FORGET YOUR WALLET

The race for frictionless mobile payment is nearly over

It's noon at the crowded Steins Beer Garden in Mountain View, Calif., and executives from **EBay**'s PayPal are discussing the future of the massive market for retail and restaurant payments with a reporter who's paying for lunch. Without ever opening his wallet, the reporter enters a four-digit number printed at the bottom of the check into a PayPal app on his smartphone. An itemized bill for three smoked chicken salads, a tomato bisque, and two Diet Cokes appears on the screen. One click later, without ever needing to flag down a waiter, the check is paid.

Over the past 60 years, plastic has gradually supplanted cash and coins when a bill arrives. For all their relative simplicity, though, credit cards still require busy sales and service staff to take objects bearing a customer's private information to specialized terminals and hand back receipts that need signatures and further processing. For the past decade, payment companies have been trying to figure out how to take advantage of mobile devices to make the process easier and more secure. After some false starts, the next revolutionary shift in payments is gathering momentum. Worldwide mobile payment transactions will total $235.4 billion in 2013, a 44 percent increase from $163.1 billion in 2012, according to tracking firm Gartner, which projects a 38 percent jump to $325 billion next year.

The new wave of mobile payments doesn't look anything like it did even a few years ago. Back then, a technology called near-field communication promised consumers a way to store credit card data in a secure chip for a smartphone, which they could tap against a merchant terminal to make a payment via secure short-wave radio. NFC failed to catch on, as early adopters didn't stop using their cards. **Apple** refused to integrate the chips into the iPhone, and other interested parties—**Google**, **Verizon**, **AT&T**, and **Visa**—couldn't agree on which company would manage the customer payment platform. NFC "didn't solve any real-world problems," says David Marcus, PayPal's president.

In most versions of the current model, customer payment data are stored on the Internet for access via smartphone applications, such as the mobile version of PayPal's site or specialized apps developed by a particular merchant. **Starbucks** customers can download the company's app to their phone, load it with a credit or debit card, then pay at most of the coffee chain's 11,437 U.S. locations by opening the app and waving their phone under a scanner. The company says more than 11 percent of payments in the U.S. and Canada are now made with mobile devices, thanks in part to a discounts and rewards program.

Other merchants have toyed with variations on that model. The 26,000 U.S. locations of sandwich chain **Subway** don't have specialized barcode scanners, but their registers can print barcodes for a customer with the company's app to scan with a phone camera and use to authorize an online payment. **Chipotle Mexican Grill**'s app lets customers order from the road to avoid standing in the chain's serpentine lunch-hour lines. Besides reducing barriers to payment, this can give retailers a much better way to contact a customer—and a closer look at her long-term behavior, says Richard Crone, chief executive officer of payment advisory firm Crone Consulting. "The real value is that they now know who their customer is and can reach out to them at any time," he says.

Companies interested in reaching mobile shoppers are quickly jumping aboard. Apple and Google are working to turn their mobile software into popular one-stop wallets that could usurp Visa and **MasterCard** as go-to forms of payment at brick-and-mortar stores, generating fees for them instead. Online reservations company **OpenTable** announced this summer that it would begin testing a service to allow users to pay a check and leave a tip with their phone at restaurants that use its service, without ever calling for the bill.

"It's all happening today," says Chris Gardner, co-founder of **Paydiant**, a Wellesley (Mass.)-based mobile payment company that helps power Subway's app. "What you'll see over the next year is that grocery and convenience stores and restaurants will all come out with mobile payments." In three to five years, he says, consumers will be able to conduct half of transactions through phones, without juggling a boatload of different apps, a scanner, or a photograph of a barcode.

In September, PayPal introduced Beacon, one possible way to streamline things further. The company is making a small, wand-shaped device available to merchants, who can plug it into a PC or a power outlet. The device emits a short-range wireless signal that triggers the PayPal app in a customer's phone when she walks into the store. If a customer has explicitly approved the service for that location, the merchant will automatically see her profile, including order history and image, on the retailer's computer terminal. It can also automatically charge the customer's account without ever presenting a ▶

Worldwide mobile payments are growing by about 40 percent a year

20 12 $163b
20 13 $235b
20 14 $325b
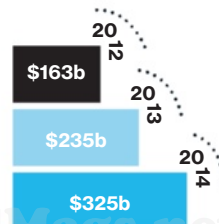
◄ bill. PayPal says it will test the service with merchants, including the Telegraphe Café, a Manhattan sandwich shop, before rolling it out more widely in 2014. "This is a completely hands-free, friction-free experience," says PayPal's Marcus.

Mobile apps such as the taxi service **Uber** are pushing payment transactions further into the background. Uber, operating in more than 50 cities and 20 countries, stores its customers' payment credentials on its servers. When a customer orders a ride, the driver's photo and location on a map appear on her phone as the car approaches. It's a seamless experience that can feel a bit disconcerting when the ride is over: The flat fare is deducted automatically from her credit card; she exits the cab without ever paying or tipping the driver.

Uber's payment feature is powered by **Braintree**, a six-year-old Chicago-based startup, which PayPal said in September it would buy for about $800 million. Braintree processes about $4 billion in mobile payments annually for Uber and other apps, including the room-booking companies **Airbnb** and **HotelTonight** and errand marketplace **TaskRabbit**. Transactions for all of these services are completed with one click, or even automatically behind the scenes. Bill Ready, Braintree's CEO, says a whole class of shopping experiences will soon happen this way. "People are willing to shop and browse on mobile devices, but they never want to do data entry," he says. In five years in-store checkout transactions "will seem as foreign as a green-screen terminal does today."

As smartphones become the preferred way to pay, consumers will have to wrestle with the implications for privacy. From Google and PayPal to your favorite pizza place and the coffee shop down the street, companies will know more about your shopping habits and what and when you buy. In exchange for this personalized information, they'll likely offer a wealth of perks and discounts, at least for now. Consumers and privacy regulators will have to decide whether the tradeoff is worth it and ensure that companies have explicit user consent—and that they can protect the information they're collecting. "A big issue with mobile payments is simply the privacy and security of the phone itself," says Lee Tien, senior staff attorney at the Electronic Frontier Foundation. "You
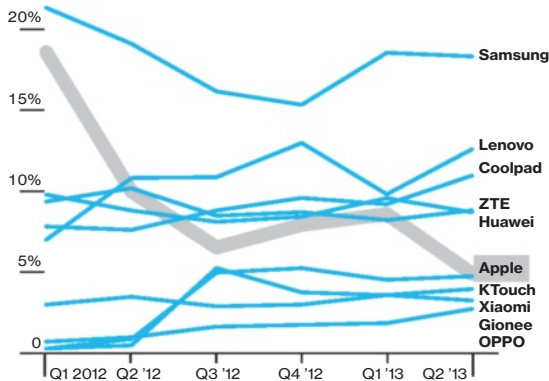
also have to consider whether there are any signal leakage issues," meaning that a payment platform's Wi-Fi or phone network connection may be vulnerable to hackers.

The shift to mobile could be far more disruptive for established payment companies. Most mobile shoppers pay by entering their Visa, MasterCard, or **American Express** account numbers in their smartphone apps, then forgetting them. The additional payment volume is good for these companies right now, but in the long run they may find themselves struggling to stay relevant. "The brand of MasterCard and Visa goes away" in many mobile transactions, says Keith Rabois, a partner at the venture capital firm Khosla Ventures, which has invested in several mobile payment firms. "Arguably their brands are the most powerful assets Visa and MasterCard have. Now a whole generation is going to be buying stuff in a nonbranded way."

The credit card giants may have a little time to adapt. At Steins Beer Garden, where mobile payments are being tested and a purple neon PayPal sign hangs on the wall, owner Ted Kim says some of his customers and waitstaff aren't yet comfortable with the idea of paying by phone. Recently a pair of regulars ate at the bar and tried to use the numbered-code system but departed without noticing that their transaction hadn't completed successfully. A bartender had to chase them down the street, the old-fashioned way. Ⓑ —*Brad Stone and Olga Kharif*

APPLE'S CHINA SLIDE

Apple's share of the smartphone business in China is shrinking as a half-dozen local vendors emerge to take a bite out of the market. They're using social media and tapping into local brand loyalty to build share. Lenovo and Xiaomi have had success selling cheap, feature-loaded smartphones priced well below the iPhone. ——*John Butler*

GRAPHIC BY BLOOMBERG BUSINESSWEEK. DATA: IDC.

EUROPE'S PUSH TO END ROAMING

When a Londoner takes a trip to Paris, two and a half hours away by train, his phone bill soars. A 20-minute call home costs £5 ($8). Texting a photo is 60 pence (96¢). Ten minutes of Google Maps is £2.76. All these services would be free had he just stayed put.

That's a big reason business is declining for telecommunications companies, according to European Commissioner Neelie Kroes, who is in charge of strengthening the European Union's wireless services. She says roaming charges cause consumers to use their phones less—which hampers business and limits economic growth. (Although some rules are set by country authorities, the EU can determine roaming policy.)

Kroes is proposing EU regulations that would eliminate roaming charges by 2016. She bills herself as pro-business, saying these changes will help companies boost profits: When consumers use their phones more, they are likelier to upgrade to more expensive plans.

The carriers don't agree with Kroes's prescription. They maintain that shrinking industry revenue is caused by too much competition. Executives including Philipp Humm, the head of Europe for Vodafone Group, and Timotheus Hoettges, deputy chief executive officer of Deutsche Telekom, want the EU to ease restrictions on mergers so they can buy smaller competitors. They say limiting roaming charges will cut into a key income source. European companies stand to make $19.7 billion in roaming fees this year, according to research firm Informa Telecoms & Media.

"I don't understand the necessity of giving the sick man sour medicine. Maybe you want him to die," Stéphane Richard, CEO of France's Orange, said at a conference in Brussels in October. "I am surprised by people who are thinking we are going to increase our investment by cutting our resources."

Kroes's plan and its potential impact are being discussed by the European Parliament this year and could be approved next year, which is also when Kroes's term ends. If the rules are delayed—companies are lobbying intensely and the national governments need to agree on the regulations—and the Parliament agrees to debate it, the package could be scrapped.

Kroes believes that clinging to roaming charges will cause further profit erosion for the wireless industry. "Either our telecom companies embrace data-driven change, or they will become corporate roadkill," she said in an Oct. 24 tweet. Ⓑ ——*Amy Thomson*

TECHNOLOGY

GET ONLINE ORDERS IN A MATTER OF HOURS

E-commerce companies want to differentiate themselves with reliable same-day delivery

Amazon.com, EBay, and Wal-Mart Stores are competing to improve their delivery speeds. The ultimate goal: ship and drop off any item, anywhere, the same day it's ordered. Right now, consumers can sometimes get these services—for a price—but each company's day-of delivery range is limited. ——*Danielle Kucera*

EBAY

With the EBay Now service, which will soon be integrated into the company's website, customers can order items from retailers such as:

- Toys "R" Us
- Target
- Home Depot
- Office Depot
- GNC
- RadioShack
- Walgreen's
- Best Buy
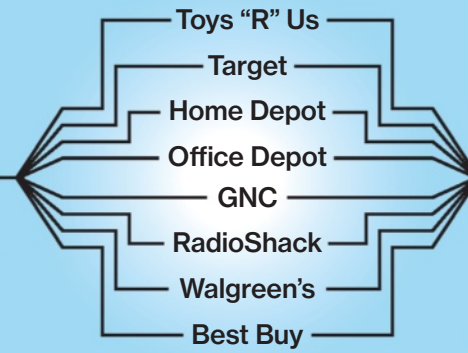
On Oct. 22, EBay bought British delivery software maker Shutl to help improve its website's interface.

For an extra $5 and up, EBay can guarantee same-day delivery in:

Customers will soon be able to schedule deliveries for exact times. Another option: EBay will direct an order to a local Best Buy or Target for pickup.

EBay will offer same-day service beginning in 2014 in Dallas, London, and 20 other cities.

WAL-MART

Wal-Mart hopes to generate more sales from its Web operation, because online shoppers tend to buy more than store visitors.

The retailer charges a $10 fee for same-day delivery service.

In some cases, the company uses third-party couriers to send items from one of its 4,700 stores. Wal-Mart employees sometimes deliver products by car.

AMAZON

To get same-day delivery, Amazon customers pay an extra $8.99 or more at checkout. For $79 a year, the company's Prime service, which includes free two-day shipping for most items, offers same-day service starting at $3.99.

Same-day delivery will work as long as Amazon has the item in stock at a nearby warehouse or a third-party seller can quickly get it there. To improve its delivery time, Amazon is adding robots, storage space, and refrigerators at its more than 90 facilities.
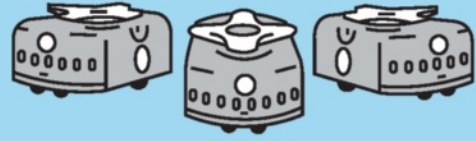
Amazon routes deliveries via carriers such as UPS and FedEx, and now on Sundays using the U.S. Postal Service.

To reach more parts of the U.S. faster, Amazon has spent about $14 billion in the last three years on new warehouses. It's adding 5,000 full-time warehouse jobs to its existing 20,000-head payroll.

At the moment, Amazon can reach about 15 percent of Americans with same-day delivery. It's building another five warehouses and could hit 50 percent of the country if it secures storage space near the top 20 metro areas, according to supply chain consultant MWPVL International.

NOW HIRING
amazon.com

amazon.com

amazon.com

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BITCOIN'S CHIP SHOT

Faster processors will give digital-currency miners an edge

The easiest way to get a Bitcoin is to buy one. You can join drug dealers, speculators, and the curious by hopping onto an online exchange and purchasing one unit of the digital currency for, as of Nov. 11, about $340. But you can get Bitcoins for free by mining them, and a new breed of chips will soon make doing that a lot faster. "You would need 70,000 Intel chips to equal what one of ours can do," says Eduardo de Castro, co-founder of Bitcoin chipmaker **HashFast Technologies**.

Each Bitcoin has to be verified on a virtual ledger of all the Bitcoins ever circulated. Anyone can download some software and get a copy of this ledger, but to add to it, you must become a Bitcoin miner. That means you set your computer to work performing cryptographic calculations to decode elements of the currency system and confirm the validity of transactions, which then get added to the main record. The reward

for this work is about 25 Bitcoins. The catch: Only one person every 10 minutes earns this prize, by solving the calculations before anyone else.

Mining Bitcoins is already a specialist's game. **Butterfly Labs** and **KnCMiner** build special Bitcoin-mining hardware that they sell to individuals and groups of people who pool their money to amass lots of computers. Then there's the Bitcoin discussion forum user known as BitFury, believed to be a self-taught chip designer from Ukraine, who "designed a chip at his kitchen table," de Castro says. "He's made a huge pile of cash" by selling

machines using the chips on his website.

BitFury and other first-wave Bitcoin hardware makers will face competition in 2014 from a second wave of designers, who aim to speed the mining process with special chips known as application-specific integrated circuits, or ASICs. The circuits' creators include HashFast, which has used cutting-edge chip design techniques to produce computers that sell for $11,700 each. **CoinTerra** has raised $1.5 million; its chief executive officer, Ravi Iyengar, used to design chips at Samsung Electronics and Nvidia. Secretive startup **21E6**, another mining-machine seller, is believed to be backed by some of the wealthiest people in Silicon Valley; its co-founder is Balaji Srinivasan, a former Stanford University professor and data-mining expert.

The latest and greatest equipment from these companies should begin arriving in December, kicking off what the startups hope will be a massive spending spree by Bitcoin miners. "It really is an arms race," says David Kanter, a chip analyst and consultant. "If you're one of the first people to get one of these, then boom, you will make some real money. But once everyone has one, it's back to square one." Individual miners who get outspent by larger groups will end up with basically worthless hardware unless they can pool it into something larger, he says. As he says about BitFury, "I am sure he made more money from the hardware than the morons who bought." Ⓑ —*Ashlee Vance*

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Disrupter

SUPER CHEAP TABLETS

- **0.3-megapixel front-facing camera**
- **4 gigabytes of internal memory, expandable to 36 GB**
- **Battery lasts for 3 to 4 hours of video or 6 hours of e-reading**
- **7-inch LCD display at 800x400-pixel resolution**
- **2-megapixel rear-facing camera**
- **Bluetooth, Wi-Fi, and 4G connectivity**
- **1 GB of RAM**

Apple and **Samsung** built big tablet businesses by appealing to early adopters with money to burn. **Lenovo** and other companies are working on sub-$100 tablets aimed at the lower end of the market. But starting next year it may be tough to compete on price with the

Aakash 4, a 7-inch Android tablet developed by British manufacturer **Datawind** and India's Ministry of Human Resources Development. Datawind Chief Executive Officer Suneet Tuli said at a *Wired* conference in October that the device has twice the processing power and

RAM of the first iPad and will cost as little as $40. The company, which has shipped about 1 million of its earlier models, will make its money on app sales and ads, he said. Now the No. 2 tablet maker in India, Datawind plans to start selling in the U.K. in the next couple of months. Ⓑ

QUALCOMM OWNS 4G

100%

of 4G smartphones in the U.S., and 85 percent worldwide, contain Qualcomm chips. (ABI Research estimates 245 million 4G LTE mobile devices will ship in 2013.) Qualcomm has spent billions in the past decade to develop smartphone radio chips that deliver faster download speeds. Ⓑ
—*Ian King*

Fresh Profits for Lucy

Streaming-video services such as **Netflix** and Amazon Prime once looked like mortal threats to syndication revenue for television networks and movie studios. Instead, the content owners have found deep-pocketed new customers. In June, **Amazon.com** shelled out about $200 million to license 4,000 old TV episodes from **Viacom**, which owns classics such as *I Love Lucy* and more-contemporary shows like crime drama *CSI*. For studios and networks, this streaming revenue is growing at double-digit rates, says Bloomberg Industries analyst Paul Sweeney. "It's been kind of found money for them." Ⓑ

SUBSCRIBE FOREVER

Software makers are converting consumers from licenses to subscriptions in earnest

In 2013 consumer software companies proved they could pull off the switch from one-time software purchases to an online subscriber model that costs customers more long term. Market researcher IDC estimates software subscription revenue has risen about 16 percent, to roughly $65 billion this year from $56 billion in 2012, and will approach $78 billion next year. IDC analyst Amy Konary says it's too soon for those software makers to declare victory, "but what they consider a success is having a [subscription] model out there, having customers choosing that approach."

Photoshop maker **Adobe Systems** was the boldest, moving its entire suite of applications to a subscription package called Creative Cloud. The boxed collection of the same programs used to cost $2,500; subscribers pay $50 a month. By mid-September the company was selling about 25,000 subscriptions a week, up from 8,000 a year earlier, when outright purchase was still an option. "We've exceeded our expectations thus far," says David Wadhwani, Adobe's senior vice president for digital media.

Microsoft hasn't given up the purchase model for its $140 to $400 suite of Office applications, but it has sold 2 million $100-a-year subscriptions to

Office 365 Home Premium since the product's debut in March. The subscription-based Office was Microsoft's fastest product to hit annual revenue of $1 billion.

There are benefits for users: They're guaranteed the latest features and security patches with no wait, surcharge, or trip to the store. Julia White, Microsoft's general manager of Office marketing, says her company can more quickly adapt to user feedback through the cloud, too. "We can see if they are using the new capabilities," says White. And with no need to maintain support for older programs, "we can deploy a lot more of our resources to future efforts."

For companies trying to shift business models, the tricky part is absorbing a short-term revenue hit. A subscription must be much cheaper than a license to entice customers to switch, meaning companies have much less cash in hand during the early going. At the end of its last quarter, Adobe's revenue fell from $871 million to $645 million. Microsoft experienced a similar drop and says the switch won't pay off until at least 2017.

Those companies can

R.I.P. BOXED SOFTWARE

SHORTCUTS TO NEW HARDWARE

Crowdfunding sites such as Kickstarter and Indiegogo have changed how hardware entrepreneurs raise money. Since Kickstarter's 2009 debut, donors there have pledged $90 million to 3,087 tech projects. But cash in hand doesn't guarantee a successful product launch. **Pebble**, which raised more than $10 million on Kickstarter for its smartwatch, began to ship watches to stores before some donors got theirs, causing a minor furor. Max Gunawan, whose shapable lamp, **Lumio**, has sold a few thousand copies, says, "There are so many times when I feel like I'm going to fail because I'm all alone." He's raised about $600,000 on Kickstarter.

Companies such as HWTrek and Dragon Innovation, which has advised Pebble, say crowdfunding in isolation is foolish. They're hawking design and production advice as a package along with crowdfunding. Whichever crowdfunder they

choose, hardware startups need to think more about next steps before asking for cash, says Cyril Eberswiler, founder of Shenzhen-based accelerator Haxlr8r. "Being ready to deliver pre-Kickstarter is becoming more critical," says Eberswiler, who takes a 6 percent stake in clients in exchange for help navigating Chinese manufacturing.

Kickstarter co-founder Yancey Strickler says the cottage industry emerging around crowdfunding ultimately will be a drag on small hardware makers. "That's how middlemen get created," he says. "That's how record labels came to be."

Gunawan, who visited Haxlr8r's Shenzhen digs, says he sees why startups might trade equity to ease the near-term strain of manufacturing. Although he doesn't want to give up a stake in his company, he says, "I'm a bit jealous of those folks." Ⓑ
——*Joshua Brustein*

afford to play the long game provided consumers continue to need their products. (Those relying more on occasional big paydays, like architectural and engineering software maker **Autodesk**, have been slower to shift.) Microsoft is betting Office users won't jump to **Google** Docs or **Apple**'s Pages. Subscription sellers are also counting on customers trained by **Netflix** and Hulu to subscribe to movies and TV shows—and license their iTunes music and Kindle e-books, rather than buying them—to keep growing more comfortable with the end of ownership. Expect more software to move to this model. Ⓑ ——*Sam Grobart*

Where is the telecommunications sector headed? Is your move to Ziggo, a Dutch cable company, your answer?

With Ziggo, the size of the company is what I was looking for. I wanted a more operational role, which means you have to be in a company which is smaller. And for the first time in my life, I will live abroad. It's probably like New York to Staten Island—that's the distance between Germany and the Netherlands. But it's a new language, and the business culture there is also much less bureaucratic.

When you look at the [telecommunications] industry, on the infrastructure side, the biggest challenge is increased politicization. Because getting fast, high-performance access to the Internet has become a general public demand throughout Europe, there is increasing pressure on politicians to ensure that, and therefore increased pressure on the private sector to make it happen.

Have any of the political initiatives proven constructive?

For the first time, after 15 years of wrong regulation, Commissioner Neelie Kroes [European commissioner for digital agenda] is addressing the needs of the industry better, but even these changes, which are just now being introduced, are not ideal for big network investments. By pleasing the public with price interventions and regulation, which are short-term and consumer-focused (and which are, by the way, to the disadvantage of consumers long term), they've so far limited private investments big time. The political attempt to keep the market highly fragmented, to keep almost a ruinous competition in place, to intervene directly when consumers don't like certain price elements or parts of the proposition of the service providers—all of that is a politically understandable reflex, but it's dead wrong.

So if you were gatekeeper, what would you do?

First and foremost, allow for consolidation within countries. In some of the smaller European countries, for instance, we still have four mobile operators, even though the network built out there is extremely expensive. So regulators should keep their hands out of it, because there is huge and heavy competition already established.

And they should allow for intramarket consolidation and cross-European consolidation. In Europe, we have hundreds of competitors, whereas in the U.S., you have only a few big providers.

What are some of the greatest opportunities for the industry now?

The biggest infrastructure opportunity is in providing an integrated, next-generation, high-speed network based on fiber and on vectoring technology, including LTE and Wi-Fi. At Deutsche Telekom, we call it "Always Best Connected." The second big opportunity is to consider yourself a platform for electronic distribution. It's why we're partnering with big and small Internet players.

And then, of course, the biggest opportunities for growth are the mobile Internet and "connected everything." Mobile Internet is more important than the entire Internet has been so far. And

EXPERT OUTLOOK

RENE OBERMANN, OUTGOING CEO OF DEUTSCHE TELEKOM

connected everything means machine-to-machine connectivity, many-to-many connectivity, intelligent networks. We're working in a number of subcategories there with a lot of effort in development, i.e., in the automotive sector or in telemedicine, in the health sector.

Any of these rise to the level of "disruptive"?

Well, in the positive sense, I think—no, let's start with the negative. I find it highly discomforting to learn every day about the alleged practices of secret services, which are damaging the trust of our customers. When I talk to corporate customers and to people every day, it's clear it's a growing concern.

My English is not the best, and I want to choose my words carefully. The atmosphere right now in Europe is not one of trust, and there's growing demand for security services and for

companies to protect customers against illegitimate espionage. There's a feeling that among friends, partner nations, that we shouldn't have to worry about being spied upon. We have great relations with the U.S. We have many friends and business partners. I want these not to be damaged. But there is the potential for real disruption here. So we need to reestablish that trust.

And what will that take?

Well, for instance, not spying upon us.

What excites you most about the future, more generally?

My problem is I find too many things exciting. The cloudification of networks—really creating a network which is extremely simplified and much faster to maintain and has a completely different architecture. That's one thing which fascinates me. I love it, I really—that's a subject we're doing with great ambition at DT. It's a project called TeraStream, and we are already in some countries very far ahead.

I love the opportunities with regards to cash replacement. I find it fascinating to think about a world where there is no more cash being handed out and printed and all that, but instead your wireless device is the device you do all your transactions with. It's your personal hub to the digital world and also to the world of payment and transport and everything. So the mobile Internet is the technological base, but then the applications on top—there seem to me endless opportunities.

And I like to think about when we have a gigabit transmission speed, everywhere in each corner of the world, when we'll eventually communicate via holograms.

That would be disconcerting, wouldn't it?

We could sit opposite to each other, having the discussion we are having now, and sharing a virtual reality deserving of the name.

Is that really something we'll live to see?

I will still be in business when we have that, absolutely, because we are now experimenting with a wireless network that goes up to 150-megabit speeds. So even if they're not ubiquitous, at least we'll have these things available to us in a couple of years. Technology is evolving fast. **B**
—*Diane Brady*