

The Upcoming Revolution In Customer Demand

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Spending for new telecom services is poised to take off. But carriers need to offer what users want to buy.

As the telecommunications industry experiences profound technology and policy-based change, there's a natural tendency to focus on supply-side developments—advances such as voice over IP (VOIP), dense wave-division multiplexing (DWDM) and broadband wireless, as well as the impact of regulatory changes. In the process, the demand side is often neglected. Yet, obviously, user needs—for business, residential and remote small office/home offices—play a vital role in moving the service environment forward.

Certainly the availability of supply-side solutions and innovative new offers will influence the demand side, but other factors will bear on demand as well. While we have done little market research on the issues discussed below, we can make several observations about likely consumer behavior in the future telecom environment.

POTS Is Vulnerable

To begin with, we can no longer assume that ubiquitous, plain old telephone service (POTS), will continue to fulfill most customer needs. Indeed, today's plain old telephone service is vulnerable to attack.

In Figure 1, we rank POTS according to three dimensions: Price, quality and functionality (using a "triplet" methodology outlined in Robin Cooper's *When Lean Enterprises Collide*). POTS's value leans toward quality at the expense of functionality and price: POTS has high quality (low blockage rate, ability to reroute around outages, short call setup times), but it offers only medium-to-low functionality (analog, narrowband service, monaural, non-high fidelity sound, limited multimedia and multicasting capabilities and in-band signaling). Also, telcos charge relatively high prices per bit for the small number of bits narrowband POTS service requires (although the price is affordable for most users).

When a product offering is sold as "one size fits all" but is skewed in the product triplet, there is often a marketing opportunity based on doing the exact opposite—i.e., selling a range of product triplets to various people. So POTS is vulnerable to encroachments.

Segmentation and a New Mass Market

What might supplant POTS? Initially, segmented offer sets will be the best candidates to replace "one size fits-all." POTS successors should employ some combination of three technology drivers: packetization, broadband and wireless (Table 1). We expect to see a variety of competing offers accentuating a wide range of new price/feature/functionality triplets. Examples include:

- High bandwidth converged voice/data.
- High bandwidth offers with low quality-of-service parameters.
- Voice over IP (VOIP) conversations at varying vocoder rates, network latencies and congestion levels.
- Mobile offers.

Unlike today's POTS segmentation (which is based mostly on pricing), the new offerings will be differentiated according to all three product dimensions shown in Figure 1. Despite the short-term market splintering this will cause, over the long term, we expect to see a new mass market emerge. Looking at the elements in Table 1, we think that when the dust settles, the bulk of the market will move from the Figure 1 model to the

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FIGURE 1 POTS Product "Triplet"

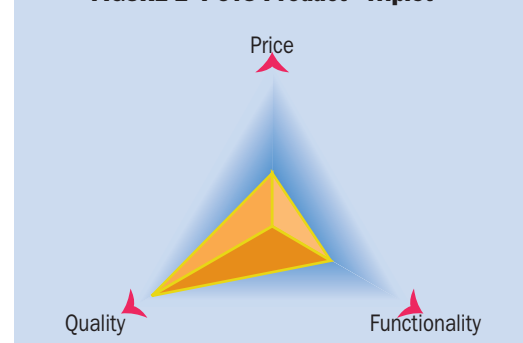


TABLE 1: Three Technology Drivers and Their Impact

	Price	Quality	Functionality
Packetization	<ul style="list-style-type: none"> ■ Substantial short-term advantage due to enhanced service provider (ESP) access cost advantage. ■ Long-term VOIP cost advantage becomes marginal add-on to data. ■ Lack of regulation facilitates shifts in pricing paradigm (fixed/variable). ■ Lack of regulation facilitates eliminating subsidies for business, rural, toll. ■ Equal “price per bit” at a particular QOS level replaces huge price per bit differential between voice and data. 	<ul style="list-style-type: none"> ■ Replace single POTS quality-level with multiple QOS levels. ■ The concept of toll-quality “voice” redefined as toll quality “functionality.” ■ People will be able to choose from among different defined levels of voice coding. 	<ul style="list-style-type: none"> ■ Replace single POTS 64-kbps vocoding with multiple options, ranging from 6 kbps to stereo CD-audio quality. ■ CPE-controlled-vocoding and quality levels (possibly application- and/or call-specific). ■ Multimedia sessions. ■ Multicasting. ■ Integrated messaging. ■ Flexibility to add, delete or change new services on the fly
Wireless	<ul style="list-style-type: none"> ■ Premium price versus average POTS call. ■ Low cost versus toll calls. ■ Lack of regulation facilitates shifts in pricing paradigm (i.e., bucket pricing, no toll rates, special family pricing). ■ Competitive forces, combined with low marginal cost, lead to value-added services included in base packages for free. ■ Hybrid wireline/wireless pricing schemes. 	<ul style="list-style-type: none"> ■ Lower voice quality than POTS, but acceptable to most people. ■ The concept of lifeline POTS is replaced with the concept of mobile service with battery backup. ■ Position location can be coarse or fine grained (e.g., GPS). 	<ul style="list-style-type: none"> ■ Include value-added services (caller ID, voice mail) in basic package. ■ Integrated voice/packetized data capability. ■ Increasing data transmission speeds (via 3G technology). ■ Hybrid wireline/wireless service to create anytime/anywhere capability. ■ Directory services based on location.
Bandwidth	<ul style="list-style-type: none"> ■ Higher price per line than POTS, but much lower cost per bit. ■ Customer service level agreements (SLAs) determine pricing. 	<ul style="list-style-type: none"> ■ Bit-error rate or block-error rate or time-duration service outage concepts. 	<ul style="list-style-type: none"> ■ Replacing 64-kbps lines with high-bandwidth capability facilitates more data-intensive use of the Internet and/or provisioning of CATV services. ■ Single “fat pipe” can replace multiple POTS lines by multiplexing.

model shown in Figure 2 (p. 56)—much more functionality at much lower unit costs, but with more variable quality.

This is because, as Internet communication becomes ubiquitous, most customers will want high bit-rate functionality. To make this affordable to the mass market, the price per bit will have to drop substantially, and to facilitate these price cuts on a connectionless network, most users will have to accept low QOS levels for data transmissions, reserving higher QOS for voice applications. There also will be low-end “budget-priced” triplets (narrowband-only capability; as-available QOS) and high-end triplets (broadband-mobile capability; high priority QOS for all traffic). But we anticipate that these will represent niches—Yugos and Mercedes of the new telecom environment, not the mass market Fords and Toyotas.

A Single Provider

For the new mass market, we believe customers will demonstrate a strong desire to purchase bundled services from a single vendor (aside from the largest business accounts, which can achieve scale for individual services). The primary reason for this tendency will be the availability of substantial discounts. When a network provider offers multi-

ple services over a common delivery platform, the marginal cost of each service is low, which facilitates discounting.

It’s safe to assume that service providers will pass along some portion of their savings to customers, because users probably wouldn’t buy bundled service solely for the convenience of dealing with a single provider; they’ll *demand* discounts. And we believe that there will always be some provider willing to sell not only the convenience of bundling, but a lower price. As a result, other players will be forced to go along.

A related trend will be the desire to choose one’s provider based on end-to-end (ETE) capability; i.e., where communications from origin to destination and over the customer’s entire footprint of facilities can be handled over a single service provider’s network. This will be the case for two main reasons:

- Customer need for consistent technical and performance standards. Unlike POTS, advanced packetized networks in the U.S. are not yet governed by standards. As a result, two IP networks could vary substantially with respect to congestion levels, ability to handle different standards such as MPLS, DiffServ, IPSec and multicasting, as well as the ability to decode certain VOIP compression algorithms. To ensure good end-to-

Providers will use technology to lock in customers more effectively

end communications, customers, therefore, may want a single vendor controlling the entire link.

■ **Customer need for ubiquitous interconnection.** Unlike POTS, IP networks do not have interconnection requirements (aside from access to a public Internet with minimal congestion controls). To set up VPNs to multiple locations, customers may be better off using a provider with an extensive footprint serving these locations.

As a result, providers such as MCI WorldCom, AT&T/BT or SBC/Ameritech, with wide footprints and end-to-end capability, may have an advantage over strictly local players, at least unless/until some of the following occur:

■ **Proposed technical and performance standards** become industry standards—and that's likely, because everyone will be buying from the same short-list of vendors.

■ **Service level agreements (SLAs)** based on QOS compliance standards allow different players to interconnect.

■ **Interconnection among packetized networks** is mandated by the FCC as advanced networks replace POTS as the major telecommunications vehicle.

But until these issues are resolved, providers that can offer end-to-end services will have a substantial advantage. Hence the focus of MCI WorldCom and AT&T on developing each of the requisite end-to-end network elements (local, long distance, Internet, etc.).

Increasing "Lock-In"

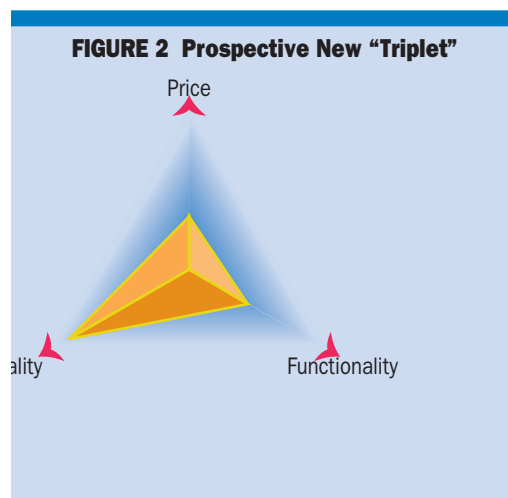
As this discussion of end-to-end services suggests, providers may be able to use technology decisions to retain customers. In their recent book, *Information Rules*, Shapiro and Varian focused on the importance of "lock-in," i.e., the fact that consumers can be locked into using certain products or services by the substantial cost entailed in making a switch.

The telecom long distance wars of the '80s and '90s were characterized by low lock-in; LD service by AT&T, MCI and Sprint was increasingly undifferentiated, the cost of changing providers was negligible and, indeed, carriers offered many incentives for switching. As a result, consumers learned that it was in their interest to be disloyal to their providers as soon as their contracts/added benefits expired.

In the new environment, however, we anticipate increasing lock-in, for the following reasons:

■ **Technological Incompatibility:** The FCC (unlike European regulators) has chosen not to mandate digital standards for advanced services such as digital cellular/PCS, DSL and CATV set-top boxes. There also are no standards for particular IP networks (i.e., all-IP networks, IP over ATM) or IP protocols (i.e., DiffServ, MPLS, multicasting).

Thus, technological incompatibility will lock customers in. For example, once a consumer has a



CDMA Sprint PCS phone, he/she has a disincentive to subscribe to a TDMA/AMPS AT&T Digital One Rate phone; similarly, once a consumer has a cable modem, it will be difficult to switch over to DSL.

■ **Required ETE Footprint:** In cases where business customers select providers based on end-to-end coverage (particularly for VPNs), there may be a disincentive to switch vendors. The list of alternative vendors may also be relatively small (e.g., international carriers such as AT&T, MCI WorldCom, British Telecom/NTT, Sprint/Deutsche Telekom/France Telecom, or regional carriers such as ITC Delta Com, GST and Teligent).

■ **All or Nothing Bundling Dynamics:** Changing LD providers was a seamless exercise for most customers. In contrast, switching all of one's services brings a much greater likelihood of service disruption.

■ **Metcalfe's Law:** Once players develop end-to-end networks, we anticipate offers that play on Metcalfe's Law (i.e., the value of a network equals the square of the number of subscribers). For example, we can envision an end-to-end provider giving extra discounts for toll calls to other subscribers on the same network, similar to MCI's Friends and Family offer.

Spending More to Get More

Another tentative conclusion we have drawn is that customers will be willing to pay more in aggregate for telecom services, so long as they get improved functionality at an affordable price. We are optimistic for the following reasons:

■ Overall, according to the U.S. Department of Commerce, telecom services comprise only around 3 percent of GDP, which isn't all that much. There's plenty of room for growth, and it's already occurring: As U.S. GDP per capita has increased, telecom's share of GDP has risen.

■ **Telecom (particularly broadband)** potentially could substitute for important sectors of the economy—e.g., transportation/travel, health care, education—based on superior cost economics.

■ There is strong pent-up demand. New capabilities like mobility, the Internet, data transmission and broadband transmission are likely to provide substantial penetration and usage growth. For example, cellular has reached 30 percent penetration in roughly 15 years, and is still growing rapidly. And the Internet has been growing at roughly 100 percent per year in total number of users since the 1980s, with the World Wide Web accelerating this growth to a much larger customer base in the early 1990s.

■ With respect to upside propensity to spend, there is a good analogy to PC usage. At the start of the computer era, the most expensive mass-market consumer electronics was a \$300 color TV (which then lasted for 10 or more years), and the most expensive general-office machine was a \$1,500 IBM Selectric typewriter. With the advent of PCs, consumers routinely learned to spend \$2,500-\$3,500 for computers that are replaced every two to four years. In other words, if consumers get improved functionality at an affordable price, they will buy new products and spend more money in total.

Price Elasticity

The discussion above, however, should not obscure a key reality: Penetration and usage will depend heavily on pricing. We have already experienced this in mobile telephony. In the early days, service providers obtained rapid penetration by subsidizing cellular service and keeping the basic monthly fee relatively low—making up for this with high usage fees. The result, not surprisingly, was low monthly usage compared to POTS: 100-150 minutes of use (MOUs) for cellular versus 1,400 MOUs for POTS (2,800 MOUs on a two-way cellular-equivalent basis). The result also was relatively limited aggregate revenues per subscriber line—\$45 per month for the average cellular subscriber versus approximately \$75 for a POTS line (with LD value-added revenues added to ILEC fees).

More recently, the advent of low-cost digital mobile technology has facilitated innovative “bucket” pricing, which gives consumers 200-1,500 MOUs at 10-20 cents per minute, with no roaming or toll charges. The result: Substantially higher (200-400) MOUs (according to Merrill Lynch), and average bucket-pricing revenues/month that are higher than those generated by POTS customers. In other words, pent-up demand is fueling higher average consumer spending—triggered by lower prices.

The same appears true in the broadband market. At year end 1998, the installed base for cable modems was estimated to be 800,000, versus

40,000 for DSL modems. While, to some extent, this reflects cable modems’ earlier start, it also relates to the fact that the average monthly cost for cable modem service is \$40, compared to \$75-\$300 for DSL.

So looking at mobile and broadband experiences, price appears to matter. The issue is how much.

In the POTS days, a number of people (ourselves included) estimated the underlying primary market demand price elasticity; the results ranged from 0.70 elasticity for LD, 0.30 for intraLATA toll and 0.10 for local service (source: Monitor analysis). On this scale, 1.00 represents the point where a given percentage of price reduction is matched by an equal percentage in volume increase; any elasticity below 1.00 means increased volume is not making up for decreased prices, so price declines bring the carrier less overall revenue, not more.

Our hypothesis, however, is that the price elasticity of advanced services will be much greater than in traditional voice services. With POTS, we were dealing with relatively mature products and modest single-digit price declines. In such circumstances, elasticities under

1.00 were understandable.

In contrast, with advanced services: (a.) there is a need for order-of-magnitude increases in usage and bandwidth due to pent-up demand and continuing Moore’s Law improvements in CPE; yet (b.) at current POTS rates per kbps, the required broadband service levels would be unaffordable to most people.

Accordingly, we see a virtuous cycle in which some carriers will have the foresight to price advanced services at a low cost per bit. This will give customers incentive to subscribe, which in turn will give the service providers more than enough income to replace the lower price per bit.

So it isn’t hard to believe that elasticity could be more than 1.00 for advanced services. Admittedly, we don’t know for sure, because there hasn’t been a rigorous testing of the proposition.

Fixed-Rate Pricing

Just what can we expect in the way of price structures? Currently, 100+ years of regulation have left us with POTS pricing that is heavily usage-based. This is the case despite a mostly fixed-cost structure.

In contrast, ISP prices, for the most part, have been 100 percent fixed. A number of economists have argued that this fixed Internet pricing will lead to “tragedy of the commons”—i.e., overuse and overcongestion. Their fix is usage fees, but



**There’s
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spending**

our hypothesis is that this conventional wisdom is wrong for the following reasons:

■ If the underlying cost structure is heavily fixed cost, so should be the pricing.

■ If the underlying costs are heavily fixed, it is likely that in a deregulated environment, one or more players will be inclined to price this way, so as to gain share (probably low-share players with more to gain/less to lose). This fixed-pricing strategy will be made economically possible by “edge shaping” (i.e., restricting entry into the network to a guaranteed fixed level at times when there is congestion).

■ Given a choice, many customers will prefer to buy on a fixed-cost basis, out of fear that usage fees will result in huge unanticipated charges.

■ If one or more players price on a fixed-cost basis, customers will buy from these players at the expense of those attempting to price on a usage basis. The fear of “sticker shock” will lead to substantial demonstration of share elasticity.

■ In the end, usage-oriented players will be forced to move to fixed pricing, or lose substantial share.

In short, we believe customers will successfully punish attempts to reestablish usage pricing of packetized networks. The shift in mobile pricing from heavily usage-based to fixed-bucket-pricing is an indication of how things could work.

Free (or Very Cheap) Pricing

Consumer desire for flat rate pricing could extend to free (or very cheap) pricing entirely. The impetus for this will come from the Internet: Portal players that enjoy market capitalizations ranging from \$18,000 to \$160,000 per unique subscriber (Alta Vista and Yahoo, respectively; source: Monitor analysis), may decide that giving away telecom service (or heavily subsidizing it) is a clever marketing ploy.

We may think of telecom as a big business. For ecommerce players, however, telecom is a mere 3 percent of GDP. Their upside is far greater, in the double digits. In the process of pursuing their dreams, they could turn the telecom game on its head. As Netscape found in competing with Microsoft, it's hard to compete with free.

Conclusion

The next period of telecom competition will be characterized by a fundamental transformation in consumer behavior. In place of the old POTS “one-size-fits-all” product set, consumers will be able to choose from multiple product sets that fit their individual needs more closely. The result will be an order-of-magnitude increase in the impor-

tance of segment-based marketing, well beyond the price-based competition that characterized the old MCI/AT&T LD marketing wars.

The resulting consumer marketing wars will be won or lost over the issues of product bundling, end-to-end capability and geographic footprint. While standards are not set and interconnection not mandated, the network providers who can offer these capabilities will have an important advantage. If so, Wall Street's love affair with CLECs and ISPs (as small plucky upstarts who can outmaneuver the giants) will be replaced by a love affair with approximately three to five end-to-end providers (read: MCI WorldCom, AT&T, one or more RBOCs), each with the scale to deliver these services.

Finally, an important part of winning and losing will revolve around pricing. While there is strong pent-up demand for new telecom services, and consumers will be willing to spend more in aggregate for telecom, they'll only do so if they get improved functionality at an affordable price.


At issue, then, is the form and level of prices. Regarding the form, customers have demonstrated a strong preference for fixed-rate ISP and bucket-priced mobile service. They therefore can be counted on to resist any attempts to impose IP network usage fees.

When it comes to pricing levels, we believe service

providers will need to cut prices to tap the pent-up demand for new services. Unlike POTS, where the demand elasticity is well below 1.00, we believe that if prices drop to a certain level, the result will be a quantum increase in penetration and usage, with an overall increase in telecom spending on a dollar basis. However, service providers will have to test this assumption in the real world, defending their positions against free service attacks coming from the Internet space.

So, in the coming period, the industry's mavens need to spend more time thinking about the demand side. And the relative de-emphasis of marketing issues within the industry is a case of “*deja vu* all over again.” Back in 1978, no one in the Bell System thought much about marketing, either. MCI taught them that someone with good marketing and a good sense of underlying costs could win.

We have the eerie feeling that we are about to see the same thing happen all over again. It will be interesting to see which telco or ISP portal teaches the rest of the industry a lesson—and, if it's a telco, whether they do it by themselves or by merging with someone who knows how to market, like AOL□



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