What is the foundation for national strength in the 21st Century?
The Management Challenge: Productivity of Knowledge Work

- The most important, and indeed the truly unique, contribution of management in the 20th century was the fifty-fold increase in the productivity of the manual worker in manufacturing. **The most important contribution management needs to make in the 21st century is similarly to increase the productivity of knowledge work and knowledge workers.** The most valuable assets of a 20th-century company was its production equipment. **The most valuable asset of a 21st-century institution (whether business or non-business) will be its knowledge workers and their productivity.** ..It is on (the productivity of knowledge work), above all, the the future prosperity-and indeed the future survival of developed economies will increasingly depend.”

  — Peter F. Drucker “Knowledge-worker productivity: the biggest challenge”
It is on (the productivity of knowledge work), above all, the the future prosperity-and indeed the future survival of developed economies will increasingly depend.”

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Table Stakes:
High Performance Knowledge Exchange as the Foundation for America’s Best Days Being Ahead

Blair Levin
Fellow, Communications and Society Program
Aspen Institute
Phoenix Center
December 2, 2010
CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN
Product of Open, Transparent Process

Fact Gathering
- August-September
- 36 Workshops
- Over 10,000 participants

Gap Analysis
- October-November
- 31 Public Notices
- 23,000 Comments from 700 parties

Policy Framework
- December-February
- 9 Public Hearings
- 1,100 ex parte filings

Throughout---Monthly public progress reports; blog with 130 staff entries and public responses
# Comprehensive Examination of Issues

## Table of Contents

- **Introduction**
- **Goals For A High-Performance America**
- **Current State Of The Ecosystem**
- **Part I - Innovation and Investment**
  - Broadband Competition And Innovation Policy
  - Spectrum
  - Infrastructure
  - Research And Development
- **Part II - Inclusion**
  - Availability
  - Adoption And Utilization
- **Part III - National Purposes**
  - Health Care
  - Education
  - Energy And The Environment
  - Economic Opportunity
  - Government Performance
  - Civic Engagement
  - Public Safety
  - Implementation And Benchmarks

## Written Products

- **Includes**
  - Basic Plan (400 Pages)
  - Technical Appendices on:
    - Broadband Adoption and Use
    - Broadband Availability Gap
    - Broadband Assessment Model
    - Public Safety Network
    - Spectrum
    - Broadband Performance
    - Disabilities

- **Offers 200+ recommendations**
  - About half to FCC
  - About half to Executive Agencies
  - Small number to Congress and other stakeholders
But Behind It All......
One Essential Challenge
High Performance Knowledge Exchange
The Fundamental Task of Knowledge Exchange

Collection

Data

Data

Data

Analysis

Dissemination

Revised Course of Actions

Feedback
The Fundamental Task of Knowledge Exchange

Transformed by Three Big Technology Trends

The Computing Revolution

Analysis

Dissemination

The Communications Revolution

Feedback

Revised Course of Actions

Collection

The Big Data Revolution
Knowledge Exchange Not Just a Service, High-Tech Sector Issue: Now Core to All Parts of the Economy

Manufacturing
- Enables just-in-time assembly
- Critical for supply side management

Agriculture
- Affecting real time decisions as to weather, prices
- Enables new business models (Community Supported Agriculture)

Construction
- Mobile broadband now essential on construction sites for scheduling, supplies, coordination
- Broadband networks used for site security

Retail
- RFID revolutionizing inventory control
- Broadband networks used throughout shipping and transport process for retail
Development of the Dreamliner: Impossible Without Advanced Knowledge Exchange

- Fuselage sections (Italy; USA, Japan, Korea)
- Passenger door (France)
- Cargo doors, access doors, and crew escape door (Sweden)
- Floor beams (India)
- Wiring (France)
- Central wing box (Italy, Korea)
- Wing tips, flap support fairings, wheel well bulkhead, and longerons (Korea)
- Landing gear (France)
- Power distribution and management systems, air conditioning packs (USA)

Being constructed in Everett, Washington

Genx Fastest selling engine in GE Aviation’s history

The fastest-selling new commercial jetliner in history
Prevailing Platform for Knowledge Exchange is the Broadband Ecosystem, Composed of Networks....

Source: OBI analysis
Devices.....
Applications...
And above all, how people use all the parts of the ecosystem

The challenge lies in making sure that ecosystem continually improves to constantly perform at the highest possible level.
Two Core Ideas for Meeting the Challenge

High Performance Knowledge Exchange

Assure a ubiquitous, diverse, and constantly improving ecosystem of knowledge exchange

Utilize advanced tools of knowledge exchange to rethink and improve how we deliver essential services
But There’s a Conflict

The Two Core Ideas

The Most Prevalent Ideas in Broadband Policy
The Agenda

Table Stakes:
High Performance Knowledge Exchange as the Foundation for America’s Best Days Being Ahead

The Role of Knowledge Exchange in the Economy and Society

The Conflict with the Most Prevailing Ideas in Broadband Policy

Effective Programs to Drive High Performance Knowledge Exchange: The USF Example
The Agenda

Table Stakes:
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The Role of Knowledge Exchange in the Economy and Society

The Conflict with the Most Prevailing Ideas

Effective Programs to Drive High Performance Knowledge Exchange: The USF Example
Why do we care about broadband?
It’s not just because it’s good for puppies

• Though it is good for puppies....
Broadband Brings Us Puppycam!

- Between Oct 1 and Dec 1, 2008, viewers watched more than 5 million hours, as many viewing hours as ESPN online in the US.

- But that’s not why it’s important...
“It’s the economy, stupid”
History teaches:
how a society treats technology determines whether that society makes economic progress... or not... or not
A Quick Look Back At Technology and Progress

• From First Century to 1500, population and GDP increase at constant rate around world (Malthusian Trap)

But something got us out of that trap...
The Industrial Revolution
Two Different Ideas for Generating Growth Through Technology

• **Idea of Pre-Industrial Revolution France**
  – Inventing as the providence of the wealthy
  – State gave inventors pensions and prizes

• **Idea of Pre-Industrial Revolution England**
  – Inventing as the province of all
  – Gave inventors the legally sanctioned right to exploit their ideas in exchange for making the invention public (1624)
One Consequence:
English Per Capita GDP Growth 243%
Greater Than France
Another Consequence: Continuing Innovation and Growth

- Adding “the fuel of interest to the fire of genius” (Lincoln) also led to pattern of invention ever continuing
  - Led to a period of ongoing “combinatorial innovation”
  - Unlike earlier technology developments in China, Islamic Golden Age

With massive increase in 20th Century due to *combinatorial innovation* in manufacturing...
But Even Those Increases in GDP Can’t Measure Real Gain: Compare $70,000 in 1900 to $70,000 in 2010

This cannot buy Central Heating, Air Conditioning, Car, Plane Ticket, Cell Phone, Internet Connection, Shower, etc. that this can

Path Forward Depends on Innovation and Productivity Gains
As per Drucker, in today’s economy, productivity of knowledge work is pivotal.

Critical factor for success is facilitating “combinatorial innovation”, itself dependent on the process of knowledge exchange.

Knowledge exchange is driven by the interplay of networks, devices and applications---largely in broadband ecosystem---as utilized by people.

**A healthy knowledge exchange ecosystem** is the foundation for constant innovation and broad economic growth.
Key Elements of Healthy Knowledge Exchange Ecosystem for Economy

- Constantly Improving
  - Driven by Opportunity, Not History
- Right Sized for Specific Products, Geographies
- Widespread
  - Elements of ecosystem
  - Incentives to Use
- People Friendly
But it’s not just about the economy.
It’s also about a healthy civic society
Key Democratic Functions Depend on Vibrant Knowledge Exchange

- Public Policy Debates
- Knowledge Exchange
- Education
- Government Accountability
- Civic Engagement
- Dissemination of News and Information
Key Elements of Healthy Knowledge Exchange Ecosystem are Same for Civic Society as They are for the Economy
For the First Time in History, the Foundation for a Strong Country Converges

Ubiquitous, diverse and constantly improving ecosystem of knowledge exchange

Improved Economy

Improved Civic Society
Are we there yet?

No, but not for lack of tools

- “The future is here. It's just not widely distributed yet.”
  - William Gibson

And second, thinking is not here

- Drucker’s challenge not just about tools...
- ...and it’s déjà vu all over again
The Factory 1910

Three decades after central electricity, same design and same processes as with factories powered by water
Why Did It Take So Long?
(Diffusion Lag---40 Years to Get to Electric Power to 50% of Factories)

- **Sunk Cost**
  - Of Existing Factories

- **Sunk Thought**
  - Expertise was in existing technology; tendency to overlay new on old
  - Major productivity gains not be realized until whole process rethought
  - Gains came through specific applications utilizing new technology platform
But once people started thinking in new ways, factories went from centralized power, forcing vertical design, to....

....distributed power, allowing a more efficient horizontal design and a higher performance society
How Can We Improve the Way We Deliver Essential Goods and Services to Take Advantage of High Performance Knowledge Exchange?

The Computing Revolution

The Communications Revolution

Revised Course of Actions

Feedback

Analysis

Dissemination

The Big Data Revolution

Collection
Right Ideas For High Performance Knowledge Exchange

Ubiquitous, diverse, constantly improving tools of knowledge exchange

Rethinking processes to take advantage of those tools

But there's a problem when we get to broadband policy land...
The Most Prevalent Ideas in Broadband Policy

I ideological

Transaction
Government Has No Role in Improving the Knowledge Exchange Ecosystem; the Market will Solve All Problems

Broadband Should be a Public Utility and Government Should Exercise Significant Powers
Both Ideas Raise Good Questions

Why Does Government Need to Be Involved At All?

Given the Impact on Society, Why Doesn’t Government Take on a Greater Role of Directing Investment?
As to the First Idea, Upon Examination, It Becomes Clear Government Has Important Roles Affecting that Broadband Ecosystem

<table>
<thead>
<tr>
<th>Competition Policy</th>
<th>Consumer Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Access to bottleneck facilities</td>
</tr>
<tr>
<td>Control of Key Inputs</td>
<td>Spectrum</td>
</tr>
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<td></td>
<td>Rights of Way</td>
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<td></td>
<td>Pole Attachments</td>
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<tr>
<td>Government Support Needed for Areas</td>
<td>Geographic Areas that</td>
</tr>
<tr>
<td>Without Which No Business Would</td>
<td>Need Universal Service</td>
</tr>
<tr>
<td>Provide Service</td>
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<td></td>
<td>Low-Income Support</td>
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<td></td>
<td>Programs</td>
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<tr>
<td>Key Buyer in Markets where Effectiveness</td>
<td>Education</td>
</tr>
<tr>
<td>Depends on Knowledge Exchange</td>
<td>Public Safety</td>
</tr>
<tr>
<td></td>
<td>Job Training</td>
</tr>
<tr>
<td></td>
<td>Health Care</td>
</tr>
</tbody>
</table>
But there is a good reason that argument maintains political currency
Most of the Current Policies Are Being Carried Out Very Ineffectively......

- **Competition Policy**
  - No transparency rules
  - No Data to monitor markets
  - Key policies (set top boxes) have no impact

- **Control of Key Inputs**
  - Spectrum allocations based on history, not markets
  - Inefficient rights of way rules

- **Government Support Needed for Areas Without Which No Business Would Provide Service**
  - Universal Service does not go to where need is greatest, rewards inefficiency and supports old technology

- **Key Buyer in Markets where Effectiveness Depends on Knowledge Exchange**
  - Many barriers to effective use of digital platforms to improve public services
Need to Build Effective Programs on a Foundation of Right Ideas and Right Goals
As to the Second Question, Again, Upon Closer Examination, Government has a Role but It is Limited

**Networks**
- For most areas, private risk capital driving sufficient investment
- Competitive forces driving investment decisions that public sector is ill advised to take on (though this varies by country)

**Devices**
- Highly competitive market that, in most product categories, is driving significant innovation
- Need to be mindful in some product categories and need to drive products for public service uses

**Applications**
- Highly competitive market that, in most product categories, is driving significant innovation
- Need to drive applications for public service uses
Both Views Provide Critical Discipline

- Common Ground: “The legitimate purpose of government is to do for a community of people, that which they cannot do so well for themselves. But in all things a people can do for themselves, government ought not to interfere.” President Lincoln
The primary metric for judging the vision of a nation’s broadband policy is the speed of the wireline network that reaches the most rural of residents.
It’s time.....

...to drive a stake through that idea
The primary metric for judging the vision of a nation’s broadband policy is the speed of the wireline network that reaches the most rural of residents.
## Summary of Bad and Good Ideas

<table>
<thead>
<tr>
<th><strong>Bad Ideas</strong></th>
<th><strong>Good ideas</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Primary Metric</td>
<td>• Ever Improving Ecosystem</td>
</tr>
<tr>
<td>• Speed/Networks</td>
<td>• Use/People</td>
</tr>
<tr>
<td>• Wireline</td>
<td>• Mobile and Fixed</td>
</tr>
<tr>
<td>• Rural</td>
<td>• Right sized to all geographies</td>
</tr>
<tr>
<td>• Residents</td>
<td>• Right sized to all market segments</td>
</tr>
</tbody>
</table>
Bad Seed 1

Bad Idea
• Focus on primary metric

Good Idea
• Focus on interplay of inputs and outputs
Thought Experiment

Which would we prefer?

Great hammers but no nails or blueprint?

Great nails but no hammer or blueprint?

Great blueprint but no hammer or nails?
Answer:

None. All lead to disaster.
We Need Policies that Drive Each Element to Continually Improve

- Improve case for deployment and upgrades through policies such as lowering costs of inputs
- Leads to Better, Faster Networks
- Leads to more compelling Applications and therefore greater adoption and willingness to spend
- Leads to More Robust Devices

Better, Faster Networks Leads to More Robust Devices

Applications

Improve case for deployment and upgrades through policies such as lowering costs of inputs
We Need Diversity in Each Element to Continually Drive Innovation

Diversity and Asymmetry Drive Market Based Innovation

Multiple Types Leads to Better, Faster Networks

Leads to more compelling Applications and therefore greater adoption and willingness to spend

Leads to More Robust Devices
Above All, Policies Should Drive Each Element to Continually Improve The Actual Use

- Improve case for deployment and upgrades through policies such as lowering costs of inputs
  - Leads to Better, Faster Networks
  - Leads to more compelling Applications and therefore greater adoption and willingness to spend
  - Leads to More Robust Devices

Most Critical: People Who Know How to Use All
Bad Seed 2

**Bad Idea**

- It’s about one input—*speed*

**Good Idea**

- Speed matters---but it’s about the output; the way people use speed to do things
Speed is not the only critical characteristic

**Non real-time**
- Email
- Web browsing
- SD and HD video download

**Real-time**
- Streamed video and music
- VOIP (+ video) or teleconference
- IP TV
- 2-way video gaming

**Primary performance drivers:**
- Throughput – Download and Upload speeds
- Availability/ reliability

---

**Speed primarily** determines user experience

**Both speed and quality** determine user experience
Where is the greatest potential for impact: Applications for all or increased speed for a few?

Incremental benefit of fixed speeds to residential areas beyond current average uncertain
Incremental Value of Upgrade

- Incremental value to consumers of upgrade from slow to fast is 15 times greater than value of fast to super fast

  - Source: “Household Demand for Broadband Internet in 2010”, Rosston, Savage, & Waldman
Consumers Generally Do Not Show a Preference for High Speed Tiers
But We Know Better Applications Can Drive Savings in Health Care

Possible savings from implementation of electronic health records over 15 years

Possible savings from implementation of remote monitoring over 25 years

$700B in potential net savings over 15-25 years
We Know Better Applications Can Drive Savings and Improved Education and Job Training

Comparison of results between traditional and hybrid instruction models (percentage)

Comparison of Advanced Placement scores at Florida Virtual School and under traditional instructional models
Advanced Placement scores (scale of 1-5)
We Know Better Applications can Drive Savings and Improved Government Services

Comparison of costs of processing tax returns (Dollars per user)

Comparison of tax filers by hand v. E-file (Percentage)

$333M in savings over 5 years
Bad Seed 3

Bad Idea

• It’s about wired

Good Idea

• It’s about both mobile and fixed
New mobile devices are enabling convergence of basic fixed and mobile application use cases

<table>
<thead>
<tr>
<th>Category</th>
<th>Example uses</th>
<th>Application and device example</th>
<th>Similarity to fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utility</strong></td>
<td>• Voice&lt;br&gt;• Email&lt;br&gt;• One-way browsing&lt;br&gt;• M2M</td>
<td>• Kindle accessing ebooks&lt;br&gt;• Basic smartphones accessing news&lt;br&gt;• Connecting devices for energy savings</td>
<td>High</td>
</tr>
<tr>
<td><strong>Emerging multimedia</strong></td>
<td>• Two-way browsing&lt;br&gt;• Content streaming and download</td>
<td>• Smartphone accessing library to upload/download photos</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Full media</strong></td>
<td>• SD video streaming&lt;br&gt;• Interactive gaming or physical commands</td>
<td>• iPhone enabling voice recognition for person with disability</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Advanced</strong></td>
<td>• P2P or HD streaming&lt;br&gt;• 2-way HD video teleconferencing</td>
<td>• Minimum today, but emerging (e.g. Videoconferencing)</td>
<td>Minimal</td>
</tr>
</tbody>
</table>
Mobile to exceed wired access in under 5 years

Source: Morgan Stanley
Most Important For Growth: Wireless as Horizon Industry

- Economy suffering from demand shock
- Wireless generating new demand in and of itself
- Wireless generating new demand in every other industry
- And we ain’t seen nothing yet....
  - Location awareness
  - M2M
  - Nanotech

“This coming recovery will be driven by a communications boom”

~Mike Mandel, Former Chief Economist, Business Week
Spectrum Technologies Strategic for Security

- Advanced spectrum technologies essential for “freedom of action across all domains” (battlefield control)

- Advanced spectrum technologies essential for military uses

- United States defense requires insight into bleeding edge of development
Bad Idea 4

Bad Idea
• It’s about rural

Good Idea
• It’s about right sized to all areas
Justifications for rural focused policy logically lead to greater emphasis on non-rural needs

**Economic**
Argument leads to higher priority to faster speeds to strategic drivers which are generally non-rural

**Social Justice**
Argument leads to higher priority to adoption (90 million) than unserved (15-25 million)
November 9, 2010 Des Moines Register: **FCC plan a rural-urban digital split for Iowans**  

DAVE DUNCAN is president of the Iowa Telecommunications Association. Contact: dduncan@i-t-a.net. Making robust broadband networks available to all Iowans is something we should all agree is a good idea. However, you may not if you work for the Federal Communications Commission (FCC), which is promoting a plan that creates an urban-rural "digital divide" in Iowa. Last spring, the FCC released its "National Broadband Plan" (NBP) for public comment. The NBP was designed to ensure ubiquitous broadband coverage across America. The details of the plan show it will fall far short of that goal. Business and community groups have argued the NBP will stifle broadband upgrades in many rural areas and discriminates against small businesses. So far, however, the FCC is not listening to these pleas. Broadband is our business. Iowa's locally owned and operated, independent telecom companies have deployed basic broadband to nearly all their customers. More than 50 Iowa-based providers have deployed advanced fiber-to-the-home networks in more than 80 communities. But Iowa is far from achieving full build-out of advanced broadband networks. It is not just about broadband. We all use the interconnected network over which broadband is provided. Many Iowans are unaware the typical wireless call cannot be completed without using landline telephone networks that transport the call between the tower closest to the caller and the tower closest to the call recipient. Smart-phone web surfing depends on a robust "backhaul" landline network connected via landline to the World Wide Web. It takes a lot of bandwidth to supply these needs, and it takes money to make the landline network "work." The NBP will significantly restrict the cash flow available to locally owned and operated companies to finance network upgrades. Lenders are sounding alarms that existing loans used to build networks cannot be repaid under the NBP, and future investment capital will be restricted. How? The NBP redirects tens of millions of dollars away from investment in telecom networks in Iowa to networks in other states by gutting the cost-recovery mechanisms rural carriers have used to serve sparsely populated areas. Providers use this revenue to build, operate, maintain and expand their landline networks vital to the communications landscape throughout Iowa. This is bad for all of Iowa. But it gets worse. The drafters of the NBP engineered a permanent digital divide by supporting broadband networks in rural communities 25 times slower than those in urban areas. The plan sets target broadband speeds by the year 2020 of 4 mbps (megabits per second) in rural areas, and sets a goal of 100 mbps speeds in urban areas. It is hard to believe, but the FCC does not believe all Iowans should have access to the same type of broadband speeds. Consumers, businesses, schools and hospitals in rural areas across Iowa are demanding broadband speeds of more than 4 mbps today, let alone 10 years from now. Setting a goal of "achieving" only 4 mbps will devastate any efforts of small towns to attract or maintain good-paying jobs and will prevent rural Iowans from enjoying the benefits of services using high speed Internet. A recent survey of the International Economic Development Council shows fewer than 9 percent of respondents expect broadband speeds of 4 mbps to be adequate by 2013 (let alone by 2020) to achieve important economic development initiatives such as luring or retaining businesses, reviving business districts or providing training. Across Iowa, school districts are requesting broadband pipes of 15 mbps, 20 mbps and up so they can offer their students comparable curricula to those in urban areas. The Iowa Utilities Board (IUB) regulates the telecommunications carriers in Iowa, and it is seeking input on the impact of the NBP on Iowa. The independent, locally owned and operated communications companies in Iowa continue to advocate that Iowa's rural consumers should receive comparable services to those enjoyed by urban customers. To get there, we'll need more cooperation from federal and state regulators if we are going to continue to provide the quality service Iowans have come to know and expect.
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In April, the FCC released its "National Broadband Plan" (NBP) for public comment. The NBP was designed to lure more and more broadband upgrades in many rural areas and discriminate against small businesses. Some states fear the FCC plan could put their business out of business. Iowa's locally owned and operated, independent telecom companies have deployed advanced fiber networks that transport the call between the tower closest to the caller and the tower closest to the recipient without "backhaul" that money to make the landline network "work". The NBP sets no requirements to operate, maintain, or upgrade networks in Iowa to networks in other states by giving the FCC the power to require them to do so. This is bad for all of Iowa. But it gets worse. The NBP sets a goal of 100 Mbps (megabits per second) in rural areas, and while some Iowans should have access to the same type of broadband speeds as their urban counterparts, Iowans are demanding broadband speeds of more than 4 Mbps today, and many Asian countries have set targets for full broadband speeds of 4 Mbps to be adequate by 2013 (let alone by 2020) to achieve or maintain good-paying jobs, attract or provide training. Across Iowa, the Iowa Utilities Board (IUB) regulates the telecommunications carriers in Iowa, and it is seeking input on the impact of the NBP on Iowa's rural communities. IUB independent, locally owned and operated communications companies in Iowa continue to advocate that Iowa's rural consumers should receive comparable services to those enjoyed by urban customers. To get there, we'll need more cooperation from federal and state regulators if we are going to continue to provide the quality service Iowans have come to know and expect.
Problems with this argument.....Bad logic....

Market, not Government Determines Speeds
- Different market demands
- Different market costs

RLECs Preferred Policies Denies Many Rural Areas Any Broadband
- Current system creates rural-rural divide
- RLEC solution never gets money to unserved areas

Government Assuring Equal Speeds Would be Counterproductive
- Cost of 100 Mbps to all would be $30 a month per subscriber
- Would drive tens of millions off the network
And Worse for the Economy

Recipe for Stagnate Economy

![Graph showing speeds (Mbps) for different types of users: Research Institutions, Large Enterprises, Anchor Institutions, Mid-Sized Institutions, SMB, Urban Residences, Suburban Residences, Rural Residences. The speeds are relatively low, indicating stagnation.]
Argument Ignores that We Need Diversity in Each Element to Continually Drive Innovation

- **Diversity and Asymmetry Drive Market Based Innovation**
- **Multiple Types Leads to Better, Faster Networks**
- **Leads to more compelling Applications and therefore greater adoption and willingness to spend**
- **Leads to More Robust Devices**
Asymmetric Uses Drive Innovations Throughout Ecosystem

Recipe for Growing Economy

Innovations Here

Drives Innovation and Use in Other Markets
Bad Seed 5

Bad Idea
• It’s about the residential market

Good Idea
• It’s about leading in strategic markets

Question:
What would improve society more: 100M everywhere or Gigs to strategic institutions and baseline broadband everywhere?
Business Use of Digital Communications Technologies Dwarfs Consumer Use in Economic Importance

U.S. E-Commerce

Source: The Future of Digital Communications Research and Policy, Wallsten, 2010
Consequences of Bad Ideas

Policy serves wired companies, not consumer choice or new needs

Policy serves history (wired voice), not markets (moving to wireless data), or the future (innovation ecosystem)

We focus on wrong issues (non-strategic speed) and ignore opportunities (applications in public data; rethinking processes)

We make wasteful investments; don’t make wise ones

$17,000 per line per year to homes that don’t want fiber connection but want mobile

We do not fund in high-cost wireless areas

Still no national interoperable wireless public safety network
Right Ideas for Policy

Ecosystem
Use/People
Mobile and Fixed
Right sized to all geographies
Right sized to all market segments

Ubiquitous, diverse, constantly improving knowledge exchange ecosystem

Use tools to improve ways we deliver services
The Agenda

Effective Programs to Drive High Performance Knowledge Exchange: The USF Example

The Conflict with the Most Prevailing Ideas in Broadband Policy

The Role of Knowledge Exchange in the Economy and Society
Qualities of Effective Programs:
- Cost Effective
- Uses Government Levers in Measured Manner
- Re-enforces Multiple Objectives
- Scalable

*Today’s Focus
How Do the Core Ideas Apply to Universal Service Reform

**Ubiquitous, Diverse, Constantly Improving Ecosystem**
- Reprioritize funds to finish job of connecting everyone to baseline broadband
- Reprioritize to assure mobile everywhere
- Reprioritize funding for near term literacy needs

**Rethink Processes**
- Incentivize connecting all communities to higher speed networks
- Create space for experimentation
2010 total projected federal outlays to support Universal Service

- $1.2 billion in discounts for basic telephone service for low-income persons
- $4.6 billion for network deployment to high-cost areas
- $2.7 billion in subsidies to connect schools and libraries
- $214 million in subsidies for rural health care communications
- Includes money for multiple wireless companies but not unserved wireless areas
- No money for digital literacy

Most of this money does not go to unserved areas......

Current System Not Designed to Fund Gaps in Ecosystem
Key Questions for Reforming USF

What Level Should Be Subsidized?
- 4 down/1 up Actual
- More than current average
- Among most aggressive targets in the world

What is Sized of Unserved?
- 7 Million Homes

What is Sized of Private Investment Gap?
- About $24 billion
  - But $10 billion should be enough
The Broadband Investment Gap

Number of U.S. homes without access to terrestrial broadband and projected 10-year investment gap to connect them to terrestrial broadband. Majority of gap ($13.4 billion) is caused by final 250,000 homes.

4% of the Problem causes nearly 60% of the cost!
But Critics Don’t Address

Most Common Criticism:

Subsidized Speeds are Too Slow

• Incremental Cost of Increased Speed
  • Going from 4 to 6 doubles cost
  • Minimal Incremental Benefit to Society
# Target Would Put US at Leading Edge of Universalization

<table>
<thead>
<tr>
<th>Country</th>
<th>“Universal” availability target (download)</th>
<th>Type of speed</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>4 Mbps</td>
<td>Actual</td>
<td>2020</td>
</tr>
<tr>
<td>Rep. of Korea</td>
<td>1 Mbps (99%)</td>
<td>Actual</td>
<td>2008</td>
</tr>
<tr>
<td>Finland</td>
<td>1 Mbps</td>
<td>Actual</td>
<td>2009</td>
</tr>
<tr>
<td>Australia</td>
<td>0.5 Mbps</td>
<td>Unspecified</td>
<td>2010</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.5 Mbps</td>
<td>Unspecified</td>
<td>2010</td>
</tr>
<tr>
<td>Ireland</td>
<td>1 Mbps</td>
<td>Unspecified</td>
<td>2010</td>
</tr>
<tr>
<td>France</td>
<td>0.5 Mbps</td>
<td>Unspecified</td>
<td>2010</td>
</tr>
<tr>
<td>Germany</td>
<td>1 Mbps</td>
<td>Unspecified</td>
<td>2010</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2 Mbps</td>
<td>Unspecified</td>
<td>2012</td>
</tr>
<tr>
<td>Australia</td>
<td>12 Mbps</td>
<td>Unspecified</td>
<td>2018</td>
</tr>
</tbody>
</table>
Second Most Common Criticism: We Should Not Get Rid of Rate of Return Regulation

But Critics Don’t Address

• Inefficient Investment Incentives

And More Important
Should the Government Ever Use Its Power to Assess Consumers to Assure the Permanent Profitability of a Private Company?
Should the Government Ever Use Its Power to Assess Consumers to Assure the Permanent Profitability of a Private Company?

Everyone agrees the answer is **No!!!**

But that is exactly what the current system is doing.
Adoption a function of value, not price

Digital Literacy Corps

Reform of Lifeline Link-Up

Public Computing Centers/Libraries

Local Partnerships

Digital Literacy Portal

Adoption Efforts
Adoption
---
Economic Development
---
Giga Communities
---
Targets for Experimentation
How does USF Reform Serve High Performance Knowledge Exchange?

- **Ubiquitous**
  - Close deployment gaps
  - Close adoption gaps

- **Diverse**
  - Fixed and mobile
  - High speed institutional, baseline residential

- **Constantly improving Ecosystem**
  - Gig communities to drive new applications
  - Adoption efforts to assure improving use

- **Improve Processes**
  - Gig to every community in anchor institutions
  - Experiments in economic development
National Purposes:
Broadband is part of the solution to many of the country’s problems
But First, We Have to Rethink

- Knowledge is different from other resources. It makes itself constantly obsolete, so that today’s advanced knowledge is tomorrow’s ignorance. The productivity of knowledge and knowledge workers will not be the only competitive factor in the world economy. It is, however, likely to become the decisive factor.

"The most important area for developing new concepts, methods, and practices will be in the management of society’s knowledge resources, specifically education and health care, both of which are today over administered and undermanaged."


Yet Our Approach Today Uses Yesterday’s Logic and Tools
What Platform is Best for Our Kids: Gutenberg’s or Digital?

- Options for student who does not understand: None
- Updated: Twice a decade at big cost
- Effectiveness hard to test
- Restricted to text and pictures
- Expensive to distribute
- Provides no data to teachers, board or parents

- Options for student who does not understand: multiple
- Updated: Whenever at little cost
- Easy to test effectiveness
- Can use multimedia and communications
- Inexpensive to distribute
- Can provide constant, actionable data to teachers, board and parents
Conclusion:
What Are the Table Stakes for a Strong Country in the 21st Century?
A ubiquitous, diverse, and constantly improving ecosystem of networks, devices, applications and people

Using advanced tools of knowledge exchange to rethink and improve how we deliver essential services
High Performance Knowledge Exchange

A ubiquitous, diverse, and constantly improving ecosystem of networks, devices, applications and people

Using advanced tools of knowledge exchange to rethink and improve how we deliver essential services
Table Stakes for the 21st Century

- Strong Economy
- Strong Civic Society
- High Performance Knowledge Exchange

A ubiquitous, diverse, and constantly improving ecosystem of networks, devices, applications and people

Using advanced tools of knowledge exchange to rethink and improve how we deliver essential services
Will We Grasp the Future?

• “The danger in times of turbulence is not the turbulence. It is to act with yesterday’s logic”
  – Peter F. Drucker