14	9
Indonesian	250	10	24	24

“The biggest issue for Wikimedia moving into the future is ultimately the education and wealth gap. You can have this conversation in a place that’s information rich and Wikipedia already seems utopian. But look at the trends and numbers. ...The gaps are becoming too big between the opportunities that different people have.”
GLAM (GALLERIES, LIBRARIES, ARCHIVES, AND MUSEUMS), UNITED STATES

“Senior citizens would play an important role in online knowledge management. They have time, experience, and knowledge to share with the online community.”
POLICY/GOVERNMENT, THAILAND

“Indian language content is not tagged or indexed well; hence, search does not find it. Wikipedia has a long way to go.”
TECHNOLOGY, INDIA

“In terms of access to knowledge . . . most content you find online in text is in English. There is very little in Indian languages.”
MEDIA, INDIA



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- Africa will grow the fastest with projections that the continent's population will increase by more than 40 percent.⁷
- Europe's population will plateau then

- decline during this period.⁸
- Urban areas will continue to grow faster than rural areas globally.⁹
- Africa will have the youngest median age by 2030.¹⁰

“Our population pyramid is bottom heavy: 50 percent of the population is under 18. This is important. We are already a country that has more mobile devices than mature adults in this country. This is truly a mobile first country and will continue to be because so many people who are accessing information for the first time are doing so via mobile.”

MEDIA, NIGERIA

“Crowdsourcing for Arabic content is weak and challenging. Expanding it will be the best way to increase local content. Growing the local communities is the key.”

EDUCATION, EGYPT

“One of my favorite things [about Wikipedia] is how much local control there is. There are two sides of the coin. One is really good: awesome people in different countries can get access to crowd-sourced information in their own language edited by their own people toward their own viewpoints and mindsets.”

GLAM, UNITED STATES

Aging of the global population

- Overall, the global workforce will age by 2030.
- The aging workforce will create labor shortages and other problems for some countries, as already seen in Japan.¹¹

Languages used

- Mandarin will remain the most widely spoken language.¹²
- Spanish will become the second most widely spoken language, with English, Hindi, and Arabic following in third through fifth places.¹³

Global literacy

- The proportion of the global population with no formal education will decrease.¹⁴

Wikimedia usage demographics

- In 2017, 49 percent of Wikimedia contributors were writing in English or simple English.¹⁵
- Wikimedia editors are overwhelmingly men (90 percent).¹⁶
- Most of Wikimedia's contributors and users are not located in parts of world

where the fastest growing populations are projected between now and 2030.

Strategy questions

- How can Wikimedia expand content and recruit editors in the parts of the world expected to grow most quickly over the next 15 years?
- How can Wikimedia projects be made more accessible to aging populations—and can those people be recruited as contributors?
- What shifts in editing protocols, sensibilities, or media may be needed to serve the users from distinct new cultures and geographies?

EMERGING PLATFORMS 2030

How will people around the world be using communications technologies to find, create, and share information?

There are many emerging information technologies to watch over the next 15 years, each of which has the potential to serve as:

- competition for the attention of Wikimedia project users,
- content or topics for Wikimedia projects,
- potential opportunities for distributing Wikimedia projects' content, or
- vehicles for spreading the ethos of open editing and sharing of content.

A Pew Research Center study suggests that while technology usage rates in emerging economies are accelerating, “people in advanced economies still use the internet more, and own more high-tech gadgets”—especially those who are young and affluent.¹⁷ In practice, this means that those just coming to the internet tend to use inexpensive mobile devices that prioritize social and chat



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apps, while people with more resources are juggling multiple, highly personalized methods and tools for accessing online information. This contrasts sharply with the desktop, browser, and search-engine

driven environment which has enabled Wikipedia to become one of the world's most used sites.

Fragmentation of platforms and user habits is slated to accelerate. In two widely

cited reports on technology innovation and usage, Mary Meeker and Amy Webb lay out the most likely new content types and platforms to mature between now and 2030—several of which, not incidentally, use mobile devices as a base for attracting users and shifting media consumption behaviors.¹⁸ These include bots, interactive interfaces, voice-driven personal assistants, and toys that are powered by artificial intelligence (AI); virtual reality (VR) and augmented reality (AR) for news, education and gaming; wearables; and ubiquitous interactive screens.

At the same time, people continue to use analog and offline forms of communication. In the United States, traditional offline media formats including live TV, radio, DVRs, and game consoles still dominate users' daily time—although, as is often the case, habits differ by generation with younger users gravitating to mobile.

After decades of digital disruption, older communications technologies do not vanish. Instead they linger and sometimes become more targeted to adjust to shifting consumer habits. Offline formats are also useful in geographic areas where internet access is limited. The Wikimedia Founda-

tion's New Readers team has already been exploring possible formats for offline access to Wikipedia including mobile PDFs, digital classroom systems, solar-powered terminals, and pre-loaded apps.

These and other similar technology predictions are provocative. They provide useful context for the Wikimedia movement as it works to develop strategy. At the same time, such predictions have limitations. Consulting or industry firms seeking to prove their value to customers or to stimulate investment in particular markets might be much more bullish on the prospects for certain technologies than is warranted. The focus on gadgets, platforms, and products downplays the importance of how users might creatively adapt both old and new technologies to serve public good based on their own needs and constraints.

What's more, the entire tech prediction industry tends to downplay negative consequences. These include embedded bias in the design of automated systems, the loss of a shared public space as proprietary apps and devices gain popularity, digital overload among users, and the frailty of digital information.

“One thing that makes it difficult—the platform itself. [Facebook] is a very good platform that people want to go back to again and again. So how do you take into account how people behave and build toward that, rather than design the interface that do-gooders think will work?”

TECHNOLOGY, UNITED STATES

“What are the questions developers in the movement should be asking themselves? How to build platforms that serve people most at the margins? If this works and everyone uses it, how will it affect society? How do we earn the trust of users on platforms rather than coerce their usage? For for-profit entities: how to structure on value exchange rather than surveillance and emotional manipulation?”

TECHNOLOGY, UNITED STATES

“Wikipedia should go beyond [the] written format. We live in an audio-visual world now, so Wikipedia should not miss this opportunity and responsibility to make its content orally available.”

TECHNOLOGY, UNITED STATES

Internet and device use

- The percentage of the global population that use the internet is predicted to rise from 44 percent to 58 percent between 2016 and 2021.¹⁹
- IP traffic is predicted to grow three-fold, with the fastest growth in the Middle East and Africa between 2016 and 2021.²⁰
- Devices and connections per capita, average speeds, and average traffic per capita per month all expected to rise globally.²¹
- India and China lead the list of countries with projected new mobile subscribers by 2020.²²
- Access to the web via mobile remains low—under 40 percent—for much of Asia and Sub-Saharan Africa.²³
- Between 2016 and 2021, one estimate shows mobile data traffic increasing sevenfold.²⁴
- Lack of local content has been cited as one factor in slower adoption of mobile.²⁵
- Getting information via messaging apps is seen as the equivalent to information passed by word-of-mouth in some regions.²⁶

Wikimedia research

- For the first time, in 2017, the percentage of users accessing Wikipedia via mobile devices exceeded those accessing via personal computers.²⁷

Strategy questions

- Given that Wikipedia is the most used of all of the Wikimedia projects, and mobile seems increasingly likely to be the way that new users will access these sites, how can mobile access to existing content and editing capabilities continue to be improved?
- How can these projects be retooled for a future in which content is increasingly visual, audio, or immersive?
- Which new platforms and technologies seem most promising for expanding access to knowledge?
- How can a continual culture of research and development be built into the Wikimedia projects so that new approaches and platforms are regularly being evaluated and tested?

“The biggest app usage in all markets is Snapchat and WhatsApp, so these then become a viable platform for delivering content. Start figuring out how to deliver content directly through these chat streams.”

TECHNOLOGY, SOUTH AFRICA

MISINFORMATION & VERIFICATION 2030

How will people find trustworthy sources of knowledge and information?

Research shows that, around the world, Wikimedia projects are vulnerable to government, political, cultural, or profit-driven censorship and misinformation campaigns, as well as outright falsified content. Various actors will exploit current and future technological developments to their benefit, whether it means faking a video, developing new ways to cut off access to content online, or deploying ever-more intelligent bots.

Much recent concern has emerged internationally about the political uses of misinformation to influence open democracies from the 2016 United States elections to recent European electoral contests and to Africa. But the challenge goes beyond politics; commerce, personal interactions, and every sphere of information exchange is also affected. And Wikipedia, in its very essence, has the same vulnerability to misinformation, disinformation, and mal-information campaigns that



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open democracies do; the open platform is both its weakness and its strength. “[T]here has been much discussion of how information disorder is influencing democracies. More concerning, however, are the long-term implications of dis-information campaigns designed specifically to sow mistrust and confusion and to sharpen existing sociocultural divisions using nationalistic, ethnic, racial and religious tensions.”²⁸

The deliberate spread of misinformation can be traced to some of the earliest recorded history, with examples dating back to early written history, but it is the ways in which such information is created and how it travels that have changed. At one time the newspaper was cutting-edge technology; now there is a possibility (if small) of human-level intelligence or even greater than human intelligence, known as super-intelligence, being created by 2030. Such developments will both increase the sophistication of misinformation and make it more challenging to detect.

Existing and emerging technologies also offer opportunities to *enhance* public knowledge. The challenges Wikimedia

projects face are true, too, for the entire open knowledge ecosystem. It is crucial that the Wikimedia movement work with others in this ecosystem to recognize and combat organized efforts to mislead the public as well as remain vigilant, educated, and nimble in meeting technological change.

Technology creates many opportunities for information to be created via new means, such as artificial intelligence (AI), bots, big data, and virtual reality. The unprecedented surge in the automation of knowledge creation and analysis brings both advantages and challenges. On the plus side, these tools are helping information producers; for example, the Associated Press has written about technologies such as drones and robotic cameras that have augmented reporting in ways that would not be possible by simply handing humans a camera. Deploying machine learning can also help mine information from sources that would otherwise be opaque to analysis, such as audio and video.²⁹ But the development of new tools can also lead to more misleading content that could pose

“The interesting role that Wikimedia plays is the branding that it does—that the notion of accurate information is both possible and desirable.”

GALLERIES, LIBRARIES, ARCHIVES, AND MUSEUMS (GLAM), UNITED STATES

“Wikipedia’s responsibility is greater than any other time in history. The role of Wikimedia being a neutral broker of reliable information should/could be incredibly powerful.”

TECHNOLOGY, UNITED STATES

“The more the content can be viewed as local and locally driven, the greater the comfort and confidence. Hence the importance of more local volunteers and local contribution. There is a degree of skepticism and paranoia by the people from this part of the world about information that is perceived as foreign, as people wonder that the agenda is. But it is less applicable when you are talking about news coming from civil society or private source locally.”

BUSINESS/ENTREPRENEURSHIP, EGYPT

challenges when sourcing Wikipedia entries. In response, between now and 2030, the Wikimedia movement will need to remain alert and develop new methods of verification that match new technological capabilities that may potentially be used to spread misinformation. Technology also presents myriad obstacles to accessing the content delivered on Wikimedia platforms as the trend toward mobile is rapidly challenging Wikipedia's web-based, desk-top-accessed model.³⁰ In addition, there are new means of content delivery such as wearables, immersive rigs, and voice-activated digital assistants to consider as new platforms. With new modes of information delivery come new opportunities to falsify or mislead.

Governments and political actors have the power to both suppress and distort content by persecuting activists, journalists, academics, and other citizens, as well as to restrict access to Wikimedia platforms. For example, in China, the government has not only restricted access to the internet and sites such as Google and Facebook but also to Facebook's WhatsApp messaging service

and virtual private networks. China's activities in this sphere are known as the "Great Firewall of China."³¹

Such government control not only reduces source material for Wikipedia editors but can also result in an overall chilling effect on freedom of expression for those seeking to produce or verify information. A related trend among governments and political actors is purposeful propagation of disinformation or propaganda. This not only weakens sources and, therefore, content on Wikipedia but also creates an overall culture of doubt related to the reliability of online information. With respect to access, primary concerns will be censoring or blocking the Wikipedia platform, blocking online access altogether, and monitoring online access.

The rise of commercial social media platforms over the last decade, and the concurrent decline of and trust in traditional modern news sources, creates concerns about new ways that misinformation is being filtered and delivered online and used in public discourse, especially with respect to sponsored research, advertorials, hired shells, and clickbait content. The next frontier in understanding how

"With people feeling that the truth is so under attack, there's no greater statement about the resilience of truth than Wikipedia being relatively unaffected by this and continuing to scale. You can't afford to fail."

POLICY/GOVERNMENT, UNITED STATES

"The power of Wikipedia is in its references. It has credibility."

BUSINESS/ENTREPRENEURSHIP, NIGERIA

"Because of your digital real estate, brand, and utility ... you'll become a battlefield. You'll see a lot of what tampering looks like and Wikipedia will fight those digital battles. You guys legitimately are defenders of the truth."

POLICY/GOVERNMENT, UNITED STATES

"Wikipedia should play a role in an age where polarization is a thing in many countries. This should be done without being political."

POLICY/GOVERNMENT, BRAZIL

to combat misinformation involves developing a more sophisticated grasp on how networks help to spread it and may involve ubiquitous fact-checking.³² Threats to access come from battles over net neutrality, filter bubbles, the rise of proprietary apps and platforms, and corporations' willingness (or unwillingness) to provide access to Wikipedia content from within their own content properties and devices.

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Technology

- “Human-level machine intelligence,” the ability to match human skills in most professions, has a 10 percent probability by 2022 and 50 percent by 2040; super intelligence could come soon after.³³
- Supercomputers will exceed human capabilities in almost all areas by 2020 to 2030.³⁴
- Incipient technologies seem likely to present challenges to discerning what is real and what is fake.³⁵

Governments

- Textbooks and reference sources are the targets of crackdowns by repressive regimes³⁶
- The most recent analysis of press freedom worldwide from Reporters Without Borders declared that the globe is “darkening.”³⁷
- Governments are purposefully breeding misinformation.³⁸
- Problems are so pronounced and pervasive that a taxonomy of both misinformation and disinformation shows multiple tactics to spot and watch in the coming years.³⁹

Innovations

- There is innovation around fact-checking to help citizens find reliable sources.⁴⁰
- Researchers, developers, journalists, and others are working on ways to automate parts of the fact-checking and verification process, helping to reveal the pathways by which messages travel across social media and other transmission channels and developing tools to promote greater understanding of the ways in which information is altered.⁴¹
- Social media platforms are being pressured to help solve misinformation and propaganda problems globally.⁴²
- Governments are adopting or considering laws and policies requiring more transparency on the spread of misinformation on social media sites and online, as well as regulatory measures to prevent it from happening.⁴³

Wikimedia research

- Outright censorship of Wikipedia articles is waning.⁴⁴ Strategies the Wikimedia movement has developed to

combat censorship are working; but it's important to remain vigilant.

- Wikipedia is developing new tools such as the Objective Revision Evaluation Service (ORES) to help editors spot potentially “damaging” edits.
- Wikipedia’s open contribution model is poorly understood in geographies where there is low awareness and is, therefore, viewed as a weakness.⁴⁵
- Wikipedia’s deployment of HTTPS that prevents censors from seeing which page within a website was visited “has been a good one in terms of ensuring accessibility to knowledge,” according to a Berkman Klein study. In general, technological solutions (e.g. HTTPS) to technological problems (such as outright blocking) can sometimes bring relief—until the next technological challenge emerges.⁴⁶

Strategy questions

- How can Wikimedia encourage and embrace experiments in artificial intelligence and machine learning that could help enrich Wikipedia content?
- How will Wikimedia track develop-

	CONTENT	ACCESS
Influence: technology	information created via new means such as AI, bots, big data, virtual reality	new means of content delivery such as wearables, immersive rigs, voice-activated digital assistants
Influence: governments and politics	rise in misinformation, threats to press freedom	censoring/blocking Wikipedia platform, blocking online access altogether, monitoring online access
Influence: commerce	sponsored research, advertorials, hired shills, clickbait content	filter bubbles, proprietary devices and platforms

- ments in journalism, academia, and technology for new ways to fact-check and verify information that can be used as sources for Wikimedia platforms, such as evaluating video or other new media?
- How will Wikimedia collaborate with other public interest organizations

- to advocate for press freedom, free speech, universal internet access, and other policy goals that ensure access and the free flow of information?
- How can Wikimedia use emerging technologies to build and deepen local content around the word?

LITERACY 2030

How will the world learn in the future?

Global literacy rates are increasing, although they vary in different geographic, political, and economic contexts. The Wikimedia projects have a role—and some might argue an obligation—in advancing literacy worldwide.

But the literacy of the future looks different from basic literacy skills of the past. Learners of the future will need to be versed beyond the nuts and bolts of language and numbers. They will need to know how to make productive use of new technologies as educational materials and instruction are delivered in new ways. They will also need the ability to discern and contextualize the information itself, to learn not just how to make coherent arguments based on facts but also to recognize propaganda and misinformation and expose them as such.

Today the Wikimedia projects are predominantly text- and image-based. As the ways in which people acquire, create,

and share information change, text- and image-based modes of communication may become less prevalent. Wikimedia projects will need to adapt to provide a platform for new and evolving modes of communication.

While this research did not encompass a significant study of trends in formal education, educational technology is a booming sector. Emerging forms of educational technology include learning as gaming, 3D visualization and imaging applications, and Augmented Reality (AR). These new forms allow learners to explore their subjects in multiple sensory dimensions. Expansion of technology in educational settings suggests that the Wikimedia movement and other open knowledge sources and platforms will have new opportunities to develop free educational applications for the many schools and learners around the globe who are under-resourced. Populations with access

to open knowledge sources will hold an information advantage over those with blocked or limited access.

Wikimedia is exploring effective ways to partner with educators and students through initiatives like Wiki Education, but many educators remain skeptical about incorporating Wikipedia in their courses.



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The Wikimedia movement can help counteract this perception—and strengthen students’ digital and media learning skills—by increasing its efforts to partner with educators and involve students in contributing to Wikipedia and adhering to its strict citation guidelines. Finding ways to utilize or crowdsource other rising forms of educational content—including audio, video, and even virtual reality or AR—will help Wikimedia projects keep pace with shifting trends in learning.

Literacy

- Rates of literacy have been rising globally over the past six decades.⁴⁷
- Research from UNESCO predicts that our understanding of basic literacy skills will expand beyond reading and numeracy to include facility with using digital devices.⁴⁸
- Online knowledge-seekers are looking for short, compact, and visual ways of engaging with content and acquiring new skills.⁴⁹

Technology and learning

- Despite gaps in access, educational technology is in growing use.⁵⁰

- The business of paid e-learning is expanding rapidly, particularly in Africa and Eastern Europe.⁵¹
- Experts from Africa, Asia, and the Middle East believe that the formal education system is failing youth in emerging markets around the world and that people in these regions are seeking new ways to consume and process knowledge online.⁵²

Wikimedia research

- Wikipedia’s future users will need a platform that allows them to create and transfer knowledge in non-text formats with a strong emphasis in oral and visual resources.⁵³
- Leaders in historically marginalized communities in the western world share concerns similar to those in emerging markets about the current text-based modes of consumption on Wikipedia. The editing guidelines about who and what is cited do not always match the cultural preservation systems in these communities.⁵⁴

“I know that Wikipedia is looking at image content and other kinds of things. In the same way, libraries are trying to figure out beyond text-based literacy, understanding the other containers that information is going to come in will be critical.”

GLAM (GALLERIES, LIBRARIES, ARCHIVES, AND MUSEUMS), UNITED STATES

“Future roles: If someone is willing to learn, how do you create other avenues for someone beyond written knowledge? Get young people into the Wikipedia movement and building soft and life skills through that volunteer work, so contribution becomes a credential in itself.”

EDUCATION, NIGERIA

“This information flood will continue, as we know that humans are creatures that love to share. These sharing activities can never be stopped. So what we need to do is educate people with media literacy, so they can pick the right source.”

POLICY/GOVERNMENT, INDONESIA



Strategy questions

- To what level of “literacy” should Wikimedia aim its content? How can it better reach individuals in countries with lower levels of literacy?
- As education becomes increasingly tech-enabled and personalized, what additional strategies could the Wikimedia movement consider in order to expand the use of its content by educators and students?
- How will the rise of other modalities of learning and generating knowledge (AI, immersive, 3D printing, etc.) affect the usability of Wikimedia platforms within formal and informal education settings

“Currently, Indians are huge consumers of information but not producers. In the future, this will get more bi-directional and interactive. Knowledge that is more tacit now will be documented. Knowledge gaps in formal organisations like the government will be filled by informal initiatives like citizen activism.”

POLICY/GOVERNMENT, INDIA

“Digital literacy is unbelievably important now. Take email for example. My mother can’t tell spam from an email. You have to look very closely at the address of everything! Where can people go to learn this (digital literacy)? Universities assume that kids already have it. But they don’t.”

EDUCATION, UNITED STATES

OPEN KNOWLEDGE 2030

How will we share culture, ideas, and information?

Galleries, libraries, archives, and museums (GLAMs), along with other content- and asset-rich cultural organizations, are opening collections and archives and making them freely available online. This global movement demonstrates the public's appetite for free open access to the knowledge, expertise, and collections GLAM organizations hold. However, progress is uneven as GLAM institutions with the greatest resources outpace smaller and less well-funded organizations, and searches for content across organizations remain difficult. Wikimedia can play a key role both in expanding access and improving the end user experience.

Today, many GLAM institutions have built their own singular methods to access their collections, making navigation across multiple collections onerous for the end user. Burgeoning creativity in the creation of engagement tools and platforms like

proprietary apps and games also have differing use criteria and permissions and are too infrequently shared across organizations. A helpful trend toward standardizing metadata could make cross-organizational and cross-collection searches feasible. Europeana is an example of a concerted effort across countries and collections to make materials searchable.

The Wikimedia movement supports

a growing number of partnerships with GLAM institutions around the world. Through these efforts, the movement could do more to create and encourage utilization of cross-organizational platforms. Some institutions hold source materials that incorporate important community ephemera, cultural historical documentation, oral histories, and other materials that do not match Wikipedia's



Anna Carol (CC BY-SA 2.0)

strict citation protocols. Finding ways to incorporate these as searchable cultural assets could offer rich knowledge and information for Wikimedia users.

Libraries are becoming more lively actors in the open knowledge ecosystem, becoming digital portals to information as well as physical spaces for convening and study. They frequently offer digital access to collections and source materials, along



CoToVan (CC BY 2.0)

with training in how to access and use digital materials. Libraries are educating users around misinformation, fraud, and propaganda online. Between now and 2030, libraries will increasingly serve as technology gateways, introducing people to new tools like 3D printers or virtual reality (VR).

Between now and 2030, there are opportunities for the Wikimedia movement and GLAM institutions to gain allies in the open knowledge movement and to find creative ways to connect users to new knowledge. A few examples:

- Developing digital platforms for under-resourced GLAM organizations on a global basis
- Identifying protocols for citing new kinds of source materials
- Helping to build a search gateway that crosses collections and organizations
- Engaging GLAM organizations as contributors of content and as editors
- Enriching Wikimedia projects through purposeful recruitment of non-western collections and archives

The Wikimedia movement should also watch other open knowledge trends likely to accelerate between now and 2030.

“It is becoming more obvious that you don’t need all the really expensive infrastructure that the university provides (sports teams, facilities), and it is much cheaper to do just the learning on its own. Historically, we’ve been lazy with pursuing our own knowledge path and have outsourced the learning process to universities because it was easier. Pursuing self-enrichment or learning on one’s own is more feasible for the future.”

BUSINESS/ENTREPRENEURSHIP, BRAZIL

“It’s important for organizations like libraries, museums, and civic institutions to bring people together for civic discourse. How might this societal function become important to Wikimedia?”

GLAM (GALLERIES, LIBRARIES, ARCHIVES, AND MUSEUMS), UNITED STATES

“What Wikipedia needs to do is have something like a platform to learn the ropes, learn how to be a Wikipedian and, with time, learn and graduate to be able to post material on the Wikipedia platform.”

TECHNOLOGY, NIGERIA

Improvements in voice-to-text platforms, translation software, and accessibility tools all will make materials easier to share and access online. Training users to identify and counter misinformation will also become paramount—a ubiquitous part of literacy training for all open knowledge organizations.

GLAM organizations and open collections

- Trend toward digital open access to collections.⁵⁵
- Experimentation in digital offerings proliferating.⁵⁶
- Libraries becoming hubs for access to both physical and digital collections.⁵⁷

Ease of access

- Translation software will improve.⁵⁸
- Voice to text will improve.⁵⁹
- Ease of use will increase for vision-impaired people and others with special access needs.⁶⁰

Wikimedia research

- Wikimedia projects are expanding collaboration with GLAM institutions.⁶¹
- Individual Wikipedia chapters are reaching out to language minority

populations and collections.⁶²

- Wikimedia is participating in collaborations to standardize metadata.⁶³

Strategy questions

- What role can materials like oral histories, personal photo collections, or other documentation play within the Wikimedia movement’s citation practices? Can the movement help foster connections with repositories of these source materials that can enrich Wikipedia’s content?
- How might Wikimedians contribute their platform expertise to benefit smaller, less-formal, and less-institutionalized GLAM partners?
- Could the Wikimedia movement benefit from expansion of in-person, physical programming? What might such programming comprise and how might it be different in different countries and regional centers?
- How can the Wikimedia movement influence GLAM and other institutions to encourage and facilitate policies for free and open access to digital content?

“Wikimedia could do fun competitions for university students to get people engaged and contributing.”

TECHNOLOGY, INDONESIA

“Wikimedia is something you have to go to. But Wikimedia could be the one that goes. They could go to people and teach what is vitally important.”

EDUCATION, UNITED STATES

“Wikipedia, in 2030, should play a key role in providing pedagogical tools and platforms. There is no other free and open source provider filling this gap.”

EDUCATION, INDIA

EXPECT THE UNEXPECTED BY 2030

How can we know what the world will look like in 2030—and what the Wikimedia movement’s role in it will be?

From 2015 to 2017, the Wikimedia Foundation has been pursuing a variety of perspectives to inform the Wikimedia 2030 process through consultation with movement members; expert interviews and group discussions; and scanning of industry, government, and academic research. Each of these methods has its own strengths and weaknesses. Combining them helps to bolster the weak spots, but there’s still more work to be done in anticipating the unexpected in the coming years.

“How can we prepare for what’s likely to happen next?” should not be not a static question asked periodically for strategic planning purposes and then set aside. There are numerous possible future shifts that were not considered in depth during the strategy process such as antibiotic resistance, unforeseen conflicts, the impact of automation on work, climate catastrophes, cyber warfare, and improve-

ments in medical technology. Building in the capacity to periodically project and respond to coming changes in technology, policy, demographics, learning, and media habits—and finding the volunteers and partners who are excited and prepared to help—is central to making the Wikimedia projects flourish.

There are a few different tools for thinking through unexpected futures. One is scenario planning—a method that provides enough narrative structure and detail to allow planners to more easily imagine future consequences. Confronting different futures also forces participants to consider their own assumptions and biases.

Another is speculative fiction, sometimes coupled with speculative design of products or services. While current technologies and political conditions often shape the possibilities explored in such works, these stories can, in turn, influence

the creation of new technologies and political responses. Foundations, corporations, and governments have commissioned science fiction writers to think through the implications of their ideas for various sectors. There are also already-popular books that address concerns central to the Wikimedia movement. (See further reading below.)

“[A]ll organizing is science fiction,” writes Walidah Imarisha in *Octavia’s Brood: Science Fiction Stories from Social Justice*



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Movements. “We are dreaming new worlds every time we think about the changes we want to make in the world.”⁶⁴ The Wikimedia projects are themselves the product of a utopian vision: “Imagine a world in which every single human being can freely share in the sum of all knowledge.”

Of course, both scenario planning and science fiction are only as imaginative as the people who create them. If the contributors are too homogenous then the quality of information and insight suffers. It is important to have contributors represent varied geographic regions, races, genders, and ideological contexts.

With its global reach and visibility, the Wikimedia movement is well-positioned to gather and consider speculative visions from across the globe and apply these visions to understanding how Wikimedia projects should evolve.

Further reading

- Knight Foundation scenario planning report, *Imagining the Futures, 2017*, available on knightfoundation.org.
- *Black Swan: Impact of the highly improbable* by Nassim Nicholas Taleb (Random House, 2007).

- *Speculative Everything: Design, Fiction, and Social Dreaming* by Anthony Dunne and Fiona Raby (MIT Press, 2013).
- *Walkaway* by Cory Doctorow (Tor Books, 2017).
- *Ready Player One* by Ernest Cline (Random House, 2011).
- *Infomocracy* by Malka Older (Tor Books, 2016).
- *Hieroglyph: Stories & Visions for a Better Future* edited by Kathryn Cramer and Ed Finn (William Morrow, 2015).
- *Octavia’s Brood: Science Fiction Stories from Social Justice Movements* edited by Walidah Imarisha and Adrienne Maree Brown (AK Press, 2015).
- “Moving Toward Science Fiction Thinking” by Deji Bryce Olukotun (Tor.com).

Strategy questions

- How can the Wikimedia movement—with all its insight and knowledge—build the future together?
- Who gets to shape the future?
- How can our collective action shape the future we envision?

“The promise is that Wikimedia, as much as anything else, is emblematic of what’s possible in terms of collaborative online democracy, as anarchistic as it may be and as messy as it may be, its visibility and the promise of its structure... and the geographic breadth.”

TECHNOLOGY, UNITED STATES

“Wikipedia was a radical idea, stuck in past radicalism. It needs to move out of the textual mode. As the leader in free knowledge, can it take its leadership to the whole world? It’s a small type of movement right now. Needs to become big and slip in and out of other ecosystems.”

MEDIA, INDIA

If I think 15 years forward ... we will know whether we made it to avoid catastrophic climate change or if we are dealing with the consequences of catastrophic climate change. Either we have avoided civilization-disturbing mass migrations or we will be in the middle of them and dealing with consequences of them.

TECHNOLOGY, UNITED STATES

ACROSS THE RESEARCH: RISING THEMES

An exciting prospect for any researcher is a confluence of themes rising from disparate subject areas. In pursuing our research for this project we frequently had the sense of meeting ourselves coming and going, with similar ideas flowing into the same river from our different streams of inquiry.

We offer five such rising themes here, ideas we encountered repeatedly both in crafting our research briefs and in our interview conversations.

The Wikimedia projects are inspiring.

People believe the Wikimedia projects demonstrate the best of what the open web can give humanity: cooperation, global visibility, dedicated volunteers, and clear and continuing value.

The Wikimedia projects are values-based. People perceive the Wikimedia projects as based on a model of restraint

and relative civility, showing how even when voices are fractious or polarized there can be consistent process and agreement.

The Wikimedia projects must actively welcome new users and new partners.

To thrive, the Wikimedia platforms and movement must reach out purposefully to welcome new users—whether that means students, women, those just coming online across the globe, a greater percentage of people from emerging communities, or partners at GLAM and educational institutions.

Outsiders view the Wikimedia projects as a global utility, not merely a content hub. The Wikimedia projects serve more than individual audiences seeking information; they provide a further body of knowledge valuable to researchers, AI programmers, search engine

developers, and others. This means that the projects' value goes beyond information, and their loss would be felt across many fields and disciplines.

Guard against the complacency of success. While demonstrating the best of the open web, Wikimedia is also viewed by many as fragile, notably closed to newcomers, change-resistant, and vulnerable to the increased buffeting of “the darkening globe.” Observers warn against complacency and urge renewed activism.

RECOMMENDATIONS FOR THE WIKIPEDIA MOVEMENT

Do now

- Re-articulate and widely share your values statements, and do so in ways that enhance the urgency and the value proposition of the Wikimedia movement.
- Clarify and reinvigorate the relationship between the Wikimedia Foundation and the movement globally.
- Clearly define what you mean by the “Wikimedia movement”—who is in it and what roles they play.
- Engage with other open knowledge players globally, identify areas of common interest, and join forces to mobilize against threats to the open web.
- Take a proactive role in efforts to solve online misinformation challenges and campaigns, which poses an imminent danger to the Wikimedia movement while also providing a strategic opportunity to create greater public value.
- Strengthen editing, access, and submission tools for mobile.
- Use popular social platforms to recruit new movement members and find digestible ways to share timely content and engage users.
- Make the case for new kinds of volunteers: ambassadors, futurists, designers, connectors, and others.

Do soon

- Use Wikimania 2018 in Cape Town to complete a concrete plan for making Wikimedia projects invaluable across Africa.
- Build internal capacity to scan for and respond to major changes in technology, policy, and user habits.
- Invest in user experience testing and visual design.
- Prioritize Wikipedia’s credibility, authority, and usability in education.
- Consider and prepare for Wikimedia’s

role in moments of natural and man-made disaster.

- Reward and celebrate veteran volunteers—but not at the expense of adapting to a changing world.
- Maximize partnerships with GLAM institutions to engage new movement members in local communities.
- Connect and partner with philanthropic foundations and donors that are seeking to protect the digital commons and advance open knowledge.

Do by 2030

- Retool for a more visual, aural, immersive, and tactile media future.
- Rethink sourcing rules to validate non-Western forms of knowledge and information.
- Continue to embrace the scale of your aspirations: We’ll never actually know everything, and that itself is beautiful.

DISCUSSION QUESTIONS

For organizations in the open knowledge ecosystem

- *Mobilization*: How will the broader open knowledge movement organize itself to better reach and inform policymakers, legal advocates, and other stakeholders in matters related to the future of the open internet?
- *Representation*: What joint funding initiatives can help insure that open internet advocates are present at key public policy discussions among internet governance entities such as ICANN, ISOC, IGF, and others that are more local and regional?
- *Policy*: How will the open knowledge movement support the growing need for legal work around the globe in defense of free speech, access to information, and open knowledge?

For funders

- *Field-building*: Given the increasing frequency and intensity of threats to the digital public square, how can the philanthropic sector advance its own knowledge of relevant global players?
- *Streamlining*: How can philanthropy support collaboration among open internet and knowledge organizations in order to advance their collective missions and help avoid duplication and gather strength?
- *Inclusion*: How can philanthropy help ensure that new voices participate in the open knowledge movement?
- *Access*: How will funders support the public's right to internet access and open information through philanthropic support for policy initiatives,

legal defense funding, and grants for capacity-building among advocacy organizations?

- *Defending veracity*: How can philanthropy support the people, organizations, and coalitions working to combat misinformation and build digital literacy?
- *Strengthening cultural connections*: What partnerships could philanthropy encourage and support that would build relationships among educators, GLAM organizations, and other non-profits so that more people and organizations contribute to and benefit from open knowledge?

For the Wikimedia Foundation itself

- *Stewardship*: How will the Wikimedia Foundation assert and balance leadership of the Wikimedia movement with its role fostering a robust volunteer culture?
- *Valuing difference*: How will the Wikimedia Foundation articulate its commitment to diversity, equity, and inclusion and to building a culture that welcomes, encourages, and supports the multiplicity of voices necessary to build the global movement, develop richer content, and become more relevant to more people?
- *Protecting users*: How will the Wikimedia Foundation model exemplary institutional behavior around privacy and transparency—and articulate the values and ethics of its policies and practices—in order to serve as a beacon for those critiquing government, corporate, and even nonprofit practices?
- *Partnerships*: How will the Wikimedia Foundation use its considerable visibility and influence to work with other open internet and open knowledge allies to advocate for press freedom, free speech, universal internet access, and other policy goals that will ensure the free flow of information?
- *Resilience*: How will the Wikimedia Foundation weather continuous change by building a culture of research and innovation so that new approaches and platforms are being regularly evaluated and tested?

ENDNOTES

- 1 "Wikimedia Traffic Analysis Report," Wikimedia, 2017, accessed October 12, 2017, stats.wikimedia.org/wikimedia/squids/SquidReportPageViewsPerCountryOverview.htm.
- 2 "Gross Domestic Product 2016, PPP," World Bank, 2016, accessed June 30, 2017, databank.worldbank.org/data/download/GDP_PPP.pdf.
- 3 "2017 Revision of World Population Prospects," United Nations, Department of Economic and Social Affairs, Population Division, accessed July 15, 2017, esa.un.org/unpd/wpp.
- 4 "Population 2030: Demographic challenges and opportunities for sustainable development planning," United Nations, Department of Economic and Social Affairs, 2015, accessed July 15, 2017, www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf.
- 5 "2014 Revision of World Urbanization Prospects," United Nations, Department of Economic and Social Affairs, Population Division, accessed June 15, 2017, esa.un.org/unpd/wup/publications/files/wup2014-highlights.Pdf.
- 6 "World Urbanization Prospects: The 2014 Revision," United Nations, Department of Economic and Social Affairs, Population Division, accessed June 15, 2017, esa.un.org/unpd/wup/publications/files/wup2014-highlights.Pdf.
- 7 "Population 2030," United Nations, Department of Economic and Social Affairs, 2015, accessed June 11, 2017, www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf.
- 8 "Population 2030," United Nations, Department of Economic and Social Affairs, 2015, accessed June 11, 2017, www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf.
- 9 "World Urbanization Prospects: The 2014 Revision," United Nations, Department of Economic and Social Affairs, Population Division, accessed June 15, 2017, esa.un.org/unpd/wup/publications/files/wup2014-highlights.Pdf.
- 10 "Population 2030," United Nations, Department of Economic and Social Affairs, 2015, accessed June 11, 2017, www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf.
- 11 "Population 2030," United Nations, Department of Economic and Social Affairs, 2015, accessed June 11, 2017, www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf.
- 12 "Summary by Language Size," Ethnologue 18th edition, 2015, accessed July 20, 2017, www.ethnologue.com/ethnblog/m-paul-lewis/welcome-18th-edition.
- 13 Graddol, David, "The Future of English: A Guide to Forecasting the Popularity of the English Language in the 21st Century," accessed June 24, 2017, www.teachingenglish.org.uk/sites/teacheng/files/learning-elt-future.pdf.
- 14 "Education by Age, Sex, and Level," International Futures (IF) Tool, Frederick S. Pardee Center for International Futures, University of Denver, 2016, accessed October 17, 2017, www.ifs.du.edu/ifs/frm_EdnCohoDisp.aspx?Group=World.
- 15 "Wikipedia Statistics: Contributors," Wikipedia, 2017, accessed June 14, 2017, stats.wikimedia.org/EN/Table-sWikipediansContributors.htm.
- 16 Khanna, Ayush, "Nine Out of Ten Wikipedians Continue to be Men: Editor Survey," Wikimedia Blog, accessed October 12, 2017, blog.wikimedia.org/2012/04/27/nine-out-of-ten-wikipedians-continue-to-be-men/.
- 17 Poushter, Jacob, "Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies," Pew Research Center, February 22, 2016, www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies.
- 18 Meeker, Mary, "Internet Trends Report 2017," Kleiner Perkins, May 31, 2017, www.slideshare.net/kleinerperkins/internet-trends-2017-report.
- 19 Webb, Amy, "2017 Tech Trends Annual Report," Future Today Institute, accessed June 27, 2017, futuretodayinstitute.com/2017-tech-trends.
- 20 "Cisco Visual Networking Index: Forecast and Methodology, 2016-2021," Cisco, June 6, 2017, accessed June 25, 2017, www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.pdf.
- 21 "Cisco Visual Networking Index: Forecast and Methodology, 2016-2021," Cisco, June 6, 2017, www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.pdf.
- 22 "Global Mobile Consumer Trends: First Edition," Deloitte, accessed June 27, 2017, www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-global-mobile-consumer-trends-first-edition-2016.pdf.
- 23 "Global Mobile Trends," GSMA Intelligence, October 2016, accessed June 27, 2017, www.gsmaintelligence.com/research/?file=357f1541c77358e61787fac35259dc92&download.
- 24 "Global Mobile Trends," GSMA Intelligence, October 2016, accessed June 27, 2017, www.gsmaintelligence.com/research/?file=357f1541c77358e61787fac35259dc92&download.

- 24 "Cisco Visual Networking Index: Forecast and Methodology, 2016-2021," Cisco, June 6, 2017, www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.pdf.
- 25 "Global Mobile Trends," GSMA Intelligence, October 2016, accessed June 27, 2017, www.gsmainelligence.com/research/?file=357f1541c77358e61787fac35259dc92&download.
- 26 "New Voices Synthesis Report," Wikimedia, accessed November 29, 2017, [meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/New_Voices_Synthesis_report_\(July_2017\)](https://meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/New_Voices_Synthesis_report_(July_2017))
- 27 "Global Mobile Consumer Trends: First Edition," Deloitte, 2016, accessed June 27, 2017, www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-global-mobile-consumer-trends-first-edition-2016.pdf
- 28 Wardle, Claire, "Information Disorder: Toward an Interdisciplinary Framework for Research and Policy Making," Council of Europe Report, Harvard Kennedy School, Shorenstein Center on Media, Politics and Public Policy, October 31, 2017, accessed November 6, 2017, firstdraftnews.com/coe-summary/.
- 29 Marconi, Francesco, Alex Siegman, and Machine Journalist, "The Future of Augmented Journalism: A Guide for Newsrooms in the Age of Smart Machines," AP Insights, accessed November 6, 2017, insights.ap.org/uploads/images/the-future-of-augmented-journalism_ap-report.pdf.
- 30 GSMA, "The Mobile Economy 2017," accessed June 1, 2017, www.gsma.com/mobileeconomy/
- 31 "Great Firewall of China," Bloomberg Quicktake, October 13, 2017, www.bloomberg.com/quicktake/great-firewall-of-china.
- 32 "To Enable a Conversation Over the World's Knowledge Hypothesis Mission," The Hypothesis Project, accessed 22, May 2017, hypothes.is/about/.
- 33 Bostrom, Nick. *Super Intelligence: Paths, Dangers, Strategies*, New York: Oxford University Press, 2014.
- 34 Helbing, Dirk, et al., "Will Democracy Survive Big Data and Artificial Intelligence?," *Scientific American*, February 25, 2017, www.scientificamerican.com/article/will-democracy-survive-big-data-and-artificial-intelligence/.
- 35 Bilton, Nick, "Fake News Is About to Get Even Scarier Than You Ever Dreamed," *Vanity Fair*, January 26, 2017, www.vanityfair.com/news/2017/01/fake-news-technology.
- 36 Puddington, Arch, "Breaking Down Democracy: Goals, Strategies, and Methods of Modern Authoritarians," Freedom House, 2017, accessed June 8, 2017, freedomhouse.org/report/special-reports/breaking-down-democracy-goals-strategies-and-methods-modern-authoritarians.
- 37 "Journalism Weakened by Democracy's Erosion," Reporters Without Borders, accessed May 29, 2017, rsf.org/en/journalism-weakened-democracys-erosion.
- 38 Paul, Christopher and Miriam Matthews, "The Russian 'Firehose of Falsehood' Propaganda Model: Why It Might Work and Options to Counter It," RAND Corporation, doi: 10.7249/PE198, www.rand.org/pubs/perspectives/PE198.html,
- 39 Wardle, Claire, "Fake News. It's Complicated," First Draft News, February 16, 2017, medium.com/1st-draft/fake-news-its-complicated-d0f773766c79.
- 40 "To Enable a Conversation Over the World's Knowledge Hypothesis Mission," The Hypothesis Project, accessed 22, May 2017, hypothes.is/about/.
- 41 Adair, Bill, "Knight Foundation, Facebook and Craig Newmark provide funding to launch Duke Tech & Check Cooperative," Duke Reporters Lab, September 25, 2017, reporterslab.org/duke-tech-and-check-cooperative-funding-announcement/. Peacock, Colin, "The French Fake News Fightback," Radio New Zealand, April 30, 2017, www.radionz.co.nz/national/programmes/mediawatch/audio/201841633/the-french-fake-news-fightback. "News Verification Platform Truly Media Wants to Help German News Orgs Combat Fake News Ahead of Germany's Election," NiemanLab, September 22, 2017, www.niemanlab.org/2017/09/news-verification-platform-truly-media-wants-to-help-german-news-orgs-combat-fake-news-ahead-of-germanys-election/.
- 42 Born, Kelly, "The Future of Truth: Can Philanthropy Help Mitigate Misinformation?," William and Flora Hewlett Foundation, June 8, 2017, www.hewlett.org/future-truth-can-philanthropy-help-mitigate-misinformation.
- 43 "Britain Eyes Regulating Google and Facebook Like News Providers," Tech, CNBC, October 10, 2017, www.cnn.com/2017/10/10/theresa-may-google-facebook-could-be-regulated-like-news-providers.html. Meyer, David, "Germany's New Hate Speech Law Goes Live: So Who's in its Sights?," ZDNet, October 2, 2017, www.zdnet.com/article/germanys-new-hate-speech-law-goes-live-so-whos-in-its-sights/. Blumenthal, Paul, "Legislation Would Require More Transparency From Facebook, Google On Political Ads," Huffington Post, September 22, 2017, www.huffingtonpost.com/entry/facebook-political-ad-disclosure_us_59c55ca2e4b0cdc773313503.
- 44 Clark, Justin, Robert Faris, and Rebekah Heacock Jones, "Analyzing Accessibility of Wikipedia Projects Around the World," Berkman Klein Center for Internet & Society Research Publication, accessed May 25, 2017, dash.harvard.edu/handle/1/32741922.

- 45 "Summary of Key Opportunities and Findings: Indonesia and Brazil," Wikimedia Movement, June 6, 2017, meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/Indonesia_research_findings_draft_May_2017.
- 46 Clark, Justin, Robert Faris, and Rebekah Heacock Jones, "Analyzing Accessibility of Wikipedia Projects Around the World," Berkman Klein Center for Internet & Society Research Publication, accessed May 25, 2017, dash.harvard.edu/handle/1/32741922.
- 47 "Reading the Past, Writing the Future: Promoting Literacy Over Five Decades," UNESCO, United Nations, 2016, accessed November 5, 2017, www.unesco.org/fileadmin/MULTIMEDIA/HQ/ED/pdf/unesco-promoting-literacy-over-five-decades-en.pdf.
- 48 "Reading the Past, Writing the Future: Promoting Literacy Over Five Decades," UNESCO, United Nations, 2016, accessed November 5, 2017, www.unesco.org/fileadmin/MULTIMEDIA/HQ/ED/pdf/unesco-promoting-literacy-over-five-decades-en.pdf.
- 49 "New Voices Synthesis Report," Wikimedia, accessed November 29, 2017, meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/New_Voices_Synthesis_report_(July_2017).
- 50 "Babson Study: Distance Education Enrollment Growth Continues," Online Learning Consortium, February 9, 2016, onlinelearningconsortium.org/news_item/babson-study-distance-education-enrollment-growth-continues-2.
- 51 "E-Learning Market Trends & Forecast 2014 - 2016 Report," Docebo, 2014, accessed October 16, 2017, www.docebo.com/landing/contactform/elearning-market-trends-and-forecast-2014-2016-docebo-report.pdf.
- 52 "New Voices Synthesis Report," Wikimedia, accessed November 29, 2017, meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/New_Voices_Synthesis_report_(July_2017).
- 53 "New Voices Synthesis Report," Wikimedia, accessed November 29, 2017, meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/New_Voices_Synthesis_report_(July_2017).
- 54 "New Voices Synthesis Report," Wikimedia, accessed November 29, 2017, meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Sources/New_Voices_Synthesis_report_(July_2017).
- 55 Weller, Chris, "Libraries of the Future Are Going to Change in Some Unexpected Ways," *Business Insider*, August 24, 2016, www.businessinsider.com/libraries-of-the-future-2016-8.
- 56 Wong, Queenie, "Facebook's Oculus to Bring Virtual Reality to California Libraries," *San Jose Mercury News*, June 7, 2017, www.mercurynews.com/2017/06/07/facebook-oculus-to-bring-virtual-reality-to-california-libraries/.
- 57 Weller, Chris, "Libraries of the Future Are Going to Change in Some Unexpected Ways," *Business Insider*, August 24, 2016, www.businessinsider.com/libraries-of-the-future-2016-8.
- 58 de Looper, Christian, "Machine Learning Improvements for Google Translate Expand to More Languages," *Digital Trends*, March 7, 2017, www.digitaltrends.com/computing/google-translate-machine-learning/.
- 59 Ruan, Sherry, et al., "Speech Is 3x Faster than Typing for English and Mandarin Text Entry on Mobile Devices," August 25, 2016, arxiv.org/pdf/1608.07323.pdf.
- 60 "Promoting Digital Accessibility: For Persons with Disabilities, with Persons with Disabilities," Internet Society (blog), February 13, 2017, www.internetsociety.org/blog/asia-pacific-bureau/2017/02/promoting-digital-accessibility-persons-disabilities-persons.
- 61 "Presenting the IFLA Wikipedia Opportunities Papers," Information Society, International Federation of Library Associations, January 17, 2017, www.ifla.org/node/11131.
- 62 "Atikamekw Knowledge, Culture and Language in Wikimedia Projects," Wikimedia Canada, accessed October 16, 2017, ca.wikimedia.org/wiki/Atikamekw_knowledge_culture_and_language_in_Wikimedia_projects.
- 63 Charles, Valentine, "Why Data Partners Should Link their Vocabulary to Wikidata: A New Case Study," *Europeana* (blog), August 7, 2017, pro.europeana.eu/blogpost/why-data-partners-should-link-their-vocabulary-to-wikidata-a-new-case-study.
- 64 Imarisha, Walidah and Adrienne Maree Brown. *Octavia's Brood: Science Fiction Stories from Social Justice Movements*, Chico, CA: AK Press, 2015.