Internet Governance Forum – USA
Speech by Lee Rainie
Director, Pew Internet & American Life Project
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"The Unfinished Symphony:
What we don't know about the future of the internet"

It is an honor for me to be invited to give this address and I'd like especially to thank Marilyn Cade and my friend and colleague Janna Anderson for believing that the work of the Pew Internet & American Life Project had a place at such an important gathering.

I want to highlight four major areas of uncertainty whose resolution will shape the future of the internet.

The **first area of critical uncertainty involves the kind of internet we have** – from the standpoint of the internet's architecture and its adoption.

The **second involves what kind of information policies we have** – that is, the kind of rules we develop about information property such as copyright, patents, and trademarks and the marketplace norms that apply to property.

The **third involves the kind of policies and norms we develop about our online identities** – specifically, the policies and practices we construct about online privacy, anonymity, and surveillance.

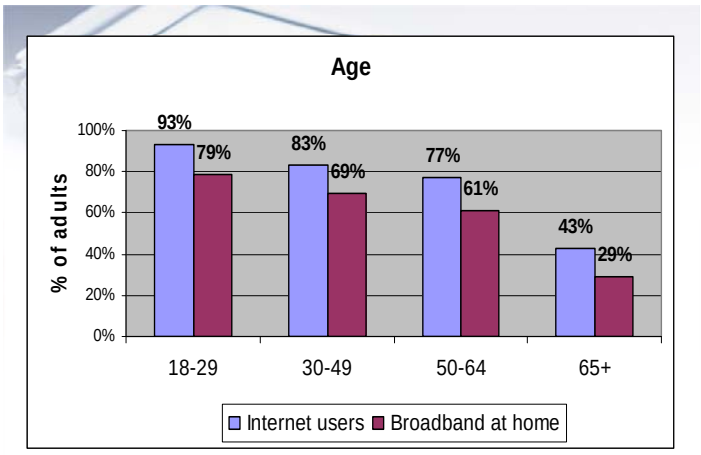
The **fourth area of uncertainty is that we do not yet know the full impact of the internet** when it comes to economic, medical, social, and political outcomes. The social science community is just beginning to tackle issues related to the value of the internet – both good and bad – in empirical terms.

Some aspects of the future of the internet are pretty clear: In the next decade or so, the computing power at our disposal will be more than 20 times greater than it is now and considerably cheaper if Moore's law continues hold. Furthermore, our ability to pack lots more data into hard drives will keep pace.

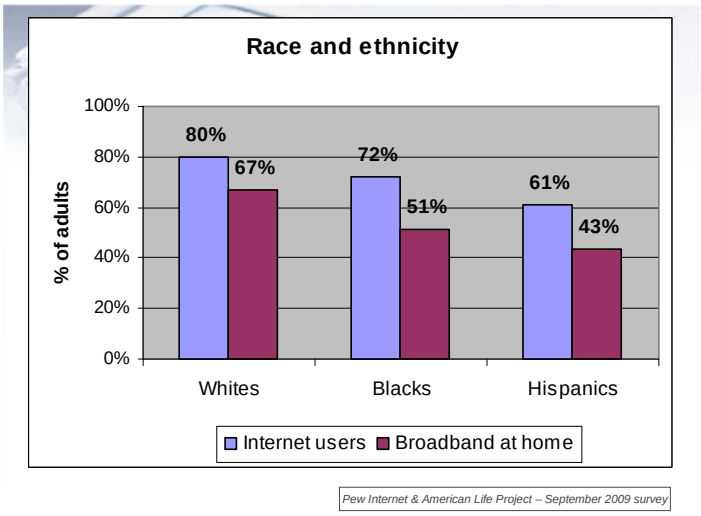
This will bring more people and more things tied together in the networked world. We'll be wearing devices on our bodies or carrying them in our pockets that will "talk" to devices in the environment. Chips embedded in our cars, our household furnishings, the soil, will feed data to each other and help us figure out how to skirt traffic jams, when to water our flowerbeds, and even when the pizza delivery van has pulled up to our house.

In addition, technologists will continue to make major advances in how quickly and efficiently digital material can be moved around wires and wirelessly. There will be a "broadband tsunami." Still, in the midst of these certain changes, there are two public policy areas where the outcome will determine how widely that tsunami washes over things.

The first and most immediate issue relates to broadband deployment: In a survey we at Pew Internet just completed on September 14, we found that 77% of American adults use the internet and 63% of American adults have broadband access at home. Technologists like to quote the aphorism that the future is already here, but it is unevenly distributed. Our data show that even the present is unevenly distributed.



Pew Internet & American Life Project – September 2009 survey



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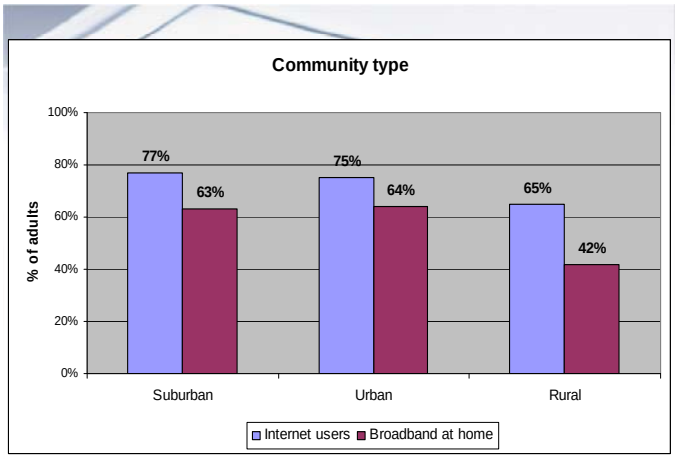

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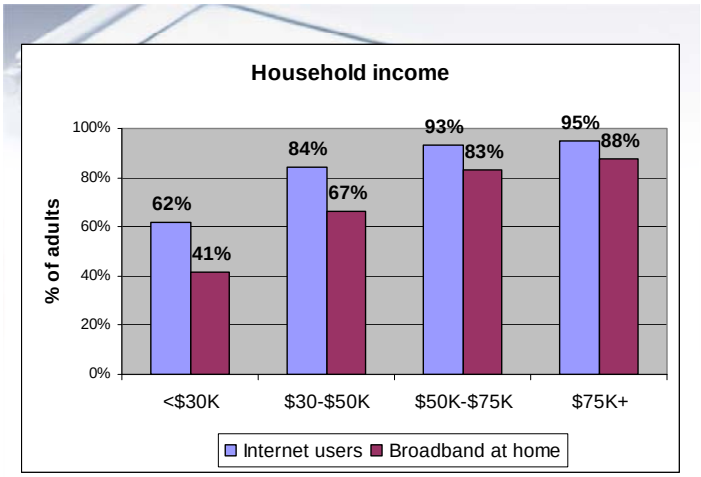

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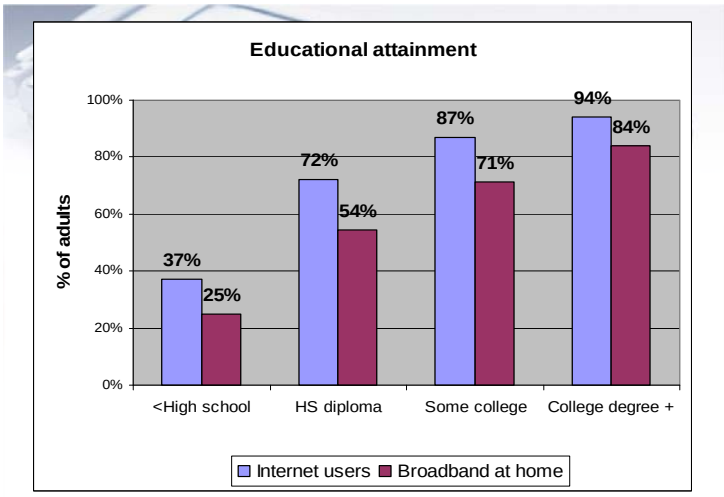

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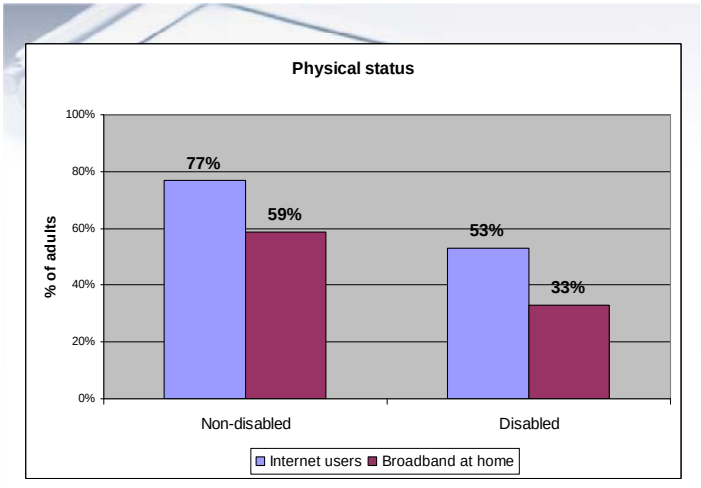
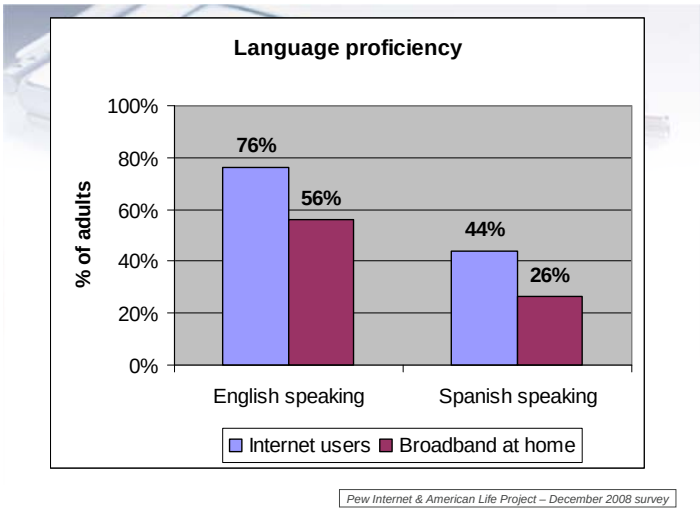


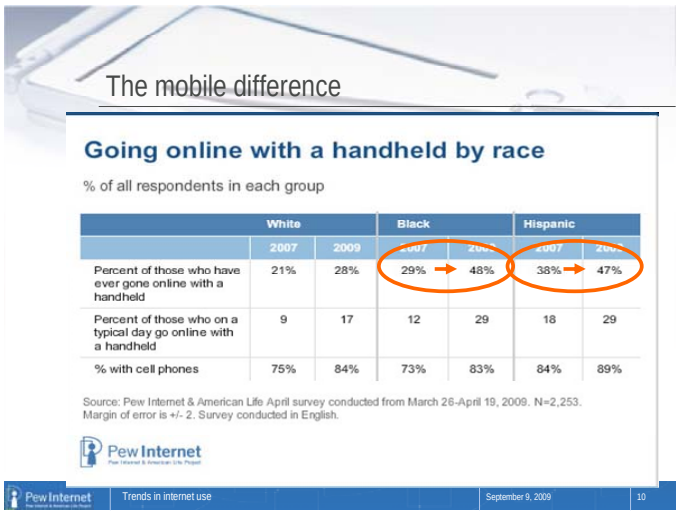
Pew Internet & American Life Project – December 2008 survey

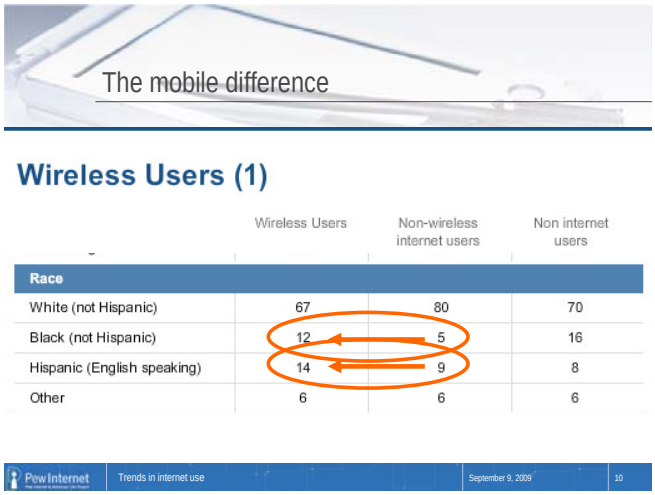


This is a dominant issue in technology policy which is tied at least in part to reports that the United States ranks somewhere between 15th and 25th among advanced nations in broadband penetration, though the methods by which those rankings were calculated are intensely disputed. Whatever the United States' place in the world rankings, it is clear that 27% of Americans do not use high-speed connections at home and there is substantial policy ferment about the best way to bring broadband connections to rural areas and to those with relatively low household incomes.

The unsettled issue related to these divides is the degree to which access is the problem – people want to use the internet, but cannot easily use it – or lack of interest is the problem. Two-thirds (63%) of non-broadband users tell us they do not want it.

Mobile connectivity changes the picture somewhat, though the meaning of that change is still unclear. Our latest survey shows that 54% of adults connect to the internet wirelessly -- via WiFi, WiMax, or their smart phones. This changes the digital divide in several ways: It all but eliminates race and ethnicity as issues when it comes to general internet access and it reduces the gap related to household income by roughly 4 percentage points.





Still, we do not understand if phone access to the internet is as important and as useful as access on computers in terms of user experience and personal satisfactions. Simply put, is accessing the internet by cell phone a different and less beneficial activity than accessing it by a wired computer?

A related broadband policy dispute centers on net neutrality – the degree to which providers can manage traffic over their networks and whether providers can give certain content preference over other material, especially if it involves charging higher prices so they can recoup their investments. The rise of wireless connectivity and the explosion of applications have vastly complicated the issue and it is not at all clear how principles of neutrality will actually be applied to the technical operation of networks – especially in a wireless environment -- where consumers seem eager to use heavy-bandwidth applications.

A second public policy issue on internet architecture relates to the long-term problems tied to the innards of the internet itself. A number of the builders of the internet are trying to construct new architecture that is less vulnerable and more efficient as a way to facilitate communication and information flows.

Those at the center of the “start over” internet say they are trying to solve four key problems with the current internet:

Security: No one expected that the level of malevolence online to be what it is, so the “start over” planners would love to build a new system that would do a better job of authenticating people and their computers in a way that would help keep hazards like viruses at bay.

Mobility: The internet was invented with fixed and stationary computers in mind and the fact that wireless connectivity has exploded has caught many by surprise. The “start over” folks hope to create a new system to assign internet addresses to small and mobile devices such as sensors, phones, and embedded processors in cars would allow them to connect to the internet securely.

Instrumentation: When we at Pew Internet asked experts three years ago what had surprised them most about their first answer was the growth of the Web itself. Their second answer was the way file-sharing through peer-to-peer networks had emerged. Basically no one foresaw the level of traffic the internet would bear and there are all sorts of hassles in the way data moves on the internet these days. So, the “start over” group would like to build something allowing all pieces of the network to have the ability to detect and report emerging problems such as technical breakdowns, traffic jams, or replicating worms to network administrators.

Protocols: These traffic flow concerns also prompt "start over" architects to want to structure better traffic routing agreements between internet service providers that would allow them to collaborate on advance services without compromising their businesses.[1]

When we asked a sampling of experts about the likelihood of such start-over efforts coming to fruition, they were skeptical because the current architecture of the internet is so widely embraced and embedded. But many did feel that there was a strong likelihood that the internet of the future would be broken apart in some ways so that closed networks for businesses and even social and political purposes might be developed to cope with some of those problems. Clearly, the mechanics of the internet itself are a work in progress and how they are resolved will have important consequences for the performance and utility of the internet.

Now that I have raised questions about the first mystery about the future – what kind of internet we will have – I want to turn to the second uncertainty. It involves policies and practices related to information itself: Who owns it? For how long? How much information and media can legitimately be remixed or shared? How much will people pay to access information and media that matters to them? How much personal information that is revealed online – advertently and inadvertently – should be catalogued and synthesized and then used for marketing purposes?

The newest Pew Internet survey found that more than half of adult American internet users and three-quarters of teenagers create content and share profile material on social networking sites. About a seventh of adult internet users (15%) and 21% of teen internet users are remixers – they take digital content they find and rework it and then share it with others. A year ago we found that 15% of online adults use peer-to-peer file sharing systems – but we do not have a good fix on how much of that sharing is legitimate and how much is piracy.

Every knowledge industry and media company is affected by these changes. Every individual whose personal information ends up online or in a database is affected. And yet we are still in the early stages of figuring out what business models will survive and what social activities will be affected.

And even if the current disputes over information property get settled for now, I'd predict they will reemerge repeatedly and might be re-resolved in very different ways when the members of Generation Y (those under age 25) move to the next stage of their lives and eventually come to power. The generation that grew up with the internet and other digital technologies has very different notions from its parents' generation about what constitutes fair use, the power (or impotence) of copyright protections, what it means to mashup and share content, and what it means to live life with higher levels of personal disclosure.

That leads me to the third policy domain where the future impact of the internet is unclear: It is the issues related to identity, privacy, and surveillance.

Our surveys show that users live in paradox: They like the empowering aspects of the internet that permit them to be their own broadcasters, their own publishers, indeed, their own story tellers and culture creators. In the wonderful phrase of media scholar danah boyd, people are "writing themselves into being." It can be a glorious experience.

As people experience the joy of a high Google ranking and second-to-second broadcasts of their doings, they also are disclosing a tremendous amount about themselves. That means prospective employers, lenders and credit-card companies, college admissions officers, romantic

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[1] See http://www.technologyreview.com/InfoTech-Networks/wtr_16051,258,p1.html

partners, friends, friends of friends, business associates and business competitors can learn a great deal about them.

The paradoxical point is that at the same time they are sharing all this material, they say they cherish, privacy, anonymity and the ability to control their identities, even after information about them has passed into others' hands. My sense from many of the internet users we interview – especially the teens – is that they have not fully weighed the pluses and minuses of this volume of disclosure and that a day of reckoning will eventually come when they begin to worry about this volume of disclosure.

One of my favorite teachers in this area is panelist Marc Rotenberg. He has recently been focusing attention on the privacy issues that are raised AFTER disclosure has taken place to a doctor, a government, an ISP, even to a friend. For most users, one of the key aspects of online experience is the ability of the user to present herself in different ways in different settings.[2] That is simply harder to do, as danah boyd notes, when our digital identities have five new properties.[3] As danah sees the new properties of digital media are:

1. Persistence. What you say sticks around. This is great for asynchronicity, not so great when everything you've ever said has gone down on your permanent record.

2. Replicability. You can copy and paste a conversation from one medium to another, adding to the persistent nature of it. This is great for being able to share information, but it is also at the crux of rumor-spreading.

3. Searchability. With social media, it's quite easy to track someone down or to find someone as a result of searching for content. Search changes the landscape, making information available at our fingertips. This is great in some circumstances, but when trying to avoid those who hold power over you, it may be less than ideal.

4. Scalability. Social media scales things in new ways. Conversations that were intended for just a friend or two might spiral out of control and scale to the entire school or, if it is especially embarrassing, the whole world.

5. (de)locatability. With the mobile, you are dislocated from any particular point in space, but at the same time, location-based technologies make location much more relevant. This paradox means that we are simultaneously more and less connected to physical pace.

At some point, I'd guess there will be a reckoning over privacy and identity as more and more data spills occur and as the unexpected revelations about people multiply. But it is hard to know how it will resolve – and hard to know how the current attitudes of content creators (especially the young) about privacy and identity issues will evolve over time.

I suspect some of the policy suggestions will revolve around ideas that promote parallel transparency -- if you can watch me, I should be able to watch you watching me. And it also might include discussion of opt-out mechanisms that would allow people to step off the digital grid under some circumstances.

Lastly, the fourth critical uncertainty about the internet involves its real value. We gather plenty of evidence at Pew Internet about users' sense that the internet has improved their lives and general well being. For instance:

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[2] See http://www.huffingtonpost.com/marc-rotenberg/whats-privacy-in-the-age_b_299466.html.
[3] See http://www.danah.org/papers/talks/MSRTechFest2009.html

- 42% of Americans say they or someone they know has been helped by health advice and information they have found online – compared with 3% who say they have been hurt by online medical information
- 68% of broadband users say broadband is important to them for finding out what is going on in their communities
- 62% say it is an important contributor to economic growth in their communities
- 58% say it is important to their ability to share their views with others
- 57% say it is important to their ability to communicate with local officials
- 25% of all Americans say the internet and cell phones have made their current family life closer than the life they knew when they were young, compared with 11% who say technology has made their family not as close

Still, the data are scarce on some of the most central questions. We do not have a wealth of consistent data yet about:

- the exact economic value that is added to a locale when you bring broadband to the community … or the benefits that accrue to individuals as productive workers and as smart consumers when they become internet users. On the flip side, no one has quantified the order of magnitude of the deficit people suffer when they are not internet users.
- any improvements that occur in learning, especially in formal educational outcomes, when internet use is encouraged in school-related work
- the impact on medical outcomes that occurs when people use the internet to gather health information and share their stories about their own experience of diseases and treatments
- the possibility that internet use produces new involvement with civic and political life by those who might otherwise be disengaged

I would add another area of scarce data that doesn't entirely relate to the internet, but is central to the role the internet plays in people's lives: We don't yet have a deep understanding of the ways that information markets perform. There is enormous concern in the medical community, in newsrooms, among librarians, and among scholars and social critics that the internet is enabling bad information and bad actors to influence others in bad ways. They are deeply anxious that people are self-diagnosing and self-medicating and hurting themselves as a result. They fear that spin and disinformation are influencing the way people vote. They fear that powerful profiling tools are being used to shape consumer tastes in subtle and sometimes sinister ways. They are dismayed that those full of hate and ill-intentions have new ways to organize and new outlets for expressing themselves. They worry that even well-meaning users are more polarized and nudged into intolerance more easily thanks to the internet.

What we don't know with any certainty is whether those concerns are outweighed by the benefits that are afforded by the internet. There is much work yet to do in the social science community to get to the bottom of all this.

So, we have our work cut out for us when it comes to shaping the internet of the future: You who care about the governance of the internet and we in the research community who hope to provide you the data you need to help your deliberations about how the internet should evolve.

The reason for both of us to do our jobs well is pretty clear: All of us, sooner or later, will sit down at the banquet of consequences of what we start doing now.

Thank you and good luck with your work.