Your television is ringing

A survey of telecoms covergence | October 14th 2006

Your television is ringing

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"Convergence" is the telecoms industry's new mantra. Whether customers really want it is another matter, says Tom Standage

WHAT has come over the telecoms industry? The spectacular crash of 2001, with its associated bankruptcies, fraud and the destruction of around $1 trillion of investors' money, has evidently been forgotten. The gloom has given way to a fresh sense of opportunity and a renewed frenzy of dealmaking. The past couple of years have seen a series of huge takeovers and mergers among network operators and makers of telecoms equipment around the world.

In America SBC paid $16 billion for AT&T, took its name, and then swallowed BellSouth for a further $67 billion. Its rival Verizon, meanwhile, bought MCI for $8.4 billion. In Europe Telefónica, Spain's national incumbent operator, bought O_2, a wireless firm with networks in several European countries, for £17.7 billion ($31.3 billion). NTL, Britain's cable operator, bought Virgin Mobile, a mobile operator, for £962m. Vodafone, the world's biggest mobile operator by revenue, signalled a retreat from its global ambitions and sold its Japanese arm to Softbank, a local wireline broadband operator, for $15.4 billion.

In addition to these and many other deals, operators around the world began building "next-generation networks" at vast expense. Verizon is spending over $18 billion on its new network, and Britain's BT is spending £10 billion. These networks allow telecoms operators to offer television service in addition to voice calls and broadband internet access.

Meanwhile, large internet companies including Google, Yahoo! and Microsoft's MSN marched into the telecoms business by launching new services offering free calls over the internet. Skype, the leader in this market, was acquired by eBay for $2.6 billion. And equipment-makers began teaming up too: Cisco, the world's largest network-equipment firm, bought Scientific-Atlanta, which makes television set-top boxes, for $6.9 billion; Alcatel and Lucent agreed to merge in an $11 billion deal; and Nokia and Siemens combined their network-equipment divisions.

At first sight these deals might not appear to have much to do with each other. But all of these transactions were prompted by a single underlying trend that has become the industry's new mantra: convergence.

All together now
What this means, roughly, is the coming together of previously separate communications and entertainment services: fixed and mobile telephony, broadband internet access and television. But more often the word is used in a quasi-mystical way to evoke information heaven. "Convergence really means the freedom for consumers to use any service under any circumstances they choose to," says Ben Verwaayen, the boss of BT. "It is a question of convenience, enriching people's lives, because we can provide communications, information and entertainment the way ▶▶

they want it," says Mark Wegleitner, chief technologist at Verizon. "We want to bring simplicity to our customers, the first step towards digital paradise!" exclaims Didier Lombard, the chairman of France Telecom.

In fact, although the industry likes to depict convergence as a great boon for customers, it actually involves a technological shift that, in the first instance at least, will primarily benefit network operators. At its heart, convergence is the result of the telecoms industry's embrace of internet technology, which provides a cheaper, more efficient way to move data around on networks. On the internet everything travels in the form of "packets" of data, encoded using internet protocol, or IP. The same system can also be used to encode phone conversations, text and photo messages, video calls and television channels—and indeed anything else.

It is only relatively recently that IP technology has matured to the point that it can carry these other services reliably and efficiently, says Basil Alwan, the president of IP activities at Alcatel. But now that it has happened, operators can replace a jumble of different networks for services such as voice, data and video—each with its own order-entry, billing and fault-reporting systems—with a single network on which everything travels as interleaved streams of IP packets. "The ultimate goal is to have one IP infrastructure, and services running on that infrastructure," says Mr Alwan.

This convergence affects not only wireline networks, but wireless ones too. Today, operators run separate but interconnected networks for fixed and mobile phones. But the new converged networks are "access agnostic". In short, a single core network may have a variety of devices connected to its edges via different technologies. Traditional fixed-line phones might be connected via wires; mobile phones via base-stations; and televisions or computers via broadband telephone lines or Wi-Fi links.

Access agnosticism should enable a mobile phone, say, to connect to the core network via Wi-Fi in the home and then switch seamlessly to a traditional cellular connection outdoors. The core network remains untouched as new access technologies (such as fibre-optic links or new kinds of high-speed wireless data technology) are added to its edges. In an industry that loves obscure acronyms, the framework for linking everything up in this way is known as IMS, TISPAN or NGN.

"IP in a converged world enables one network, many services, any access," says Robert Lloyd of Cisco. A converged, all-IP network of this kind has two immediate technical advantages for network operators, he says. The first is that it costs less to run, thanks to its far simpler architecture and the economies of scale associated with internet standards. BT, a firm widely regarded as a pioneer in the switch to next-generation networks, expects its operating expenses to fall by 30% once its new "21st Century Network" (21CN) is completed in 2009. "By 2010 you will have to look very hard to find a fixed or mobile operator that is not running its traffic over an IP core," says Mr Lloyd.

The second advantage is that in theory, new services can be added far more quickly and easily, without the need to add any new network infrastructure. Adding a new service amounts to little more than adding software to the core of the network and perhaps some new access technologies around the edges.

The rise of the quadruple play

Because of the convergence on IP networks, companies that used to be in separate industries—telephone operators, internet-service providers and cable-TV firms—suddenly find themselves in the same business. Cable companies now offer broadband internet and voice services over networks that used to carry just television, and telecoms firms have upgraded their networks to carry television signals. In the new converged world any firm that can deliver an IP stream to customers over its network can offer any or all of these services. And offering several of them together, many operators believe, is a winning strategy.

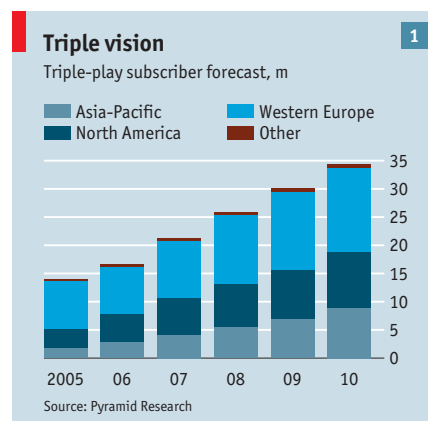Hence the current scramble to offer the "quadruple play"—the name given to the combination of fixed and mobile telephony, broadband internet access and multichannel television. This explains many of the deals that have taken place in recent months. AT&T, which is already rolling out a fast new network to carry TV signals, bought BellSouth in order to win full control of Cingular, its wireless joint venture, and complete the quadruple-play package. Softbank, which already offers television, voice calling and internet access over fixed broadband links under the Yahoo! BB brand, bought Vodafone Japan to add mobile to the mix. Similarly, NTL bought Virgin Mobile, and America's big cable operators last year struck a deal with Sprint Nextel, a wireless operator.

The desire to offer a one-stop shop for quadruple-play services has also prompted several national incumbent operators to reabsorb their previously separate wireless operations. And it has hastened consolidation among telecoms-equipment vendors, such as the Alcatel-Lucent and Nokia-Siemens deals. Large operators have concluded that buying as much as possible from a single equipment-maker increases their bargaining power and avoids problems with integrating equipment from different suppliers.

Operators claim that selling all four services together as a bundle makes life easier and more convenient for customers. "Customers in our experience really want that," says Ed Whitacre, the swashbuckling Texan boss of AT&T and one of the most vocal proponents of the merits of bundling, "and we can give them a better price." The average American household spends $176 a month on telephone, broadband and television services, according to figures from Parks Associates, a consultancy. Mr Whitacre's stated aim is to reduce costs by building a converged network, and to offer the quadruple play for as little as $100 a month.

There is indeed evidence that customers like the discounts associated with bundles and the convenience of a single bill. "Customers are much more open to purchasing via the bundle," says Mikal Harn, vice-president of consumer marketing at AT&T. For the incumbent telecoms operators, however, the quadruple play is all about protecting their core business of fixed-line voice calls, which still accounts for the bulk of their revenues.

Their problem is that fixed-line subscribers are being lured away by cable operators and voice-over-internet firms, or are getting rid of their fixed lines in favour of mobile phones. During 2005, for example, the number of fixed telephone lines operated by Verizon, America's second- ▶▶

Triple vision 1

Triple-play subscriber forecast, m

Asia-Pacific Western Europe
North America Other

Source: Pyramid Research

largest telecoms firm, declined by 8%. Its losses were greatest in the New York metropolitan area, where it faces the most competition from cable operators offering voice services, says Stephan Beckert of TeleGeography, a market-research firm.

As cable operators offer customers the "triple play" of voice, broadband and television, telecoms operators have concluded that their best defence is to respond in kind and also to throw in wireless, which many cable operators are not yet able to offer. Customers who sign up for a bundle of services and its associated discount cannot defect to a rival provider of any one of the services without losing the discount. "We make the product more sticky—customers don't seem to leave," says Mr Whitacre. Similarly, cable operators are using bundles to protect their core business, which is not voice but television, as it, too, comes under attack from satellite-TV providers and now telecoms operators.

Another benefit of bundling everything together is that it reduces advertising, customer-acquisition and other marketing costs, because all the services can be advertised together under a single brand. That is why France Telecom recently rebranded its Wanadoo broadband division and Equant corporate-networks division to align them with Orange, its far stronger mobile-phone brand. This will allow the company to sell bundles of services to both consumers and businesses under a single brand. "It cost a lot to support all those brands, so it's very rational to choose the most popular brand in the collection to support all our products," says Mr Lombard. Similarly, doing away with the old SBC, BellSouth and Cingular brands in favour of the much stronger AT&T brand is "a huge opportunity for us", says Mr Harn.

Shades of 3G?

Convergence and bundling, in short, are two sides of the same coin. The convergence of multiple networks makes bundles of services cheaper to provide; and the business logic of bundling makes the cost of building new, converged networks easier to justify. But anyone familiar with the telecoms industry may be experiencing a sense of déjà vu. This is the same industry that spent tens of billions of dollars building new fibre-optic networks in the late 1990s, in anticipation of a surge in traffic that never materialised. The result was a spectacular crash.

Meanwhile, European operators paid around €100 billion for licences to build new high-speed "third-generation" (3G) mobile networks. They hoped that as revenue from voice calls levelled off, the new networks would open up a lucrative new data-services market. But take-up of data services fell far short of expectations, and 3G's real value proved to be much less exciting: an ability to cut operating costs and provide lots of cheap voice capacity. This caused huge write-downs in the value of the licences. Both of these episodes are now regarded as embarrassing collective hallucinations over which the industry prefers to draw a veil. But might the same thing happen again with convergence?

"What problem is convergence solving?" asks Andrew Odlyzko, an expert in ▶▶

All things to all men

Two other kinds of convergence

PART of the attraction of convergence is that it covers so many different things. "If you ask five people what it means, you'll get seven different viewpoints," says Stephen Bye, who is in charge of "wireless and converged services" at AT&T. In addition to the broad trend of convergence between voice, data and entertainment services, and the networks and companies that deliver them, the term is also used in at least two other senses that are worth a brief glance.

The first is the convergence between the worlds of telecoms and computing, otherwise known as information technology (IT). These have long been two industries separated by a common love of technology. For many years there was networking the telecoms way (generally expensive, proprietary and reliable) and the computer way (generally cheap, standards-based and sometimes flaky). But now the two worlds are starting to look more similar as internet standards and technologies spread.

Telecoms networks are becoming ever more reliant on software and complex computer systems to handle service delivery; computing, meanwhile, is beginning to look more and more like telecoms as software is increasingly delivered as a network service and companies are increasingly dependent on their networks to keep things running. Hence the advance of the big systems integrators into telecoms services, and the move of telecoms firms into IT services. This trend is real enough, but it is not central to most telecoms operators' strategies.

A remote control for your life

The second is "device convergence". Everything from a laptop to a mobile phone to a television to a games console is now, arguably, the same kind of device: each consists of a microprocessor, a screen, some storage, an input device and a network connection. You can make phone calls on your laptop, play games on your mobile phone and watch videos on your games console. This has prompted much speculation about convergence on a single powerful device that can perform all of these functions.

But although the various kinds of digital device look increasingly similar on the inside, they look increasingly different on the outside. Just look at the huge range of mobile devices, from basic handsets that simply deliver voice calls to BlackBerry-type e-mail terminals and multimedia handsets that let you watch TV on the move. "We have to be extremely careful that we don't go in the Swiss army knife kind of direction where we lose focus on what the consumer wants," says Olli-Pekka Kallasvuo, the boss of Nokia, the world's biggest handset-maker.

Jack-of-all-trades handsets have generally not sold very well. So Nokia's range of "converged" devices, the Nseries, consists of a variety of devices with specific strengths: as a music-player, a mobile TV or a camcorder, in addition to being a phone. The trend is not towards a single converged device, but towards a greater diversity of hybrid devices. Not so much convergence, then, as divergence.
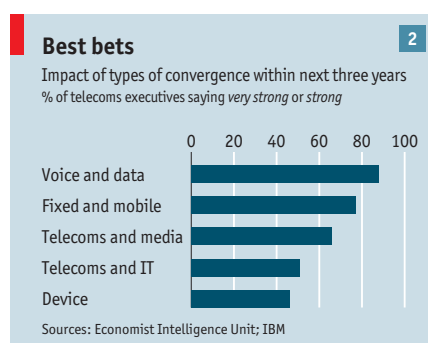
the economic history of telecoms at the University of Minnesota. "It is solving complexity issues for service providers, but it is not actually solving much for consumers." Guy Zibi, an analyst at Pyramid Research, a telecoms consultancy, is equally sceptical: "It's the technology department driving the marketing department." As with 3G, he says, operators are rushing to provide new services even though consumer demand is unclear and the technology is still immature.

Even some people in the industry, such as Arun Sarin, the chief executive of Vodafone, have their doubts. As a wireless-only operator, Vodafone could find itself high and dry if convergence does indeed prove to be the next big thing. But so far Mr Sarin has taken a cautious view of convergence, prompting much criticism of his strategy. Despite some recent convergence-friendly tweaks to its business model, including moves into the fixed-line broadband market in Britain, Germany and Italy, Vodafone's main focus is still on mobile. "It's very early days," says Mr Sarin. "We are dubious that customers really want all the things that people are imagining that they want." In particular, it is wrong to assume that everyone wants quadruple play, he thinks: "We're not saying that there are no customers who demand this—we're saying it's a very small fraction of customers."

So far, the evidence seems to prove him right. Only 1% of consumers in Italy, 8% in France and 10% in Britain have signed up for triple-play bundles of fixed-line voice, broadband internet and television, according to figures from Forrester, a consultancy. In a survey it carried out, 44% of European consumers said they were not interested in such service bundles, though 49% said they might be interested if there was a discount. But if operators have to offer steep discounts to get people to sign up for their bundles, it will be harder for them to justify the expense of building new converged networks.

Ready or not, here it comes

True believers in convergence insist that it is about more than simply bundling existing services together: it will make new services possible, too. Many operators are already getting excited about "fixed-mobile convergence", in which a single handset can be used both as a mobile phone outdoors and to make cheap calls via a fixed line at home or in the office. Another oft-cited example of a new service made possible by convergence is to enable customers to programme their digital-video re-

corders remotely, either via the web or from a mobile phone.

Mr Verwaayen, a passionate football fan, talks enthusiastically about the idea of combining television with audioconferencing, so that a group of friends can watch a match "together" from different locations. Many operators are experimenting with security cameras that sit in your home, or perhaps your holiday home, and allow you to keep an eye on the place from your mobile phone or over the web. And there is the prospect of integrating your telephone with your television, so that when you are watching a film and someone calls you, the caller's name appears on the screen and the film pauses automatically if you pick up the phone.

Convergence, then, promises operators both the means to defend themselves against competitors today and the prospect of new revenues tomorrow. According to a survey published last year by IBM, a computer giant, and the Economist Intel-

ligence Unit, a sister company of this newspaper, 80% of telecoms executives surveyed agreed that it was essential to embrace convergence within the next three years as a source of long-term revenue growth. The same survey also asked respondents which converged services and markets they thought were likely to prove most important (see chart 2). The clear leader was voice-data convergence, followed by fixed-mobile convergence and telecoms-media convergence. And these are, indeed, the three areas where convergence is most visible.

This survey will examine the prospects for convergence by looking at each of these areas in turn. Of the three, voice-data convergence is clearly the most mature (think of the popularity of Skype, an internet-calling service that is now practically a household name) and provides the strongest evidence of the power of convergence to reshape the industry. Fixed-mobile convergence is less advanced, though the first commercial services are now available in some countries. Telecoms operators' move into the television market is also at an early stage, though there have already been some notable successes.

Whether or not convergence turns out to merit the hype, the industry has convinced itself that it is worth pursuing, and anyone who disagrees risks being left behind. "As soon as one operator adopts convergence, all the others have to follow," says Mr Lombard. Quite how far and how fast the process will go remains to be seen. But like it or not, convergence is coming. ■

Best bets   2

Impact of types of convergence within next three years
% of telecoms executives saying *very strong* or *strong*

	0	20	40	60	80	100
Voice and data						
Fixed and mobile						
Telecoms and media						
Telecoms and IT						
Device						

Sources: Economist Intelligence Unit; IBM

PAUSE

STEVE'S CALLING

The end of the line

Traditional fixed-line telephony has had its day

IT WAS the industry's bread and butter for over a century. But the end is now in sight for traditional telephone service, which will soon be overtaken by voice-over-internet calls in terms of usage, and displaced by broadband internet access as the core revenue-earning service offered over fixed lines by telecoms firms. And even if the traditional telephone is not quite dead yet, its business model certainly is: metered telephone calls whose cost depends on the length of the call and the distance covered are becoming an anachronism.

The demise of traditional telephony can be charted in two ways: by looking at the proportion of call traffic carried using voice-over-internet-protocol (VOIP) technology, which already exceeds 50% on some routes and seems to be heading towards 100%; and by looking at the cost per minute of calls, which appears to be heading inexorably downwards, thanks to VOIP's far lower costs and higher efficiency. VOIP is cheaper because instead of establishing a dedicated circuit to connect two callers, it encodes the telephone call as a two-way stream of data packets that are sent over a high-speed internet connection. This encoding can be done either by a computer running a piece of software such as Skype, the most popular VOIP provider, which now has more than 100m users; or it can be done by a small box, called an analogue terminal adapter, which allows a standard telephone to be plugged into a broadband connection.

VoIPocalypse now
Sending packets across the internet is free once you have paid for your broadband subscription, so calls that travel entirely on the internet, such as those between two Skype users, cost nothing. If you use a VOIP service to connect you to a traditional telephone, the call travels mostly across the internet but pops out onto the local phone network at the other end; the owner of that network then charges a fee to deliver, or "terminate", the call, typically no more than a local call. All this reduces the price of telephone calls dramatically. Indeed, Niklas Zennström, the co-founder of Skype, believes that voice calls will

eventually cost nothing. "You don't pay for each e-mail or each web page you load," he says. "It's the same with phone calls. That's where it's going. It will be free."

Aside from undermining the pricing model of a trillion-dollar industry that still makes most of its money from voice calls, VOIP is disruptive in other ways, too. VOIP phones can have traditional phone numbers associated with them. But they work wherever they are, provided they are plugged into the internet, making a mockery of geographical conventions such as area codes. So you can assign, say, a San Francisco phone number (area code 415) to your phone, take it to another country, plug it into a broadband connection and have people in San Francisco call you for the price of a local call.

More subtly, VOIP decouples the two previously intertwined components of telephony: access to the network (via a wire running into your house, for example) and service (the ability to make and receive calls). Traditionally, access and service have been provided together. But with VOIP you can buy broadband access from one firm (a cable operator, say) and a telephony service from another (such as Vonage). So owning the access network no longer confers a monopoly on voice service; conversely, it is possible to offer a voice service without owning an access network.

The result has been a surge of innova-

tion and competition as new entrants flood into the market. The spectacular failure of Vonage's initial public offering—the firm's share price collapsed after it floated on the NASDAQ exchange in May—did not signal a lack of confidence in VOIP; it merely demonstrated that Vonage now faces serious competition in a market it helped to pioneer. According to Infonetics, a market-research firm, VOIP-based telephone services worldwide had 24m residential subscribers last year; by 2009 the number is forecast to reach 131m.

Let computer speak unto computer
Those figures exclude computer-to-computer VOIP calling, which is also growing fast. The success of Skype has prompted big internet firms, including Google, Yahoo!, Microsoft and AOL, to launch similar services, which allow free calls between computers and very cheap or free calls between computers and traditional telephones. That is why Skype sold itself to eBay for $2.6 billion last year, Mr Zennström explains. "We thought it would be good for us, as we get into competition with big internet companies, to be part of a big internet company ourselves."

Businesses are also embracing VOIP, which allows them to use a single network to carry both voice and data within and between offices. To start with, the attraction of VOIP was simply cost reduction, says Cisco's Mr Lloyd. His company, which competes neck-and-neck with Nortel to be the leading supplier of VOIP telephony equipment, has sold over 9m desktop VOIP phones. New buildings and offices now routinely have a single network installed, rather than separate phone and data networks, he explains. Sales of traditional switchboard equipment are in decline, whereas sales of IP-enabled equipment are growing at a rate of about 30% a year. Already, more than one-third of large North American companies have adopted VOIP, and two-thirds will have done so by 2010, according to Infonetics.

Having started out as a means of reducing costs, VOIP phones are now being adopted because of the new features they offer, says Mr Lloyd. With a VOIP-based phone system, office workers can sit down ▶▶

at any desk and log into the phone, which instantly becomes their extension. They can also use VOIP phones at home or in hotel rooms, making and receiving calls just as though they were sitting at their desks. "It completely decouples us from location—my office is wherever I happen to be," says Peter Carbone of Nortel, via his VOIP phone. VOIP also allows call-centre operators to work from home, making it easier to match the number of workers to fluctuating demand.

If you can't beat 'em, join 'em

All of this is a decidedly mixed blessing for telecoms operators. On the one hand they have been able to reduce their own costs by adopting VOIP internally to carry calls around their networks. Telecom Italia, for example, began using VOIP for all phone calls between Rome and Milan in 2002, reducing costs by 60%, says Stefano Pileri, the company's chief technologist. Once BT completes its "21st Century Network" in 2009, all calls will travel across the network as VOIP calls, though customers will still be able to use their old telephones. Being able to handle voice calls cheaply, as just another stream of data, is one of the benefits of building a converged network.

On the other hand most operators still derive most of their revenues from voice calls, so the inexorable decline in voice revenue as consumers and companies adopt VOIP strikes right at the heart of their business. According to figures from Informa, a market-research firm, global revenues from fixed-line voice calls were around $600 billion in 2005, and data revenues were $202 billion. By 2010, it predicts, fixed-line calls will account for less than half of operators' revenues in the developed world. Instead, their new core product will be broadband internet access.

"This is the key dilemma for the tele-

A business to get out of `3`
Net retained revenue per minute
International calls, US carriers, $

Source: FCC

coms industry," says Mr Odlyzko of the University of Minnesota. "Voice is still what matters the most, it is still 70-80% of revenues for the industry worldwide, and it's going to zero in price. So how do you handle that transition?" Forrester, a consultancy, reports that voice revenue is now falling by 10% a year at France Telecom, 6% at Deutsche Telekom and 5% at BT. The same sort of thing is happening in America, Japan and other developed countries.

Incumbent telecoms firms around the world have responded to VOIP in a number of ways. Some Middle Eastern countries have banned VOIP and blocked access to Skype's website, in order to protect their incumbent telecoms firms and ensure that phones can continue to be tapped (which is very difficult to do with VOIP). But in the developed world regulators take a dim view of such practices, so operators have had to respond in other ways. To start with they switched to new pricing structures, reducing their call charges and raising their monthly line-rental charges instead. Many operators have now done away with call charges altogether and instead offer unlimited local, national and even some international calls for a flat monthly fee.

Incumbent operators also reluctantly began launching low-cost VOIP services of their own, because their customers were defecting to VOIP providers, and a VOIP customer is better than no customer at all. "Obviously, even if it disturbs the business model of traditional voice, you cannot stop it—it's ridiculous to fight against progress," says France Telecom's Mr Lombard. Instead, he says, incumbents must now try to capture as much as possible of the new VOIP market. For example, France Telecom has differentiated itself from VOIP competitors by using the technology as the basis of its new "Voix Haute Définition" (high-definition voice) service, which enables hi-fi quality audio connections between subscribers. Other operators, including BT, have launched similar products. Operators around the world, including AT&T and Verizon in America, also offer VOIP services which customers can use over any broadband connection.

Bundling provides incumbent operators with another defence against VOIP. They might choose to offer subscribers a triple-play bundle in which voice is "free"—ie, the subscriber pays only for the broadband and television services at the usual rates. Some cable companies and alternative operators (which run fixed-line phone networks in competition with incumbents) are already doing this: Free Te-

lecom in France, for example, includes unlimited national calls to fixed-line phones, as well as a selection of free television channels, with its broadband service. Conversely, some firms offer free broadband to telephone subscribers. Of course, nothing is really free, insists BT's Mr Verwaayen. "Where voice, data and video are interchangeable, it's very difficult to allocate cost to one service or another," he says. "The word 'free' can only be used once, and you can randomly choose the component you make free."

Mr Wegleitner at Verizon thinks the threat from firms like Skype and Vonage is overstated, because they cannot offer the same range of services as a network operator. "I question the long-term viability of those solutions," he says. "Can a VOIP supplier really compete with a full-service provider like a telco or a cable company?" On this view, the real threat to incumbents comes more from cable operators offering cheap (or "free") VOIP services than from pure-play VOIP companies.

But Mr Zennström insists his company will stay ahead of the game. This has now moved on to enhancing communications in new ways, he says, by integrating voice calls with videoconferencing, instant messaging, "presence" services that show whether someone is available, file transfers and other social-networking and collaboration tools. "Beyond the zero price point you need to start offering better services, unleashing and enhancing telephony using IP networks," he says.

Trouble in the air

Even if their voice revenues vanish altogether, fixed-line operators do at least have a booming new business in the form of broadband internet access, global revenues from which will grow from $202 billion in 2005 to $410 billion by 2011, Informa predicts. That will help to make up for the decline of voice, and some operators believe that new broadband services such as television will actually enable them to increase their overall revenues. Mobile operators, however, are in a very different position. They rely even more heavily than fixed-line operators on revenue from voice calls, and despite years of effort and the construction of new high-speed "third-generation" (3G) networks, they have been unable to convince their subscribers to embrace data services.
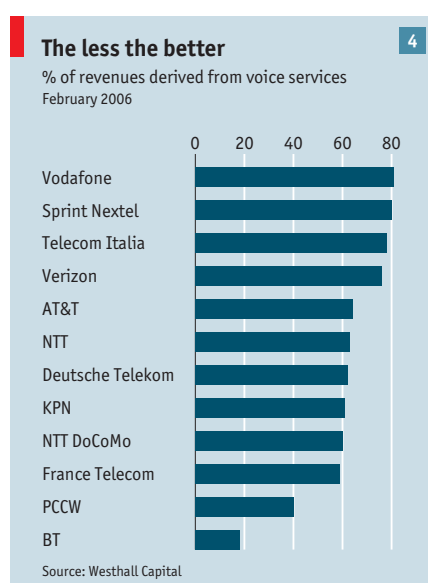
This makes them extremely vulnerable to the spread of VOIP to mobile phones. Convergence of networks implies convergence of prices, argues Cyrus Mewawalla, ▸▸
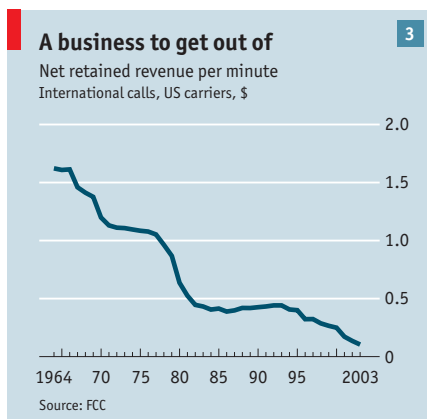
an analyst at Westhall Capital, and mobile prices are typically three to ten times higher than fixed-line prices. The majority of mobile operators depend on voice for over 80% of their revenues, and voice prices "are likely to fall close to zero in an internet-centric world," he says. He notes that each new telecoms technology spreads more quickly than the last: fixed-line telephones took 50 years to reach 50% of the population, mobile phones took 20 years, the internet ten and broadband five in some parts of the world. Mobile VOIP could be widespread within two or three years, he thinks.

The emergence of a Skype-like piece of software that could be downloaded onto a 3G phone and used to make VOIP calls could be "lethal" to mobile operators, says John Barrett of Parks Associates, a consultancy. Operators offer data communications far more cheaply than voice, often in the form of flat-rate data packages, so subscribers could avoid call charges and roaming charges by using a VOIP program to disguise their mobile calls as data traffic. Operators could block access or degrade the quality of their data services, but that would antagonise subscribers. Cutting voice prices to make traditional mobile calling more attractive would decimate their revenues, and raising data prices to discourage VOIP calling would erect more barriers to the take-up of their new data services upon which the operators are relying for future growth. "They are between a rock and a hard place," says Mr Barrett.

For the time being, he says, getting VOIP to work on a mobile handset would be too fiddly for most people. But as handsets start to resemble pocket computers, with downloadable games and other software,

The less the better 4

% of revenues derived from voice services
February 2006

	0	20	40	60	80
Vodafone					
Sprint Nextel					
Telecom Italia					
Verizon					
AT&T					
NTT					
Deutsche Telekom					
KPN					
NTT DoCoMo					
France Telecom					
PCCW					
BT					

Source: Westhall Capital

the threat of mobile VOIP looms ever larger. Ironically, as mobile operators race to upgrade their 3G networks to offer wider coverage and higher transmission speeds, they also increase their vulnerability to VOIP.

So what can mobile operators do? Some of them are already experimenting with mobile VOIP, says Mr Zennström, as a means of differentiating themselves from their competitors. In particular, E-Plus, a German mobile operator, has a partnership with Skype that allows subscribers to its unlimited 3G data plan to use Skype on the move for a fee of €40 ($51) a month—though they still have to use a laptop computer with a wireless-data card rather than a mobile phone. E-Plus is doing this mainly to sell wireless-data cards and win valu-

able business customers from rival operators. But its model may point the way for other mobile operators.

Just as fixed-line operators have switched to flat-rate billing plans, mobile operators could offer unlimited national voice calls plus unlimited data for a fixed fee, so there would be less incentive to use VOIP instead. Some operators are already moving that way, and unlimited-use data plans are also growing in popularity. Vodafone's Mr Sarin says he is watching the technology closely. But it need not be bad news for his company, he insists, because to make mobile VOIP calls subscribers will still need to pay for access to a high-speed wireless network, which is exactly what mobile operators provide.

Indeed, operators might embrace mobile VOIP technology themselves, as the cheapest way to offer unlimited calls. A recent report by Analysys, a consultancy, predicts that mobile VOIP will account for 25% of mobile calls in Europe and America by 2015—but that this will actually be a good thing for operators. They will offer mobile VOIP as a premium service with additional features such as instant messaging and "presence" information. At the same time mobile VOIP will reduce costs for operators, just as it has done for fixed-line operators, the report predicts.

Voice-data convergence, then, seems likely to mean that in future customers will pay a monthly access fee to use their phones but not pay for individual calls. Geographical and time-based charging will pass into history as VOIP erases the distinction between voice and data. This will happen on both fixed and mobile phones—though convergence is starting to erase that distinction, too. ∎

Home and away

After many false starts, fixed and mobile phones are getting ready to merge

PITY the poor old fixed-line telephone. Not only is it now being hollowed out by VOIP technology; it has also been upstaged in recent years by the mobile phone, a far more glamorous, capable and personal device. The fixed-line phone looks old-fashioned by comparison. Where is the colour screen, the camera, the funky ringtone? What, no text messaging? No wonder mobiles now outnumber fixed phones, and that voice traffic is migrating

from fixed to mobile networks. Some people are even "cutting the cord"—ditching fixed lines altogether in favour of mobile phones. The proportion of "mobile-only" households is approaching 10% in America, around 15% in western Europe and over 35% in Finland.

But fixed-line phones do have some things going for them. Calls are cheaper and clearer, and you do not have to hunt around for a signal. So technologists have

long dreamed of combining fixed and mobile phones to provide the best of both worlds: the freedom and flexibility of a mobile phone plus the reliability and low cost of fixed lines. This is called "fixed-mobile convergence" (FMC), and there have been many failed attempts at it over the years. But this time it looks as though it might really happen, thanks to improvements in technology and the industry's current mania for convergence. "FMC may ▶▶

finally be taking off after so many false starts and empty promises," says Mike Thelander of Signals Research Group, a consultancy.

The prospects for fixed-mobile convergence have improved because of the spread in recent years of broadband internet connections and the Wi-Fi short-range wireless networking standard, two crucial elements for FMC. Calls are handled within the home by a small base-station that plugs into a fixed-line broadband internet connection. This base-station communicates with nearby mobile phones using Wi-Fi (so you will need a new "dual mode" Wi-Fi-capable handset, to the delight of handset firms).

The home base-station pretends, in effect, to be an ordinary mobile-phone base-station. As you enter your house, your phone "roams" on to it. When you make a call, it is routed as a VOIP call over the broadband connection, which can handle several calls at once. If you leave the house while making a call, you roam seamlessly back on to the ordinary mobile network. And when a friend comes to visit, her phone roams on to your base-station, but the charges for any calls she makes appear on her bill.

For consumers, fixed-mobile convergence promises the convenience of a single handset, a single address book and a single voicemail box, plus good reception and cheaper calls when at home. "We take care of connecting you to the cheapest network, wherever you are," says Mr Lombard of France Telecom, which recently launched a fixed-mobile service called Unik. There are also benefits for businesses. Surveys by Gartner and IDC found that over half of employees' mobile-phone calls are made in the office, even though cheaper fixed-line phones are available; 28% of workers use their mobile phones as their primary phones. Integrating fixed and mobile phones could help companies control and reduce their spending on mobile telephony. Some FMC systems, for example, allow calls from mobile phones to be routed through a company's central switchboard. This makes outgoing calls, particularly international ones, much cheaper.

Operators like the idea of FMC too. For incumbents it has several attractions, notes Mr Pileri of Telecom Italia. Primarily, he says, it provides "another reason for our customers to buy broadband access". Next, it discourages subscribers from defecting to rival mobile operators or even giving up their landlines altogether. FMC also provides a defence against pure-play VOIP operators, who can compete with incumbent fixed-line operators on cost but cannot provide the seamless service of a single handset that also works when customers are out and about. FMC is, of course, a bundle: it ties together fixed, mobile and broadband services in a particularly "sticky" way that makes it a powerful customer-retention tool.

Fusion or confusion?

But how is FMC working out in practice? One of its strongest proponents is BT, which launched a service called Fusion last year. (It currently uses Bluetooth for the short-range indoor radio link, but will go over to Wi-Fi technology early next year.) BT sold off its own mobile network a few years ago, so it buys airtime from Vodafone. Indeed, it is the lack of a mobile network that makes BT such an enthusiastic backer of FMC, because it enables the company to re-enter the mobile market with a distinctive product that sets it apart from other operators.

However, Fusion has not been very well received. For one thing, it is quite expensive, says Paul Merry, an analyst at Informa, because customers have to have both a standard fixed line and broadband service from BT before they can subscribe to Fusion, which then adds its own baffling range of mobile-like calling plans on top. So to anyone who has already dumped their fixed line, switched to a cheaper fixed-line provider or does not have broadband, Fusion looks pricey. And the Bluetooth technology, which BT chose because it wanted first-mover advantage, is "the most clunky system ever", says Mr Merry.

BT's Mr Verwaayen naturally leaps to Fusion's defence. The technology works well, he says, and by mid-2006 some 35,000 subscribers had signed up, "which I think is fantastic" (though given that BT has over 20m residential customers, it seems a modest number).

Even so, Mr Verwaayen admits that what customers like most about Fusion is the rather prosaic benefit of good indoor mobile coverage, so that their mobile phones work properly even if they live in an area with poor network coverage. "I thought they would be wowed by technology," he says, "but consumers have their own logic." The lack of enthusiasm for FMC is not surprising, says Mr Thelander, because most of the benefits accrue to operators. "These services are offered by operators to increase their revenue and reduce customer churn with very little in it for consumers," he says.

Another criticism of today's FMC systems, including Fusion and Unico, is that customers still retain both their fixed and mobile numbers (though France Telecom's Unik service uses just the mobile number). BT argues that Fusion is not designed to do away with the fixed-line phone, but to enhance the mobile phone—a natural position for a fixed-line incumbent to take.

But regulation is also a factor in some markets. In South Korea the OnePhone service launched in 2004 by KT, the local incumbent, has been hobbled by regulators' refusal to allow discounted tariffs, as well as by poor sound quality and the lack of seamless roaming between indoor and cellular networks. Mr Pileri says that in Italy regulatory constraints prevent Telecom Italia from offering Unico with a single number. Regulators also prohibited fixed-mobile convergence in Japan, arguing that ▶

nobody else would be able to match the combination of NTT, the fixed-line incumbent, and its dominant mobile arm, NTT DoCoMo. But the rules are being relaxed. Now that Softbank, an aggressive broadband provider, has acquired Vodafone's Japanese mobile unit, it too will be able to offer fixed-mobile convergence.

Give me convergence, but not yet

In short, the fact that fixed-mobile convergence is at last technically feasible does not guarantee its rapid adoption. There does not seem to be all that much in it for consumers. It will probably happen eventually, so that the handset in your pocket merrily roams on to whatever network allows you to make the cheapest calls, whether in the home, the office, outdoors or at the airport. And operators are already behaving as though it is inevitable: a survey by Informa found that nearly two-thirds of those who were in a position to provide FMC had begun to do so.

But widespread adoption of FMC will take time, says Mr Merry, because it requires technologies and business models to be brought into a new alignment. Indeed, it requires financial engineering as well as the technological kind: operators around the world will need to reabsorb their separate mobile units in order to integrate them with their fixed-line operations. (France Telecom and Telecom Italia have both done so already, though Telecom Italia now plans to reverse the process for financial reasons of its own.) That would mean, in particular, NTT absorbing DoCoMo, and Verizon buying out Vodafone's 45% stake in Verizon Wireless.

Furthermore, notes Mr Thelander, so far the only mobile handsets with Wi-Fi support are high-end models. Until Wi-Fi support is available in cheap, mainstream handsets, its appeal will be limited. Informa predicts that even in five years' time only 5% of handsets sold will support Wi-Fi. So FMC users are likely to account for a tiny proportion of telephone subscribers and revenues for the foreseeable future. "FMC's share of total communications revenues will be small for several years, but this is just the start," says Mr Merry. He predicts a total of 92m FMC subscribers by 2011, accounting for 3% of mobile subscribers by that time.

But the prospects for FMC could improve dramatically once new "femtocell" technology arrives, probably late in 2007. This involves using an extremely small but fully fledged mobile base-station rather than Wi-Fi in the home or office. It still

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Small numbers, bigger profits **5**

Global fixed-mobile convergence
Subscription forecasts, m

■ Consumer ■ Enterprise

Source: Informa Telecoms & Media

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plugs into a broadband connection to route calls, but can be used with existing mobile handsets, which gets round the need for expensive dual-mode handsets. Softbank in Japan is particularly keen on this, as are incumbent operators in France, Germany and Italy. The problem is that femtocells are far more expensive than Wi-Fi base-stations, so everyone is waiting for the price to fall below €100, says Rupert Baines of picoChip, a chipmaker that hopes to sell its femtocell chips to established equipment-makers. That will probably not happen until 2008, but some operators may well launch femtocell-based FMC services in late 2007 in order to steal a march on their rivals.

Another factor that will influence the adoption of FMC will be the attitude of mobile operators that lack fixed-line networks, such as Vodafone. For the time be-

ing, such operators are responding by launching "homezone" products that offer consumers most of the benefits of FMC for much less hassle. Such schemes allow subscribers to nominate a particular location (ie, a particular network cell) as their home. Within that cell, their outgoing calls are charged at a lower rate. This helps mobile operators lure voice traffic away from fixed-line operators, a process known as "fixed-mobile substitution". What mobile operators are now doing, says Mr Merry, is sticking with fixed-mobile substitution for as long as possible, to steal as much traffic from fixed operators as possible, before launching their own FMC approach.

One way of achieving that would be to buy an internet-service provider that already sells broadband access. Vodafone, for example, has recently taken control of Arcor, a German broadband provider, and established fixed-line broadband partnerships with BT in Britain and Fastweb in Italy to enable it to experiment with FMC in both countries in case the idea takes off. Similarly, O_2, an operator with mobile networks in several European countries that was acquired last year by Telefónica of Spain, recently bought a small British broadband company called Be in order to gain access to Britain's fixed-line market. Mobile operators could then use fixed broadband pipes to deliver content (such as music tracks) to mobile phones. Downloading music over wireless networks is still a painfully slow business, even with 3G mobile networks. But consumers might download more music, ringtones and games on to their mobile handsets if it was quicker and cheaper at home.

Let's get down to business

For the time being, though, FMC's brightest prospects are in the corporate market, where it can help to cut costs. Compared with the consumer market the numbers are small (see chart 5), but each customer is much more valuable. "We really see it taking off in the enterprise environment," says Mr Merry. Informa forecasts that by 2011 business users will account for a mere 10-15% of FMC subscriptions but as much as 20-27% of FMC revenues.

For fixed-line operators, FMC is something of a life-raft. With the traditional voice business in decline, it enables them to hold on to their customers as they try to minimise their losses from voice-data convergence. Fortunately another form of convergence—between telecoms and television—offers them the prospect of a new market and new revenues. ■
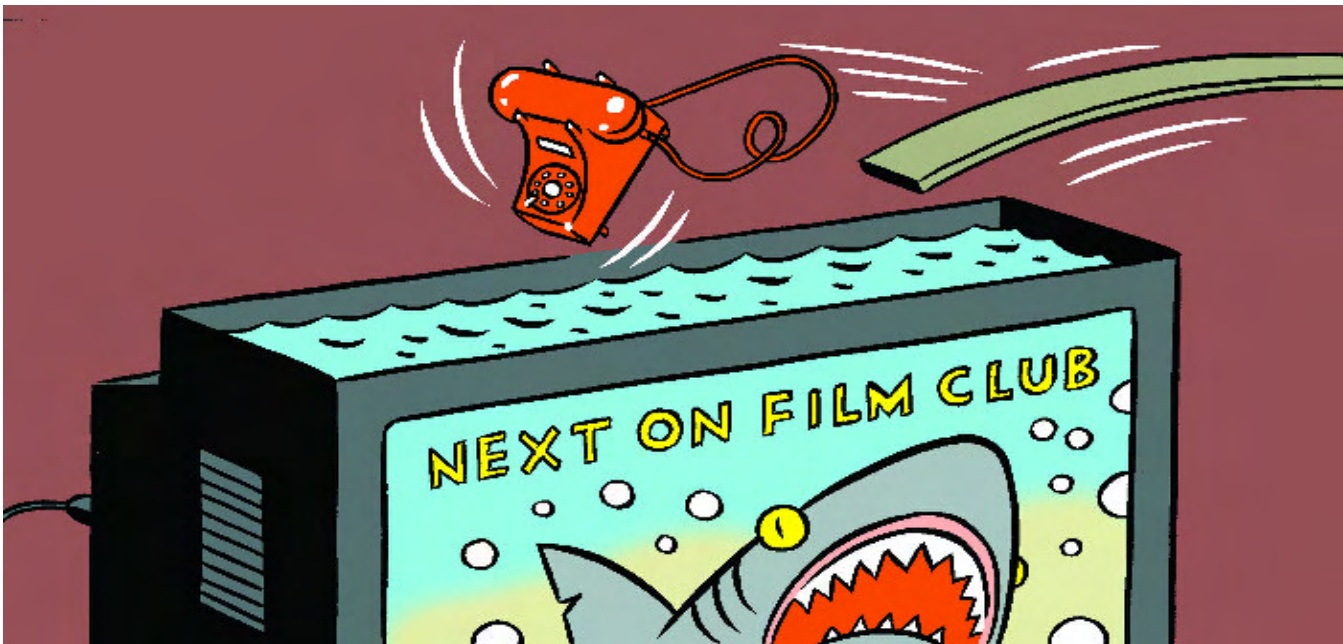
Tuning in to the future?

Telecoms firms are moving into television, but it may not be a licence to print money

IT IS a little after nine o'clock in the morning in Grapevine, a leafy suburb of Dallas, Texas, and Thomas Hixon, a Verizon engineer, is hard at work installing equipment outside a customer's house. This is one of the neighbourhoods where Verizon, America's second-largest telecoms firm, has laid fibre-optic cable under the streets as part of an $18 billion network-construction programme. By 2011 its cables will pass 18m American homes.

A directional boring machine has already drilled a tiny underground tunnel under the driveway, allowing a final length of fibre to be run from the neighbourhood splice-box to the customer's house. This single fibre can support multiple phone lines, 60-megabit-per-second internet access and over 400 television channels, with plenty of capacity to spare.

By lunchtime, Mr Hixon has finished installing everything. The phones are working, the broadband is running and he is demonstrating how to work the digital-video recorder (DVR), which allows programmes to be paused, rewound and recorded. Robert Blalock, the newest customer for Verizon's new FiOS network, is grinning broadly. Buying phone, broadband and television service together gives him a discount of $30 a month and a single bill, easier than three separate ones.

Verizon's FiOS project is one of the most ambitious examples of how telecoms operators around the world are moving into television services, in direct response to the march of cable operators

into the voice market. The snag from the telecoms firms' point of view is that whereas it costs very little to provide voice services over an existing cable network, it is very expensive to upgrade telecoms networks to deliver television over broadband internet connections, a technology generally referred to as internet-protocol TV (IPTV).

With its FiOS project, Verizon is one of a handful of operators around the world to have taken the most expensive route of all, "fibre to the premises" (FTTP), ie, running fibre right up to customers' homes. The others are NTT and SoftBank in Japan, KT in South Korea, and operators in parts of Sweden, Italy, Denmark and a few other countries. The cost involved has weighed on Verizon's share price, and its credit rating has been downgraded. "The market is very sceptical of FiOS spending," according to Blake Bath, an analyst at Lehmann Brothers, earlier this year.

But the service seems to be proving popular: in Keller, Texas, the first suburb where the fibre network was rolled out, over 35% of homes have already subscribed to FiOS TV, and over 40% to the broadband service. This bodes well for Verizon's plan to achieve 35-40% market penetration for broadband and 20-25% for TV in the areas covered by its new network, which already includes parts of Texas, Virginia and Florida.

Sheila Lau, president of Verizon's operations in Texas, says the take-up of the "triple-play" bundle of voice, broadband and television over FiOS is nearly 80% of those

taking FiOS at all. The average revenue per user, a key industry measure, is growing, and in every area where FiOS is available Verizon has been able to reduce the rate at which it is losing voice subscribers; in some areas, it is even adding some.

I want my IPTV

But for the ultimate example of an incumbent telecoms firm moving into TV, you have to visit Hong Kong. When PCCW, the local phone company, launched a TV-over-broadband service in September 2003, everyone laughed; it had tried similar ventures twice before, in 1996 and 2000, and had failed on both occasions. But its new service, Now Broadband TV, proved a success. Today it has more than 40% of the market and is on course to displace the local cable operator as the main provider of pay-TV in Hong Kong.

Moreover, last year PCCW became one of the first incumbent operators worldwide to arrest the decline in fixed-line subscribers. This is the kind of success that other telecoms firms dream of: a new service that not only stops line loss, but beats the cable companies at their own game and brings in new revenue. Better still, the service is expected to become profitable by the end of the year. No wonder that "just about every phone company in the world" has come to visit PCCW, says Alexander Arena, the firm's finance chief. PCCW is now advising telecoms firms in several countries about how to emulate its successful roll-out of IPTV. ▶▶

▶ PCCW's success provides a glimpse of the future in a technical sense as well, because it is based not on "fibre to the premises" but on a less expensive method called "fibre to the node" (FTTN) that is being adopted by many other telecoms firms. This involves running fibre to local exchanges and neighbourhood junction boxes and then, for the final link into the home, using the existing copper phone line, supercharged by a particularly fast form of the "digital subscriber line" (DSL) technology that turns phone wires into broadband pipes.

In this model, television signals travel as streams of IP packets, but because the final broadband link has a limited capacity, it is not possible to pipe hundreds of channels into the home at once and switch between them at the set-top box, as happens with cable and all-fibre networks. Only the channel that is actually being watched is sent from the fibre network down the broadband link. This has the benefit of reducing piracy and providing a far more interactive service, because individual video streams are sent to each subscriber.

Cheap and cheerful

The main advantage of FTTN is that it is comparatively cheap. Mr Bath estimates the eventual cost of connecting each home at $500-600 for Verizon, which is using FTTP, but only $250-300 for AT&T, which is using FTTN as the basis for its new network-upgrade project, known as Lightspeed. Verizon claims that its all-fibre method, although more expensive, is more future-proof; company officials say that FTTN will not, for example, support multiple high-definition streams, which require far more capacity than a copper broadband link can provide.

AT&T maintains that its system will be able to deliver two high-definition streams to each household by the end of next year. Ernie Carey, AT&T's head of network planning, insists that its more interactive approach does more than simply replicate the cable model. "We didn't just want to have a me-too product," he says. AT&T's IPTV service, launched this summer under the name U-verse, is impressive, with lightning-fast channel changes, picture-in-picture browsing of other channels and an elegant movies-on-demand service.

As well as FTTP and FTTN, there are other ways for telecoms operators to get into the television market. When the threat from cable operators first emerged a few years ago, many operators struck resale deals with satellite-TV firms, which was a quick and easy way to add TV to their service bundles without having to build any new infrastructure. But simply bolting on TV service in this way is clunky. Hence AT&T's new Homezone service, launched during the summer, which allows it to offer an advanced television service in areas where it has not upgraded its network to support U-verse.

Homezone is based on a set-top box that contains a satellite receiver and DVR and also plugs into a fixed-line broadband link. (The satellite content comes from EchoStar's DISH service.) The integration of the broadband connection allows it to offer interactive services such as music and film downloads. Because of the relatively slow speed of the broadband link, film downloads take place in the background, using a "queue and view" model.

An even more conservative approach to television is being taken by BT in Britain, Telefónica in Spain, Telecom Italia in Italy and KPN in the Netherlands. It involves a standard digital-terrestrial television (DTT) set-top box, capable of picking up multichannel digital TV, with a broadband connection that can be used to deliver IPTV services via the fixed-line network. This enables operators to offer music videos and films on demand, as well as a "catch-up TV" service so that customers can call up programmes they missed. It has the advantage that the basic television service can be provided without the need for any investment. The operator gets involved only in delivering the premium services, such as video-on-demand. BT's Mr Verwaayen says he does not see the point in investing billions just to replicate what cable companies can already offer.

There is no doubt that telecoms firms are technically capable of launching television services; the question is whether they will make any money out of them. "Every single customer I talk to knows the traditional voice service is being dissipated by mobile, by VOIP services," says Nortel's Mr Carbone. "They see revenue loss, and just taking cost out of their network will not increase revenue."

Nortel and other equipment-makers claim that there are fortunes waiting to be made by telecoms operators who jump into television. For an incumbent operator in a typical North American city, Nortel claims, a triple-play bundle including television service "doubles the average revenue per user", thanks to new television revenues and increased uptake of broadband. Television is now the largest growth o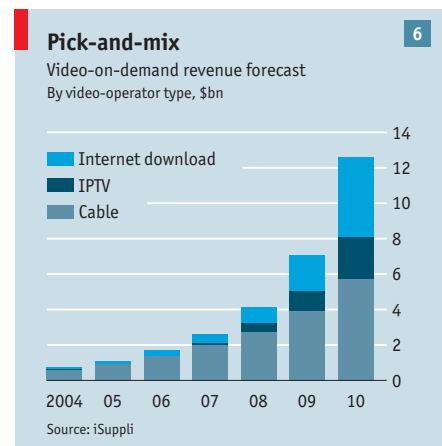pportunity for telecoms firms, the company says, and "will dominate all aspects of a telco's business for the next five to ten years." Alcatel, its larger rival, predicts that there will be 72m subscribers to telecoms firms' TV services by 2010, up from about 5m this year, and claims that operators can charge subscribers up to twice as much by adding television to their bundles.

Exactly what makes IPTV so compelling is hard to explain, says Alcatel's Mr Alwan. He draws an analogy with the TiVo and other DVRs. On paper, they do not sound life-changing: why would you want to pause or rewind live television, and what difference does it make being able to record programmes at the touch of a button? But in practice DVRs have changed the way many people watch television, by allowing them to ignore the schedules and call up their favourite shows in a jiffy.

Keeping up with the neighbours

Similarly, says Mr Alwan, users get very attached to IPTV features such as video on demand, being able to pause a film downstairs and watching the rest of it upstairs on a different set, or searching for programmes featuring a particular actor. "If your neighbour has a TV service where they can watch any show, anytime, without having to think about recording it, how much is that worth?" he asks. "If your neighbour has it, you will want it. It's a very interesting competitive advantage." Hochen Tan, the chairman of CHT, Taiwan's telecoms incumbent, talks of using IPTV to deliver "e-learning, or banking, or karaoke, which traditional cable service cannot provide".

But Lars Godell, an analyst at Forrester, is sceptical. Vendors' claims for the take-up of IPTV services are implausible, he says; despite a few small success stories, such as Hong Kong, there are still no really large- ▶▶

Pick-and-mix   **6**

Video-on-demand revenue forecast
By video-operator type, $bn

- Internet download
- IPTV
- Cable

2004 05 06 07 08 09 10

Source: iSuppli

scale deployments to point at. To him, the claim that IPTV will capture 30% of television subscribers within five years of deployment seems over-optimistic: 10-15% is more like it, he says. And even if television does double the operators' average revenue per user, they will not be able to pocket all of the extra money, because the content providers will need to be paid.

The problem for operators is that although many of them are not convinced by these numbers either, they still feel that they have to get into the television market anyway, because everybody else is doing it. "You have to defend yourself on as many fronts as possible, but as a strategic move to make a lot more money I don't see the justification," says Mr Godell.

After all, video services, like voice services, can be delivered over broadband pipes by other companies too. At the moment, real-time multichannel television is too bandwidth-intensive to be provided by third parties across the internet. But downloads of individual television programmes and films are already available from MovieLink, Amazon, Apple and others. As viewers move away from traditional forms of television and towards a pick-and-mix model, telecoms firms could find themselves in a situation similar to that created by VOIP in the voice market: their customers will be able to buy broadband internet access from one company and then choose from a host of internet-based firms for their video content. Indeed, iSuppli, a market-research firm, predicts that such downloads will be worth twice as much as IPTV video on demand by 2010 (see chart on previous page).

Telecoms operators are jumping into television at a risky time, in other words, just as the way in which it is consumed and delivered is changing radically. Perhaps they will benefit from this by offering their own video-on-demand services; but they could also find that the market is far less lucrative than they had expected.

Mr Godell believes that the best way to enter the television market, particularly in western Europe, where people are not prepared to pay very much for television content, is to keep capital expenditure and operational risk to a minimum, which would favour the hybrid DTT/IPTV approach. The projections of future growth in television adoption, says Mr Godell, ignore the fact that overall household spending on entertainment is flat, "so it's mostly about substitution—there is no overall growth."

Furthermore, Europeans spend much less on pay-TV services and DVD sales and rentals than they do on fixed-line telephony, so even if telecoms operators capture the entire television market, they will not be able to make up for the decline in their traditional voice business. They should move into television as a defence, not as a source of future growth. ∎

Changing the rules

How should regulators respond to convergence?

CONVERGENCE is forcing changes not only on telecoms companies and consumers but on regulators too. In many countries communications, broadcasting, entertainment and information services have separate regulators or different rules, but as the distinction between them starts to blur that no longer makes much sense. Drawing up new rules for a converged world, however, is fraught with pitfalls, as a recent OECD report explains. Already, fights have broken out in many parts of the world over the regulation of converged networks and bundled services.

One controversial question is whether incumbent operators should be compelled to share their next-generation networks with rivals, as they are required to do with their existing networks in many parts of the world. In America, where cable networks pass 95% of homes, regulators have decided that Verizon and AT&T do not have to make their new high-speed networks available to rivals on a wholesale basis; instead, their principal competition will come from cable operators. In Britain, however, where cable networks pass only 50% of homes, the regulator has ruled that BT must open its next-generation network to rivals. The European Com-

mission, which published a draft of its new Europe-wide telecoms-regulation framework in June, would like to see a similar approach adopted across Europe. In August the commission ordered Deutsche Telekom to open its new network to rivals.

Bundling services together, and creating new converged services such as fixed-mobile telephony, can also raise antitrust concerns. Italy's regulator, AGCOM, imposed strict limits on the initial roll-out of Telecom Italia's fixed-mobile service, Unico, because Telecom Italia's biggest fixed-line competitor, Fastweb, could not offer mobile services, and its biggest mobile competitor, Vodafone, could not offer fixed-line services—though Vodafone and Fastweb have since struck a deal to bundle their services together. Given its dominant position in both markets, Telecom Italia was deemed to be acting anticompetitively by combining the two. Similar rules have prevented KT in South Korea from offering full fixed-mobile convergence.

In some cases special rules prevent firms that are dominant in one market from entering another at all. Japan's incumbent operator, NTT, is not allowed to enter the broadcasting market; conversely, the country's public broadcaster, NHK, is

not allowed to enter the telecoms market. Similar rules preventing BT, Britain's incumbent operator, from providing entertainment services were abolished a few years ago, opening the way for the launch of its television service this year.

In America the launch of television services by telecoms firms has been held back by complicated rules that require operators to win approval from thousands of local franchising authorities. This has prompted some states to pass laws granting blanket approval for telecoms firms to launch television services, and the industry is now pressing for federal rules to cover the whole country. But cable operators are understandably opposed. They grumble that their franchises require them to offer blanket coverage, whereas telecoms firms are able to pick and choose which neighbourhoods they cover with their new television services.

Unfair advantage

Another bone of contention is "must carry" rules that require cable operators to carry certain local or public-interest channels on their networks, but do not apply to telecoms firms. The cable companies complain that having to carry these channels ▶▶

prevents them from using the network capacity for other things, such as internet access or new high-definition channels.

One way of dealing with problems of this kind is, appropriately enough, to establish a "converged" regulator, as Britain did when it merged its communications and broadcasting watchdogs into a single body, Ofcom, in 2003. Three years on, its experience provides three lessons for regulators in other countries, says Peter Phillips, an Ofcom strategist.

First, converged services and existing services will co-exist for a long time, "so you can't just jump straight to a solution." Instead, regulators must be flexible enough to deal with both the old ways of doing things and the new.

Second, under the old rules there were a lot of implicit deals: telecoms operators were granted monopolies in return for providing universal service, for example, and broadcasters were given spectrum in return for meeting public-service requirements. "In a converged world, those deals need to become much more explicit if you want to preserve the policy goals," says Mr Phillips.

Third, content on different platforms may require different rules. Broadcast television is not the same as subscription cable channels or streaming internet video. The shift away from broadcast television does require a more laissez-faire approach from regulators, but that is not the same as a total free-for-all. "If you have massive amounts of content out there, on platforms that may not respect international boundaries, you have to put more reliance on people's ability to understand the nature of content and decide how they want to engage with it," says Mr Phillips.

That raises another regulatory challenge: the fact that different rules apply in different countries. For example, there has been a huge fuss in Europe in recent months over the extension of the European Commission's "Television Without Frontiers" directive to cover video sent over the internet or to mobile phones. The aim is to impose standards governing things like decency and advertising on these new forms of video, but critics regard the rules as too heavy-handed.

Convergence will make the need for a common set of European rules more pressing as operators begin, for the first time, to venture onto each other's home turfs. For example, Orange, France Telecom's wireless arm, operates in several European countries and now also offers fixed-line broadband and voice services in several of

them in order to provide a service bundle. Similarly, O_2, another European wireless operator, is branching out into fixed-line services in several countries. Telecom Italia has launched fixed-line triple-play services in both France and Germany, and Deutsche Telekom is doing so in France and Spain.

In America, meanwhile, the debate about telecoms regulation in recent months has been dominated by one issue: network neutrality. In essence, this means that the internet simply delivers packets of information from one place to another, regardless of their content or the identity of the sender or receiver. The furore began last November, when Mr Whitacre, the boss of AT&T, complained in an interview with *Business Week* about Google, Yahoo! and other internet companies getting a free ride on his company's expensive new broadband network. "Now what they would like to do is use my pipes free, but I ain't going to let them do that, because we have spent this capital and we have to have a return on it," he said. "So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using."

Neutral tones

A few weeks later Ivan Seidenberg, the boss of Verizon, said that Google, Microsoft and other providers of bandwidth-intensive internet applications ought to "share the cost" of operating high-speed

networks. "We need to pay for the pipe," he told an audience at the Consumer Electronics Show in Las Vegas. Both AT&T and Verizon denied that they planned to act as gatekeepers, blocking access to any big sites that failed to pay up. Instead, they suggested, Google and other firms, such as music and video download services, might choose to pay extra to have their traffic prioritised.

The result was an outcry. Critics felt that AT&T and Verizon were threatening to abandon the hallowed principle of network neutrality. It is this principle that has enabled the internet to support new applications and made it such a hotbed of innovation. Its agnostic design, which ensures that it blindly does its best to deliver whatever traffic is fed into it, meant there was no need for the inventors of the web, or Napster, or Skype, to ask permission to run their software across the internet.

Advocates of net neutrality gave warning that the introduction of fast lanes and other premium services could undermine this innovative culture. "If the fast lane is the information 'superhighway', the slow lane will operate more like a dirt road," wrote Meg Whitman, the boss of eBay, the leading internet auction site, in an e-mail to its users. "A two-lane system will restrict innovation because start-ups and small companies—the companies that can't afford the high fees—will be unable to succeed." Eric Schmidt, the boss of Google, took a similar stance: "Creativity, innova- ▸▸

tion and a free and open marketplace are all at stake in this fight," he said.

Such self-styled defenders of the internet like to portray the net-neutrality debate as a fight to stop evil telecoms firms messing with freedom and innovation. The reality is rather more complicated. For a start, the internet is not, in fact, neutral today. Fast broadband connections already cost more than slower ones, for consumers and businesses alike. As well as buying fast pipes and building huge "server farms", big companies such as Google and eBay also pay extra for specialist "content delivery" services, such as Akamai, to make their websites download even faster. None of this has hampered innovation or hurt small companies.

It is also rather odd to see internet activists, who are generally suspicious of government intervention, calling for regulators to step in and pass new laws in the name of freedom. Laws mandating net neutrality could, in fact, do a great deal of harm. Ensuring "neutrality" could require regulators to interpose themselves in all kinds of agreements between network operators, content providers and consumers. Content-delivery services, such as Akamai's, might suddenly become illegal. Strict rules could also hinder the development of new services that depend on being able to distinguish between different types of traffic. And it does make sense, after all, to be able to prioritise telephony and video traffic over e-mails. "We are talking about some people getting a better service if they are prepared to pay for it," says Forrester's Mr Godell.

By dressing up the net-neutrality debate as a fight for online freedom, however, Google, eBay and other big internet firms have cleverly diverted attention from an unpleasant truth. As telecoms firms around the world upgrade their networks, there are two ways in which they can recoup the money. They can simply charge subscribers more; or they can pursue new business models in which big internet firms and other content-providers pick up some of the bill too.

But the idea that big firms such as Google ought to contribute in some way to these costs "has been roundly greeted as if it is a threat to basic liberties," notes Craig Moffett, an analyst at Sanford Bernstein in New York. Despite their howls at the idea of paying for such services as packet prioritisation, he says, it would in fact be the big internet companies that would benefit most from the new business models that such premium services might unlock.

In the name of consumer choice

That does not mean that big telecoms firms should be allowed to interfere with access to sites that do not pay them. But Mr Whitacre insists that he has no plans to do so. "We're not going to block, we're not going to interfere with what's out there today," he says. Instead, the idea is to charge extra for additional services. "The other way, consumers are all locked into one calibre of service, but consumers should be free to choose what they want," he explains. Not everyone believes him, of course. But so far there is no evidence that AT&T or Verizon have tried to block sites or demand

ransoms. And if they do, regulators will be able to take action under existing antitrust laws—there is no need for a new net-neutrality law.

Even so, the arguments of the past few months have served a useful purpose. "The public reaction has already been as powerful and effective as any law," says Timothy Wu, a professor at Columbia Law School who is credited with coining the term "net neutrality". The debate has put the telecoms companies on notice that they are being watched closely, he says, and has forced them to make public pledges not to block or degrade access. "Shame can have more power than litigation," says Mr Wu. "The market and consumers can control bad practices, but consumers actually have to be aware of what is going on for that to happen."

The telecoms firms could even find that the boot is on the other foot, says Mr Odlyzko of the University of Minnesota. Referring to companies such as AT&T and Verizon, he asks: "What makes them think that they are going to charge Google, as opposed to Google charging them?" Cable companies, he points out, have to pay for the television shows and films they deliver over their networks.

Clearly convergence requires new or updated rules in some areas and the enforcement of existing rules in others. But overall, by pitching companies in previously distinct industries against each other, convergence will result in more vigorous competition. That should allow market forces, rather than regulators, to determine the best shape for the industry. ■

Winners and losers

Who will benefit most from convergence?

WHO is right about convergence, the boosters or the sceptics? The truth probably lies somewhere in the middle. Operators have high hopes that convergence will open up valuable new markets, but that seems unlikely. Voice-data convergence can cut operating costs, but the same VOIP technology is also eroding revenues from traditional fixed-line telephony, and new revenues from broadband will not fill the gap. Fixed-mobile convergence may help operators to hold on to customers, but will not produce much, if anything, in the way of new revenue. And the prospects of

telecoms firms making money from television also look dim, because they will have to lure customers away from other television providers and invest heavily.

Yet that is not to say that telecoms firms should keep clear of convergence. It might still be the best way for them to cut costs, fend off competitors, retain customers and minimise their losses from declining fixed-line voice revenues—not least because everyone else will be doing it. They may have overstated the money-making potential of convergence, but there are probably good reasons to pursue it anyway, not

least greater operating efficiency and lower running costs.

"It's not a panacea, but it is a necessary step," says Alcatel's Mr Alwan. "It doesn't fix everything right away—it's a multi-year, multi-step, complex project that will ultimately deliver a better infrastructure with which to lower costs and improve services." AT&T's convergence project, Lightspeed, for example, is not being driven by a mania for technology for the sake of it, says Mr Alwan, but "because there's a serious threat to voice revenues from triple-play bundles from cable companies."

As well as cutting costs by replacing many separate networks with a single, converged one, telecoms operators will also increase their agility, suggests BT's Mr Verwaayen. Offering low-priced bundles of services will attract a certain number of customers, he says, but the real benefit of convergence is its potential to make entirely new services possible. "In the past, you could make a map of what your customers wanted going forward. But nowadays it's like the fashion business: moods change, and it's hard to predict," he says. Convergence, he adds, is "the only way I know to be flexible and agile, so it doesn't matter if customers change their minds." Inevitably, operators will continue to launch some services for which demand turns out to be low, but convergence should make it easier and cheaper to experiment, and thus to find new services that people actually want.

Bundle of joy

And, of course, offering bundles of converged services makes customers less likely to defect and saves money on marketing and customer acquisition, because many services can be advertised and sold together. Bundling services together also makes sense on basic economic grounds, observes Mr Odlyzko of the University of Minnesota: "It means you can exploit uneven preferences for different goods." Demand for bundles is more predictable than demand for individual services, and customers who might not find individual services attractive may be prepared to buy the whole bundle. Bundling hides the prices of individual services, and a single bundle appeals to different customers for different reasons. This also makes bundles more profitable, because people may end up paying for services they do not want.

But everyone is doing it, and, by definition, not everyone can be more competitive, more agile and better able to attract new customers and retain existing ones. Figures from the OECD show that household spending on communications, having risen during the 1990s as people signed up for internet access and mobile phones, has been flat since 2000. The same is true of spending on recreation, which includes television, DVD sales and rentals, and cinema-ticket sales (see chart 7).

As VOIP has driven down the cost of fixed-line telephony, consumers have spent more on mobile phone calls instead, says Rupert Wood of Analysys; but their overall spending on voice calls has stayed roughly constant. So the coming fight be-

tween converged operators of various kinds will be over the allocation of existing spending. Nobody seems to be offering anything new that will increase the overall size of the pie.

Despite the evidence to the contrary, everyone seems to think they can win. "At the moment, the stockmarket valuations of both telcos and the cable companies seem to assume that each side is going to win close to 100% of the market," says Mr Odlyzko. Something similar happened during the telecoms boom of the late 1990s: dozens of companies built identical long-haul fibre networks, each assuming that they would win 20% of the market. As a result, most of them went bust.

This time around, convergence will have the effect of intensifying competition, dividing the industry into winners and losers and leading to a round of further consolidation. So who will do best? Not simply those who embrace convergence most quickly to benefit from reduced costs and greater agility; there are other factors, too.

The first is flexibility. Not everyone wants to buy a bundle of services, so operators must allow customers to pick and choose the services they want. "We looked at many carriers across the globe, and generally speaking there is a category of customers that want a triple-play, but overall most customers preferred single-play and double-play, mixing offers from different players," says Mr Zibi of Pyramid Re-

That flat feeling 7

Household spending in OECD countries*
1990=100

- Communications[†]
- Education
- Recreation and culture
- Restaurants and hotels
- Food and non-alcoholic beverages
- Clothing and footwear

1990 92 94 96 98 2000 02 04

*Excluding New Zealand and Turkey †Telecommunications equipment and services, and postal services
Source: OECD, SNA database

search. The most successful operators, he says, are those that have the technology to offer multi-play service bundles, "but offer those services in such a way that the consumer is the one making the choice—they don't push a specific bundle, or force services on consumers that they don't necessarily want."

Mr Barrett at Parks Associates has come to a similar conclusion. In a survey of American households with broadband, 43% said they had not subscribed to a multi-service bundle because they wanted to make specific choices for different services. Intriguingly, this suggests that there will continue to be a role for companies that specialise in particular services, such as satellite television or mobile telephony, and do not offer the entire triple-play or quadruple-play package. "The triple-play hasn't been an overwhelming success so far," says Mr Wood. "It's driven by operators' desire for it to work, rather than real demand. So there will still be demand for single-service suppliers, and for single services from suppliers who also offer the triple-play."

The customer is king

Crucially, to get customers to sign up for three or four services, each of those services must be competitive and attractive in its own right, says Mr Zibi. "The beauty of convergence as we see it isn't so much that you can sell multiple services to a customer, but that you can allow them to mix and match whatever services they want," he says. Sol Trujillo, the boss of Telstra, draws an analogy with shopping. Some people want simplicity, he says, and prefer to have everything in one place, as in a mall or a department store. But others prefer to do some shopping in the mall and to seek out specialist shops for specific products. "So you have to allow both à la carte and integrated capability," he says.

Secondly, for convergence to work it has to be simple for the consumer. This is something that every technology firm insists is a top priority. But their products, and their users, suggest otherwise. "I'm sure if you go to some laboratories somewhere, they can show you caller ID on the TV screen. The challenge is to take the technology and make it really simple, so our mothers and fathers can use it," says Skype's Mr Zennström. Making free phone calls over the internet has been technically feasible for years, but it only really took off with the arrival of Skype, which made it easy. "We try to make things really simple, so you don't need to be an engineer to set ▸▸
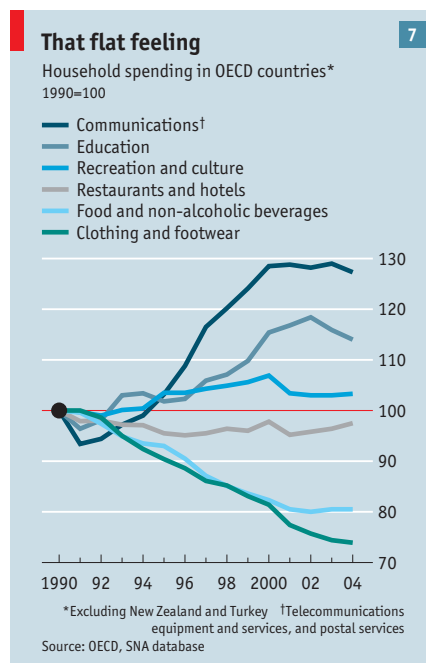
them up," explains Mr Zennström.

Mr Lombard of France Telecom admits that the industry still has some way to go in this regard. The past decade, he says, has seen the introduction of all kinds of wonderful new technologies. "But we have a kind of complexity in all these products that is rather artificial and probably transitional," he says. Carmakers do not expect drivers to open up their cars and adjust their engines. "If you compare what we are asking customers, we are asking them to enter codes, addresses, it is far too complex," he says.

What's in it for me?

Mike Cansfield of Ovum, a telecoms consultancy, also reaches for an automotive analogy. "Telecoms has historically been technology-led, full of technobabble," he says. "You have to be able to articulate benefits to encourage take-up." Consider the windscreen wipers on a car: "You could talk about different motors, variable speeds and intermittent wipes, but the benefit is that you can use the car whatever the weather." Similarly, he says, telecoms firms have to become more marketing-savvy. If they cannot explain the benefits of their whizzy new converged services, nobody will sign up for them.

There are signs that some companies have realised this. Hong Kong's Now TV, a pioneer in video-over-broadband, has developed a "network DVR" that provides TiVo-like recording and playback facilities without any extra hardware; instead, the recorded programmes reside on the network. It is all very clever, but also rather hard to explain. So the company has decided to take its time over rolling out this and other innovations to avoid overwhelming its customers.

In theory, a bundle of converged ser-

vices delivered by a single operator through a single "gateway" box should be easier to use than a jumble of boxes from different companies. The operator can ensure that the user interface is logical and consistent, and that all the various services work together well. (This is a large factor in the success of Apple's iPod music-player, iTunes software and iTunes store, all of which seamlessly work together.) AT&T is tightly interlinking its various services so that, for example, pictures taken with a mobile phone can be uploaded to the user's website and can then easily be called up on the television screen; another feature allows subscribers to AT&T's Homezone service to programme their DVRs remotely via the web. But a balance must be struck between such clever new features and ease of use.

A third and final factor in making a success of convergence is a strong brand founded on good customer service—other-

wise consumers will not want to sign up, even if offered discounts. This sounds obvious, but it could mean that telecoms operators have an advantage over cable companies, which have weaker brands and are generally less well regarded by consumers, says Mr Godell of Forrester. That explains why NTL, Britain's cable operator, recently took over Virgin Mobile: both to complete its quadruple-play bundle and to gain access to the stronger Virgin brand. Similarly, France Telecom rebranded itself as Orange, its mobile brand; other operators are doing the same, because their strongest and youngest brands are usually those associated with mobile telephony.

Convergence is both a response to, and a reflection of, far greater competitive pressure in the telecoms industry. "The competition could get very ugly," says Mr Odlyzko. "But in the end consumers will be the beneficiaries." Mr Godell agrees. "In a world where prices are falling every year, I think the only real winners are end-users," he says. "Consumers will have an increasing array of nicely packaged services at lower prices. But it will be messy."

Ultimately, consumers and businesses will be able to choose from a wider range of communications services and a wider range of providers. Some will have come from the world of telecoms; some from the field of cable television; some will have started out as internet-access providers; some will be bulked-up satellite-TV firms. But they will all be fighting over the same customers. The companies involved must be prepared for a bloody battle; regulators must ensure that the fight is a fair one; and consumers, with luck, will enjoy greater choice and lower prices. ■