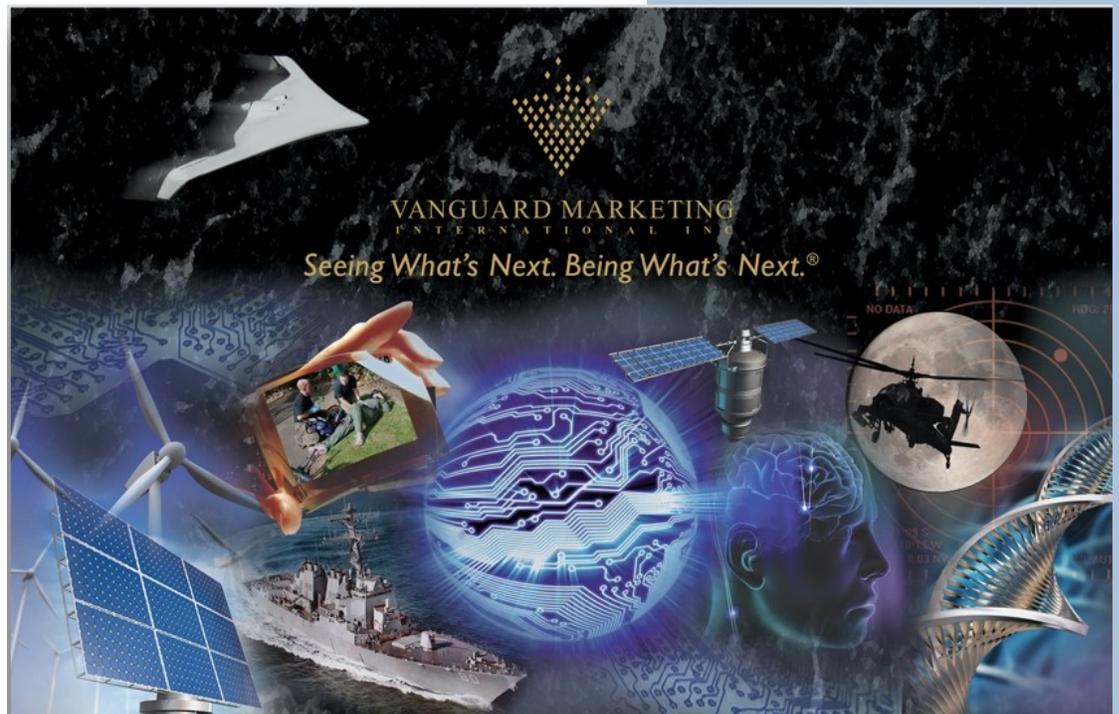




The VMI Top Ten Trends and Business Issues in the Telecom Ecosystem

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Top Ten Trends and Business Issues in the Telecom Ecosystem

WHAT THOUGHT LEADERS ARE SAYING ABOUT LEADING TRENDS IN THE TELECOMMUNICATIONS ECOSYSTEM AND HOW CONVERGENCE WITH THE INTERNET ECOSYSTEM WILL AFFECT MOBILE BROADBAND AND VALUE PROPOSITIONS.

“End users want speed, reliability, and immediate access to their content; they want services that provide value in their daily lives including the ability to develop and deliver a differential advantage in their market—this is called innovation.”

Laura Byers, Principal Consultant, VMI

About the Research

“Driving New Business Models: The Impact of Convergence of Voice, Data, and Video and the Doubling of Knowledge,” was the central issue voiced by opinion leaders in VMI’s Telecom Ecosystem white paper... in 2004. It’s interesting to see the future finally arriving!

Vanguard Marketing has conducted periodic in-depth reviews of the telecommunications infrastructure market since 1998. Over the years we have spoken with the top players in the U.S., including: Global carriers, service providers, telecommunications equipment manufacturers, network equipment providers, board suppliers, independent software vendors, designers of mobile devices, and a few “wild card” visionaries. The purpose of our investigations has been to analyze the trends and business issues that impact the evolving telecom ecosystem to build an understanding of its transformation over-time. We then seek out parallels in other industries to provide us with insights into relevant and potentially disruptive strategies of incumbent and emerging players. In this ecosystem, the level of change in the last decade has been especially pronounced as the telecommunications and Internet ecosystems converge. The big question: Which ecosystem will emerge as the leading power?

Over the last few months, we interviewed twenty-five key opinion leaders and influencers in the industry. The participants included: Founders, CEOs, CTOs, engineers and other professionals at strategic levels within stakeholder companies and organizations. Individuals were selected to create an equal balance of perspectives across all areas of the ecosystem. These thought leaders (VMI’s topical community) provided us with unique industry level insights and specific perspectives from their place in the value chain. We cannot thank them enough for their contributions to this report.

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The VMI Topical Community's Top Ten: Trends and Business Issues in the Telecom Ecosystem

After analyzing the ecosystem and through discussions with the topical community, ten notable trends and business issues stand out that we believe will be very influential in shaping the future ecosystem.

#1 Unprecedented levels of traffic; the shear amount has drastically increased and is straining network bandwidth.

- This is mainly due to Mobile broadband, specifically streaming video traffic.
 - Drivers: End users want speed, reliability, and immediate access to their content; they want services that provide value in their daily lives including the ability to develop and deliver a differential advantage *in their market* –this is called innovation.
 - Usage is moving from 4:1 downlink-to-uplink to 2:1 downlink-to-uplink, at times.
- The biggest—and most expensive—point-of-congestion is the radio access network; efficiently delivering the bandwidth required in the wireless backhaul space is the single biggest challenge in the industry.
- The number one struggle for the Service Providers (SPs) is the migration to LTE (Long Term Evolution wireless communications standard) and answering the question – how do we make money on our investment? LTE over 3G will see a capacity shortfall for Mobile Broadband in 3-4 years, despite the migration towards LTE, including an all-IP (Internet Protocol) flat network architecture. While SPs are investing billions, LTE alone will not deliver the service required.
- An even more important question is: Will LTE actually scale? If it can't, it will further add to the enormous pressures inside operator organizations. They realize that they must change the technology of the cell site and must change the architecture.
- Multi approach strategy will be needed including offload (caching), compression, improved spectral efficiency with new versions of LTE Advance (LTE release 10 & beyond); Don't give up on WiMax.
- Optimization of network capacity usage (to mitigate the impact of congestion on users during peak periods) is seen by some as a ploy to establish artificial barriers and a justification for a new monetization model.



#2 Monetization of services takes precedence over open systems, but the question remains:

- How can SPs monetize the network? How do they make money back on their investment like Google and Apple? They don't want to be a dumb pipe.
- Will the processing overhead (associated with Deep Packet Inspection (DPI), which is possibly not scalable) for tiering service create major bottlenecks, sending more subscribers to over-the-top services and therefore bypassing the SP network?
- Many believe that throttling and excessive monetization practices will impact the industry and innovation negatively, although it offers service providers a means to differentiate themselves
- Through spectral optimization, we'll get libraries per/second. So, why throttle?

#3 *The real battle* - Traditional SPs and MCO-Cable Companies (AT&T, Verizon, Comcast) are pitted against Emerging SPs (Google, Apple, Amazon)

- *Also seen as those who CONTROL (Congestion Aware Fairness) vs. ENABLE (Openness, Interconnection and Apps-oriented) innovation, respectively.*
- Decoupling of the subscriber/end user from traditional SPs by emerging SPs is taking place. Can the genie be put back into the bottle and under telecom SP control? *Not likely!*

#4 Voice is just another add-on

- A person's reachability will soon be unlimited in all of its forms (voice, voice message, text, video, or some other awareness), but needs a way for people to define their personal rules. Will reachability (vs. presence and availability) make "voice" Quality of Service (QoS) meaningless?
- Communications can become a service that comes from the cloud.
- Constant video-conferencing will become a paradigm for how we communicate – with embedded knowledge-based mash-ups for additional situational understanding.

#5 Communications is becoming about *one system for all devices*. The devices will be shared, in a shared environment (hotel, airplane, car, etc.)

- Architectural gateways are being driven by the need to transcend individual devices, with clouds' function as the transcoders for each device, which will use the content in



the network. The system is managing content real-time on the edge.

- Challenges ahead:
 - Intelligence in the system to manage multiplicity of devices.
 - Intelligence and power in the system to support the full breadth of each device

#6 Enterprise migration to the Cloud and potential backlash

- Information Technology (IT) is no longer strategic, except for SPs
 - SPs are moving into higher value of service: Personalized Content Delivery Networks (CDNs), consulting & data processing services
 - Enterprise customers' businesses looking for workload solutions, not computing solutions
- Now enterprises are realizing these cloud-based services don't have the same high-level tools that their on-premise services have offered
 - Cloud is still more expensive than on-premise technology after just a few years
 - Highly suspicious of Cloud computing benefits for enterprises, because it's motivated mostly by large datacenters interested in selling off capacity to pay for their investments
 - Cloud will be highly competitive, non the less
- Data center networks are too complex and require too much manual intervention
 - What worked in the past is no longer viable in the virtual era
 - With more equipment out there, there needs to be a simpler way of handling and managing them. Network management will be a tough issue in the future
- General purpose processors that offer virtualization and power management will enable lower OPEX and lower CAPEX. IT has learned a lot in the early stages of data center/ cloud computing that can be applied to the network side of things.

#7 Migration to new general purpose "flexible" processor architecture; performance is increasing, but traffic is increasing more.

- Telecommunications Equipment Manufactures (TEMS) and SPs worry about commoditization of bandwidth
- Infrastructure upgrades are squeezing the TEMS; difficult to finance



- Open Networking Foundation, (<https://www.opennetworking.org>), will set open standards for routers. Cisco's model will eventually be turned upside down.
- SPs will have less and less ability to dictate requirements to handset providers – handsets will become ubiquitous devices running apps chosen by end users
- TEMs are broadening their solution portfolios to adjust to evolving customer-sets

#8 Source of Innovation:

- *Service Innovation* is what people are doing well on the Internet; SPs have proven the only innovation they are looking to create is in control of the network based on *flawed* monetization models. Instead of *subscriber usage fee* should be *value-creation fee* (Apps store model, where Content Provider and Developer get fees *after* App has been purchased) in order to increase bandwidth usage.
- *Biggest innovation*: The business models of Google, Apple, and Amazon, (to name a few). SPs will only adopt after a smart person in the garage proves it.
- Companies and consumers want choice -- in networks, storage, and applications
- TEMS become successful by listening to their customers (the right customers).
 - They are coming under pressure to innovate fast, be more responsive, drive down costs. They are moving more towards general purpose hardware, software, and flexible architecture for scale and reuse.
- Most TEMS continually limit their innovation roadmaps to building traditional carrier-centric solutions and services but new emerging SP customers offer much different opportunities to innovate and differentiate.
 - Will the traditional SPs be open to such a model or will they continue to try to dictate to the TEMS?
 - *Will traditional service providers be enablers or roadblocks to innovation?*
 - Will they drive down costs and improve service by providing openness, interconnection and Apps-enabled innovation?
 - Will they "optimize" the network via throttling and collection of subscription fees; act as a gatekeeper of innovation, as described in "Congestion Aware Fairness" arguments?
 - How will the emerging SPs develop? Will they turn traditional SPs into a commodity?
 - Emerging content/SPs are focused on lowest cost per bit



- 3GPP-3G Interoperability Standards – driving network architecture
 - TEMS and SPs will be working on fixing current LTE pain points as it rolls out -- a sort of just-in-time repair strategy
 - "LTE Advance" is 5 years out
 - Future is Optimized HetNet: Networks of Networks, Fuzzy Cells, TV Whitespace utilizing Cognitive Radio Technology, *low power nodes such as picocells, femtocells and new relay nodes*
 - 2020 and beyond... leapfrog technologies, pushing physics

#9 TEMS are facing technical challenges

- Unprecedented levels of performance stress due to video and overall increase in network traffic
- Need for very complex networking protocols which are very time consuming to develop and deploy
- Many types of equipment - all have different standards/needs - there are multiple processing guidelines in the networks
- Market pressure - time-to-market challenges --> need to network and integrate these complex systems, range of equipment
- But, TEMS do have a choice. They can hedge their bets by continuing to work with traditional customers and develop new markets and channels for new innovation with emerging service/content providers
- TEMS are broadening their solution portfolios to reach evolving customer-sets.

#10 Emerging service/content providers will change the future of the traditional providers

- Players and segments are very complex, multiple stages of evolution. Their roles are blurring. In the last 18 months, Service Providers have changed from
 - 1. Wireline 2. Wireless 3. MCOs
- Now it's
 - 1. Wireline, Wireless, 2. MSOs and Alternative Access Vendors, 3. Emerging Content Providers
- They (Google & Apple) are only encroaching on the service provider space because the SPs aren't providing enough bandwidth (an economic value proposition). They think



they can do it cheaper themselves and they don't care about being an SP. It's a means to an end.

- *Players (Google, Amazon, Apple) focus on innovation and lowest cost-per bit*
 - They will build their own networks if they can't purchase the bandwidth; it's a means to an end
- Because of Apple... even with all of the changes in the industry, we are all better for it. More business is making us better competitors.

Conclusions

Traditional SPs need to handle the extreme growth predictions and lock in on the customer relationship. Additionally, they must look for sources of new revenue that are valued by the end-user.

In the end, consumers simply want to be able to use the mobile devices they purchased to their full potential, whether that be through the telecom or Internet ecosystem. The question is: Can either system live up to its brand promise? As we stated in the beginning of this Top Ten list, end users want speed, reliability, and immediate access to their content; they want services that provide value in their daily lives including the ability to develop and deliver a differential advantage in their market –this is called innovation.

About VMI

Companies that want to stay ahead of their competition must continually demonstrate leadership through leading-edge vision and the ability to execute the pursuit of new opportunities. Vanguard Marketing International works on an ongoing basis with many of its clients to ensure that they address changing market needs, capitalize on important industry trends, and maintain brands, which clearly differentiate their company and innovations throughout the investment community and prospective markets.

As a follow-up, the reader is encouraged to review Vanguard Marketing's website and published white papers on selected topics related to Vanguard's core competencies:

<http://www.e-vmi.com>

<http://www.e-vmi.com/html/papers.html>

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