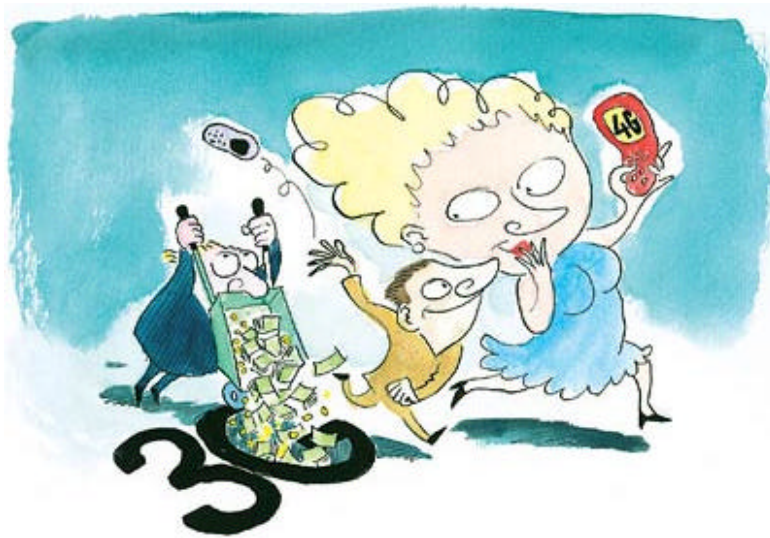


Move over 3G: here comes 4G

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Third-generation (3G) mobile -phone networks face a new rival: so-called 4G. And, astonishingly, the new networks may even be profitable

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"THE future always comes too fast," Alvin Toffler, an eminent futurologist, once said, "and in the wrong order". The state of wireless telecoms is a classic example. Even as "third-generation" (3G) mobile networks are being switched on around the world, a couple of years later than planned, attention is shifting to what comes next: a group of newer technologies that are, inevitably, being called 4G. More hubris from the technology-obsessed industry? Not exactly. Some 4G networks are operating already, with more on the way. A technology once expected to appear around 2005 is here now.

Interest in 4G owes much to the mess surrounding 3G. Operators spent *euro*100 billion (about \$100 billion) buying licences to run 3G networks, only to find that the technology that most had agreed to use was harder to implement than expected. Even where 3G networks are up and running, demand for the snazzy video and multimedia services they make possible is still uncertain. Expectations are being scaled down: 3G could end up merely as a way for mobile operators to boost their capacity for voice calls in overloaded parts of their networks, rather than a goldmine of new revenues from multimedia services. Last week, mmO2, a European operator, wrote down the value of its 3G investments by nearly \$10 billion—although this week, despite reporting a pre-tax loss of \$9.6 billion (reflecting write-downs of goodwill related to acquisitions), Vodafone chose to postpone its inevitable 3G reckoning.

As 3G has stumbled, another wireless technology, Wi-Fi, has inspired a mania unseen since the great internet boom. Wi-Fi provides high-speed internet access to suitably equipped computers within 50 metres or so of a small base-station. It is widely used in homes, offices and universities. Several firms offer fee-based Wi-Fi access in airports, coffee-shops and other public places known as "hotspots". But because of the short range of Wi-Fi technology, universal coverage is impractical. Although a dozen or so start-ups are working on ways to extend the range of Wi-Fi, it now takes hundreds of Wi-Fi base-stations to cover the same area as a single mobile-phone base-station.

Best of both worlds

But what if you could combine Wi-Fi-style internet access with the blanket coverage, and fewer base-stations, of a mobile network? The various 4G technologies developed by such firms as IPWireless, Flarion, Navini, ArrayComm and Broadstorm offer just such a blend. There is no formal definition of 4G, but what such technologies have in common, says Andy Fuertes, an analyst at Visant Strategies, a research firm, is that they are high-speed wireless networks covering a wide area, designed above all for carrying data, rather than voice or a mixture of the two. They can pipe data to and from mobile devices at "broadband" speed, typically 10-20 times faster than a dial-up modem connection.

Such 4G wireless-broadband systems can be seen in two ways: as a rival to Wi-Fi that offers wider coverage, or as a wireless alternative to the cable and digital subscriber-line (DSL) technologies that now provide broadband access to homes and offices. Mostly, the wireless operators evaluating 4G see it as the first, and fixed-line telecoms operators as the second. But the convergence of wireless and broadband, argues Chris Gilbert of IPWireless, is actually entirely new: a fast internet connection that follows you around. Navini calls it "nomadic broadband"; ArrayComm's term is "personal broadband". Mike Gallagher of Flarion, a firm backed by Cisco, likens Wi-Fi to cordless phones that work within a limited range of a base-station, whereas 4G is akin to mobile phones that work anywhere.

Numerous 4G technologies are working today. The first commercial deployments are in parts of America, Canada, New Zealand, South Korea, Germany, Italy and the Netherlands. Vendors are licensing 4G to telecom-equipment makers such as Alcatel, Nortel and LG Electronics for high-volume production. So far none of the 4G vendors has secured the endorsement of a leading "tier one" operator for a nationwide deployment, but many claim to be close to this goal.

Regulatory and technical differences will determine which technologies are likely to be adopted where. Flarion's technology is well-suited, for technical and regulatory reasons, to both America and South Korea. In Europe, the IPwireless system may appeal more. When mobile operators bought their 3G licences, extra spectrum for high-speed data services was often thrown in, and IPwireless's technology uses this spectrum. (IPWireless's technology uses a protocol that technically falls within the European definition of 3G.) Flarion and other vendors hope that Europe's regulators will relax the rules to allow their technologies to be used in this 3G spectrum too. In South Korea, operators have tested every 4G technology; which will be adopted depends on the regulators, who are due to decide later this year.

Advocates of 4G technology argue that, unlike with 3G and Wi-Fi, the business case for 4G is sound. 3G was predicated on consumer demand for multimedia services that may never materialise. Nobody is sure how commercial Wi-Fi hotspots will make money—the number of connections per day at most hotspots is still tiny—yet even so a “land-grab” is under way, with dozens of operators rushing to build thousands of hotspots. But 4G is being priced like fixed-line broadband, a service for which millions of users worldwide are already willing to pay about \$50 a month. Emphasising speed first and mobility later, 4G networks may be built initially in regions where cable and DSL are unavailable, to capitalise on pent-up demand for broadband, then expanded later to provide blanket coverage for mobile users.

4G could thus prove a very disruptive technology indeed. Fixed-line and cable operators will face a new competitor in the broadband market. Wi-Fi hotspots will seem hopelessly limited. Mobile operators will find that there is yet another hole in their 3G business plans. Unless, that is, they decide to embrace 4G as the technology that 3G should have been all along.

Some operators may be leaning in this direction. In America, Nextel, a mobile-phone operator, is said to be considering skipping 3G altogether in favour of Flarion's 4G system. In Europe, some operators may scale back 3G plans and adopt IPWireless's technology. As their 3G licences entitle them to do this, they may not be as worthless as they now seem. Mobile operators already own the key sites for base-stations, unlike fixed operators or new entrants, so they are well-placed to build 4G networks fast. They are already attacking the fixed-line voice market. 4G would let them attack the broadband market too—and neutralise the Wi-Fi threat.

It is not clear how investors would judge an operator that decided to favour 4G over 3G. So far, operators have kept quiet about their 4G plans, to avoid confusing the marketplace. Yet when Telefonica, a Spanish operator, abandoned some of its 3G investments last year, its share price went up, notes Mr Fuertes. For phone network operators willing to give it a try, skipping a wireless generation might not be such a bad idea.