Columbia Institute for Tele-Information (CITI)
THE STATE OF TELECOM: TAKE STOCK AND LOOKING AHEAD
Columbia University, New York, NY
October 21, 2005

WHERE ARE WE? A SECTOR-BY-SECTOR REVIEW
Raul L. Katz

Three Years After The Crisis, We Find an Industry Still Undergoing a Fundamental Restructuring

- Wireless underwent a "tectonic" shift
- Fusion Zone is blurring boundaries between Local, LD, Telephony and Entertainment
- Cable is targeting telephony as a major growth engine in addition to broadband

The Wireless Industry Continues to Gain Share of The Total Demand, While Undergoing Significant Structural Changes

1. Industry consolidation is continuing (Cingular/AT&T Wireless, Sprint/Nextel, AllTel/Western Wireless)
2. Wireless "pure plays" (Sprint Nextel, T-Mobile, Alltel) vs. convergence players (Cingular, Verizon)
3. Guerilla attacks from low cost carriers will continue / are increasing
4. Traffic continues to increase while ARPU is stabilizing
5. Initially driven by email and messaging, wireless data will emerge as major network upgrades to 3G are being rolled out
6. Next Gen networks and technology look like "random bets"
7. Non-traditional/disruptive business models (e.g. MVNO) will persist for 2-3 years

Major Players Have Achieved A Consolidation That Resulted in Three Major Service Providers and An Assortment of Niche Players

- The top 3 carriers went from 50% market share prior to consolidation to 70% market share after consolidation
- This still leaves 4 national players in most markets and is not expected to have a major effect on pricing or margins; additionally, as a condition of the Cingular AT&T merger, Cingular is required to forgo combined wireless operation in 22 markets to ensure market competition
- However, rural markets will often have fewer national carriers present and as a result may be able to sustain somewhat higher margins

MVNO Economics Can Be Attractive To Both The MVNO And The Network Carrier

- MVNO Economics:
  - MVNO Model: Traditional Model
  - Assumptions:
    1. Both carrier and MVNO able to realize similar voice revenues
    2. MVNO with its compelling, value-added data services is able to realize 10% of revenues from data
    3. Sales and Marketing costs for traditional carrier based on $400 cost per gross add and 2.4% monthly churn
    4. MVNO costs based on $300 cost per gross add and 2.0% monthly churn due to MVNOs' ability to leverage its existing customer relationship to specific target segment

Low Cost Carriers Are Another Type Of Non-Traditional Competitor And Are Beginning To Capture Share With A Different Business Model
The Wireline Industry Is Consolidating and Evolving to Meet the Changing Market Environment

1. Emergence of 2 to 3 “juggernauts” and disappearance of the IXC model
2. Enterprise and consumer markets are facing increased divergence of needs and offers
3. Telephony & entertainment boundaries are blurring
4. Pure play VoIP players accelerate industry disruption

Wireless: To Counter the Negative Trends, Telcos Are Focusing on the Growing Wireline Segments That Support Changing Consumer and Enterprise Needs

Wireline: Declining Local and LD Revenue Have Devastated the Telco Wireline Business Model

Wireless: While Business Access Line Declines Are Stabilizing, Consumer Segment Continues to Soften

Wireless: Wireless, VoIP and Cable Players Are Taking Share From Fixed Line Operators

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Sources: BLS, Strategy Analytics, OfCom, UBS Warbug, RCN company reports, Bell Canada company reports, ADVENTIS Analysis

Average of Only 15% in 10 Years for Second/Third Linear Video Entrants

Telcos Are Therefore Driven to Offer Video; However, Penetration Historically Reaches an Average of Only 15% in 10 Years for Second/Third Linear Video Entrants

Cable MSOs Will Continue Their Attack on Telephony Positions

1. Telephony is becoming a major new growth engine
2. Push toward broadband will continue
3. "Windows" (including wireless broadband and content-generated content) will be the MSOs' next big growth project
4. Potential trend for cable operators to gain stronger national footprint as they face off against larger RBOCs smaller players are selectively consolidating into larger players

Video Penetration Rate Analogs

A Potential Telco Play Includes Enhanced On Demand, Interactive Services and Supporting Capabilities: Way Beyond the Current Cable Offer

Large CableCos Have Led the Way in Establishing a Consumer Beachhead

3 Content Distribution Vectors

- Streaming traffic within the home will significantly drive traffic in and out of the home - 40% of U.S. Broadband Households have home networking while 12% of total PC households have home networking

IP is Also Disrupting Content Distribution: Digital Delivery Is Changing Consumption of Data To, From, and Within the Home

Consumers with TiVos show high usage levels and high affinity:
• 10% of TiVos moved shows every day rather than watch them live
• 10% of TiVos moved shows every day rather than watch them live
• Average TiVo consumers, 10-20% show them significantly in advance of when they come on

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Consequences of U.S. Broadband Households having home networking while 18% of total PC households have home networking

Stimulating traffic within the home will significantly drive traffic in and out of the home - 40%

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CONSUMER BEHAVIOR CHANGES AFTER UPGRADING TO DSL

Table showing consumer behavior changes after upgrading to high-speed:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Before DSL</th>
<th>After DSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>More time online</td>
<td>8 hours</td>
<td>10 hours</td>
</tr>
<tr>
<td>Less time watching TV</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>More time surfing</td>
<td>1 hour</td>
<td>2 hours</td>
</tr>
<tr>
<td>More time downloading music</td>
<td>30 minutes</td>
<td>1 hour</td>
</tr>
<tr>
<td>More time searching tools</td>
<td>10 minutes</td>
<td>30 minutes</td>
</tr>
<tr>
<td>More time watching TV</td>
<td>4 hours</td>
<td>2 hours</td>
</tr>
<tr>
<td>More time listening to music</td>
<td>1 hour</td>
<td>2 hours</td>
</tr>
<tr>
<td>More time sending emails</td>
<td>5 minutes</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

Video Penetration Rate Analogs

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3 Content Distribution Vectors

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In This Context, It Is Pertinent to Define Potential Scenarios Around the Future Relationship Between SBC and Verizon

- **Unidirectional:** The relationship between the RBOCs has been defined as one of status quo, which avoided direct competition.
- **National deployment allowed by the Telecommunications Act has been leading to increased competition.**
- **Three scenarios should be considered for evaluation:**
  - **Extension of status quo:** Both carriers consider that rather than compete between themselves, they would rather continue to share the market, therefore allowing to reduce some of their operating costs (e.g. R&D).
  - **Competition:** poised to grow in those markets still controlled by the other carrier, SBC and Verizon deploy competitive initiatives (e.g. SBC enters the consumer voice and broadband market in the Eastern seaboard).
  - **Enhanced collaboration:** as outlined in prior papers, not only they prefer to continue the status quo but they reach to build areas of collaboration which allow them to better respond to the cable challenger.

### New Players Are Emerging Who Are Developing Alternative Next-Gen IP Based Platforms

<table>
<thead>
<tr>
<th>Category</th>
<th>Information Dominant</th>
<th>Next/Reproducing SCP Fauna</th>
<th>Next Generation IP</th>
<th>Full Service Suppliers</th>
<th>Consolidated Telcos</th>
<th>Inter-Modal Competition for Voice</th>
<th>Specialized Suppliers</th>
</tr>
</thead>
</table>

### The Ultimate Outcome Draws 3-5 Vertically Integrated Competitors Pitted Against Each Other to Gain Share of Bundled Revenues

1. Increased competition from 3 to 5 mega players - Inflation of market, into consumer and enterprise
2. Healthy head competition between remaining RBOCs and cable providers
3. Continued trend towards triple/quadruple bundle offers
4. Limited regulations - barriers decreasing

### The Internet Players Remain The Ultimate Wild Card...

<table>
<thead>
<tr>
<th>CORE OFFERING</th>
<th>KEY RECENT DEVELOPMENTS TOWARDS THE TELECOM SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search</td>
<td>- Launch of Google Talk (VoIP)</td>
</tr>
<tr>
<td>E-Mail / Portal / Software (Webmail)</td>
<td>- Use of Google Talk (VoIP)</td>
</tr>
<tr>
<td>Online Auctions</td>
<td>- Use of Google Talk (VoIP)</td>
</tr>
<tr>
<td>ISP / Portal</td>
<td>- Use of Google Talk (VoIP)</td>
</tr>
</tbody>
</table>

### Technology Adoption Life Cycle

- **Customer Demand:**
  - **Pragmatists:** 10%
  - **Visionaries:** 20%
  - **Adopters:** 30%
  - **Early Innovators:** 40%
  - **Skeptics:** 5%

- **Technology Adoption:**
  - **Early Majority:** 10%
  - **Late Majority:** 20%
  - **Alternatives:** 30%
  - **Laggards:** 40%

### US Broadband Forecast

- **Dial-Up:**
  - 2005: 25%
  - 2007: 15%
- **Total Residential Broadband:**
  - 2005: 40%
  - 2007: 70%
- **Cable Modem:**
  - 2005: 60%
  - 2007: 80%
- **Residential DSL:**
  - 2005: 10%
  - 2007: 10%
Leveraging Deep Pockets and Well Developed Global Brands

### Wireless

**Demand**
- Market saturation will lead service providers to create niche markets and work with MVNOs to target market sub-segments.
- Sub-beam mobile voice revenues, driven by new revenue opportunities, will increase at a faster rate than home service revenues.
- The growth of services that are beginning to catch on in the most advanced markets will be significant.

**Technology**
- WiMax will be the dominant broadband technology between fixed and mobile services.
- Voice and data services will be widespread.
- Simplicity of access and speed will allow for a better overall experience.
- Voice and data services will be integrated.

**Structure**
- Lines between wires and wireless providers will begin to blur.
- Mobile players will enable voice on the move.
- Voice and data services will be sufficient.

### Cable

**Demand**
- Broadband, VoIP, and VOD will be standard.
- Voice and interactive, home entertainment, file sharing, and other emerging applications will be available.

**Technology**
- Broadband and voice will be available to all customers on demand.
- Combining a broadband and voice offering can create value.
- Broadband and voice services will be integrated.

**Structure**
- Existing cable distribution networks will allow for seamless integration.
- -In the years to come, cable operators will be able to offer more services.
- -The ability to provide services will be crucial.

### Investmen

**Strategy**
- Leverage deep pockets and well-developed global brands.

### The Market Sees the Internet and Consumer Device Players As Ultimate Future Creators of Value

**Value Creation**

- **Current Value Creation**
  - **Revenue**
    - **Services**
    - **Content**
  - **Margin**
    - **Services**
    - **Content**

- **Future Value Creation**
  - **Revenue**
    - **Services**
    - **Content**
  - **Margin**
    - **Services**
    - **Content**

**So What is the Right Strategy?**

- **Market Focus**
  - **Determine your market focus**
  - **Enter or exit**
  - **Supersize the Market**

- **Innovation Strategy**
  - **Ecosystems and Services**
  - **Business Model**
So Far, many alternatives are in play

Focus on a Winning Segment

"SuperSize Me and Milk the Cash Cows"

Redesign the Delivery Model

Disruptive
Incremental
Broad
Narrow

Innovation Strategy

Products and Services, Processes, Architecture, Business Model

Market Focus

Determine your sand-
lot

Emergence of Enterprise Far-
Play

- Cable and Wireless | Sprint (US)
- Orange (UK)

External Partners in the Technology Model

- Google
- 3GSM
- Microsoft

Intra- and Inter-Service

- Comcast and Time Warner
- Telefonica and Telefonica (Spain)
- Telefonica and Vodafone (Spain)

SuperSize Me and Milk the Cash Cows

Mobile Convergence:

- Telefonica + Cesky Telecom (April)
- Telecom Italia + TIM merger (June)
- Eircom + Meteor (July)
- BT 21st Century Network (21CN)
- Cable and Wireless UK NGN

VOIP over WLAN:

- Nokia announces deal with Avaya and Finnish operator Saunalati

Internet Portals to offer Telephony:

- Yahoo, Google, and Microsoft announce plans to offer voice service
- EBAY acquires Skype

Emergence of Enterprise Far-
Play

- Cable and Wireless + Energis (Aug)
- Qwest(?)

Portals and Telco service bundling:

- Yahoo adds Verizon to DSL partnership

Intensifying Battle for Broadband:

- SBC and VZ pushing more aggressive discount offers to promote switching from cable and retain existing subscribers

MVNO Launches

- ESPN
- Disney
- Amp’d

Content-Distribution
Partnerships

- Sprint Nextel + NFL
- Sprint Nextel + Sirius

Unfortunately, this means more turbulence which requires enhanced operating flexibility

- Transition to new organizational structure
- Overcome impediment of current ownership structures (wireline/wireless) and existing inertia
- Shift towards segment-oriented organizations
- Implement permanent “cost leadership” programs
- Redesign products/services portfolio
- Configure business as an asset
- Improve in-based and delivery models and technologies
- Optimize IT operating model and reallocate CA
- Reassess positioning vis-a-vis competition
- Competitive cost to serve, service differentiation?
- Competitors’ strategies, investments and weaknesses?
- Potential value-creation partnerships?
- Streamline portfolio of businesses and activities
- Reconsider type of business model to pursue
- For example: lowest cost delivery? Superior customer experience/intimacy?

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