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THE UNITED STATES OF AMERICA
ONE HUNDRED DOLLARS

DOLLARS

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THE FUTURE OF MONEY

CASH, CHECKS, AND CREDIT CARDS—
WHO NEEDS THEM? THE NEW GLOBAL
CURRENCY IS FLEXIBLE, FRICTIONLESS,
AND (ALMOST) FREE.

Dave & Deb
by Daniel Roth



ILLUSTRATION BY AEGIR HALLMUNDUR

AVAILABLE AUTHORIZING PARTNER SERVICES



A SIMPLE TYPO GAVE MICHAEL IVEY THE IDEA FOR HIS COMPANY.

One day in the fall of 2008, Ivey's wife, using her pink RAZR phone, sent him a note via Twitter. But instead of typing the letter *d* at the beginning of the tweet—which would have sent the note as a direct message, a private note just for Ivey—she hit *p*. It could have been an embarrassing snafu, but instead it sparked a brainstorm. *That's how you should pay people*, Ivey publicly replied. Ivey's friends quickly jumped into the conversation, enthusiastically endorsing the idea. Ivey, a computer programmer based in Alabama, began wondering if he and his wife hadn't hit on something: What if people *could* transfer money over Twitter for next to nothing, simply by typing a username and a dollar amount? ¶ Just a decade ago, the idea of moving money that quickly and cheaply would have been ridiculous. Checks took ages to clear. Transferring money from one bank account to another could take days, as banks leisurely handed off funds, levying fees nearly every step of the way. Credit cards made it a little easier to pass money to a friend—provided that friend owned a credit card reader and didn't mind paying a few percentage points in fees or waiting a couple of days for the payment to process. ¶ Ivey got around that problem by using PayPal. Since 1998, PayPal had enabled people to transfer money to each other instantly. For the most part, its powers were confined to eBay, the online auction company that purchased PayPal in 2002. But last summer, PayPal began giving a small group of developers access to its code, allowing them to work with its super-sophisticated transaction framework. Ivey immediately used it to link users' Twitter accounts to their PayPal accounts, and his new company, Twitpay, took off. Today, the service has almost 15,000 users. ¶ That may not sound like much, but it sends a message: Moving money, once a function managed only by the biggest companies in the world, is now a feature available to any code jockey. Ivey is just one of hundreds of engineers and entrepreneurs who are attacking the payment ecosystem, seeking out ways small and large to tear down the stronghold the banks and credit card companies have built. Square, a new company founded by Twitter cocreator Jack Dorsey, lets anyone accept physical credit card payments through a smartphone or computer by plugging in a free sugar-cube-sized device—no expensive card reader required. A startup called Obopay, which has received funding from Nokia, allows phone owners to

Money Over Time
A brief history of
currency technology.
—BRYAN GARDINER



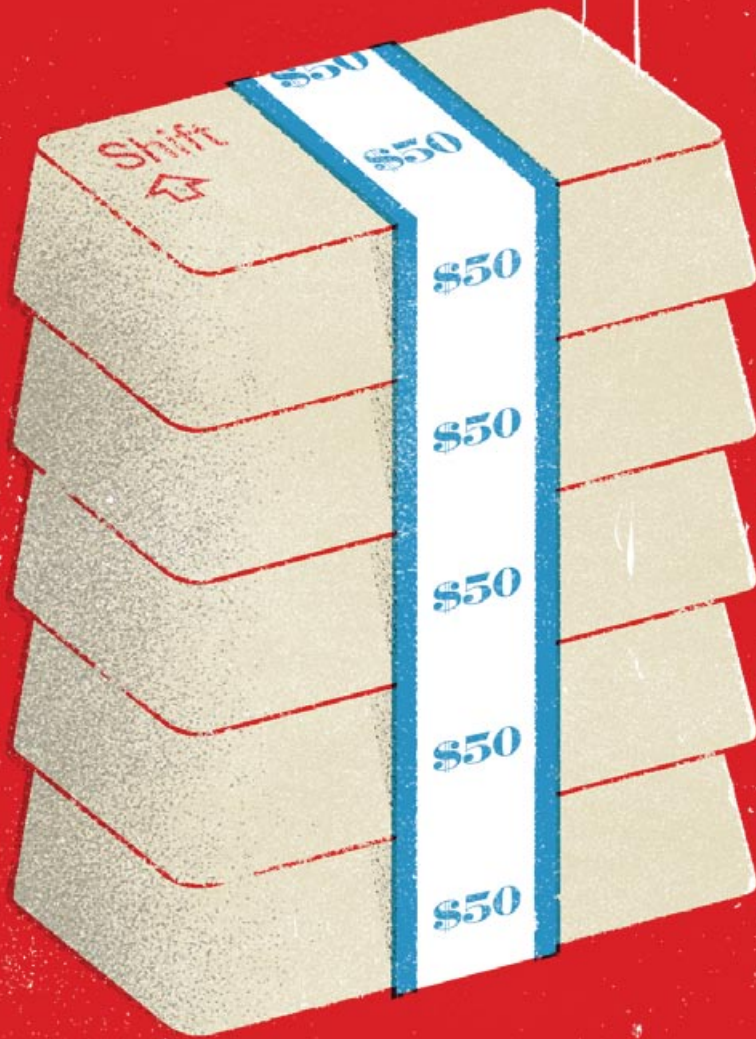


ILLUSTRATION BY HEADS OF STATE

PREVIOUS SPREAD: BENJAMIN FRANKLIN; CORBIS

transfer money to one another with nothing more than a PIN. Amazon.com and Google are both distributing their shopping cart technologies across the Internet, letting even the lowliest retailers process credit cards for less than the old price, cutting out middlemen, and figuring out ways to bundle payments to sidestep the credit card companies' constant nickel-and-diming. Facebook appears to be building its own payment system for virtual goods purchased on its social network and on external sites. And last March, Apple gave iTunes developers the ability to charge subscription fees through their applications, making iTunes the gateway for an entirely new breed of transaction. When Research in Motion announced a similar initiative last fall at a session of the BlackBerry Developer Conference in San Francisco, programmers crowded the room, spilling out into the hallway. About 20 percent of all online transactions now take place over so-called alternative payment systems,

according to consulting firm Javelin Strategy and Research. It expects that number to grow to nearly 30 percent in just three years.

But perhaps nobody is as ambitious as PayPal. In November, it further opened up its code, giving anyone with rudimentary programming skills access to the kind of technology and payment-industry experience that Ivey used to build Twitpay. The move could unleash a wave of innovation unlike any we've seen since self-publishing came to the Web. Two months after PayPal opened its platform, 15,000 developers had used it to create new payment services, sending \$15 million through the company's pipes. Software developer Big in Japan, whose ShopSavvy program lets people find an item's cheapest price by scanning its barcode, used PayPal to add a "quick pay" button to its app. LiveOps, a call-center outsourcing firm, built a tool that streamlined payments to its operators, turning what had been a nightmare of invoicing and time-tracking into an automated process. Previously, anybody who wanted to create a service like this would have had to navigate a morass of state and federal regulations and licensing bodies. But now engineers can focus on building applications, while leaving the regulatory and risk-management issues to PayPal. "I can focus on the social side of the business and not on touching money," as Ivey puts it.

PayPal is just the latest company to try to harness the creative powers of the open Internet. Google created a platform that lets anyone buy or display online advertisements. Facebook allows any developer to write applications for its social network, and Apple does the same with its iTunes App

Store. Amazon's Web Services provides developers the cloud-based processing power and storage space they need to build applications and services. Now PayPal has brought this same spirit of innovation and experimentation to the world of payments. Your wallet may never be the same.

THE BANKS AND CREDIT CARD COMPANIES have spent 50 years building a proprietary, locked-down system that handles roughly \$2 trillion in credit card transactions and another \$1.3 trillion in debit card transactions every year. Until recently, vendors had little choice but to participate in this system, even though—like a medieval toll road—it is long and bumpy and full of intermediaries eager to take their cut. Take the common swipe. When a retailer initiates a transac-

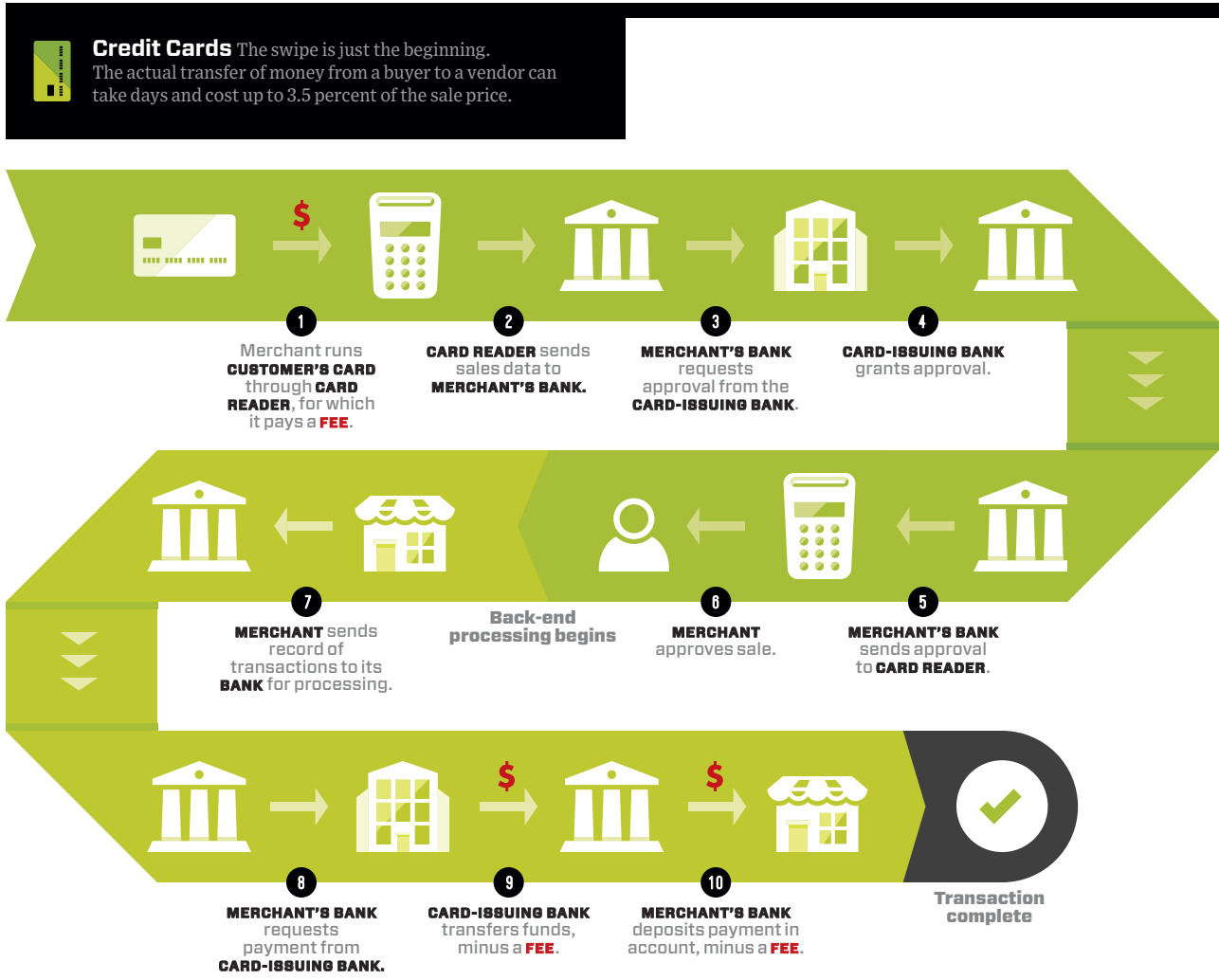


9000 BC: Cows

The rise of agriculture made commodities like cattle and grain ideal proto-currencies: Since everyone knew what a heifer or a bushel was worth, the system was more efficient than barter.

3 WAYS TO MOVE MONEY

Credit cards are expensive and inefficient. iTunes and PayPal streamline the transaction process. —B.G.



tion, the store's point-of-sale system provider—the company that leases out the industrial-gray card reader to the merchant for a monthly fee—registers the sale price and passes the information on to the store's bank. The bank records its fee and passes on the purchase information to the credit card company. The credit card company then takes its share, authorizes all the previous fees, and sends the information to the buyer's bank, which routes the remaining balance back to the store. All in all, it takes between 24 and 72 hours for the vendor to get any money, and along the way up to 3.5 percent of the sale has been siphoned away.

In the earliest days of credit cards, those fees paid for an important service. Until the late 1950s, each card was usually tied to a single bank or merchant, limiting its usefulness and resulting in a walletload of unique cards. But when BankAmericard—later renamed Visa—offered to split its fees with other banks, those banks began to offer Visa cards to their customers, and merchants began accepting Visa as a way to drive sales. Meanwhile, Visa and rival MasterCard—as well as distant competitors American Express and Discover—used their share of the fees to build

their own global technological infrastructures, pipes that connected all the various banks and businesses to ensure speedy data transmission. For its time, it was a technologically impressive system that, for a price, brought ease and convenience to millions of buyers and sellers.

But today, vendors are seeing fewer benefits from paying those fees, even as credit card companies have jacked them up over the years. Credit cards were once a way for a business to differentiate itself from competitors, but now that they've grown ubiquitous, nearly all vendors must accept them or risk losing a huge swath of customers. According to a 2003 study in the *Review of Network Economics*, every sale by credit card costs a merchant six times what the same sale with cash would run. (Cash comes with its own

Rate of Exchange One US dollar translated into various virtual currencies.

Values are approximate. Not all currencies are pegged to the dollar, and many are not intended to be exchanged for cash.

- SOCIAL NETWORK
- MASSIVELY MULTIPLAYER ONLINE ROLE-PLAYING GAME
- DIGITAL MARKETPLACE

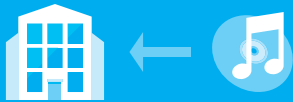


iTunes Apple's online store cuts credit card fees and friction by bundling a customer's purchases over time and processing them as one transaction.



1

CUSTOMER orders and downloads purchase from **ITUNES**.



2

ITUNES aggregates orders over a period of time, then requests payment from **CARD-ISSUING BANK**.



3

CARD-ISSUING BANK transfers payment, minus a **FEE**.

Transaction complete



PayPal Merchants don't have to wait to get their money; PayPal fronts them the funds immediately, then waits to get reimbursed by the customer's bank.



1

CUSTOMER makes purchase.



2

PayPal **ALGORITHMS** determine likelihood of sufficient funds in customer's bank account.



3

If approved, **PAYPAL** fronts money into **MERCHANT'S PAYPAL** account, minus a **FEE**.



5

PROCESSOR requests payment from **CARD-ISSUING BANK** (or customer's bank account).



4

PAYPAL sends transaction data to **THIRD-PARTY PROCESSOR**.



6

CARD-ISSUING BANK transfers payment to **PROCESSOR**.



7

PROCESSOR transfers payment to **PAYPAL**, minus a **FEE**.



Transaction complete

costs, such as requiring more oversight of cashiers, upkeep of vaults, and a bank's services to process it.)

Not that the store owner is ever quite sure how much a credit card transaction will cost. MasterCard and Visa charge hundreds of different rates—called interchange fees—for every type of card that runs through their networks; mileage cards tend to charge higher fees, for example. And if a retailer accepts one flavor of Visa, say, it has to accept them all, no matter the fee. In 1991, MasterCard had four fees, the highest of which had an interchange rate of 2.08 percent. Today it has 243 fees, and the heftiest one tops out at over 3 percent—more than a 50 percent jump. And yet the service provided has hardly grown any better, faster, or easier to access. “It seems really odd that credit card companies can

continue to charge a tax on the economy,” says Aaron Patzer, founder of the financial management service Mint.com, which is now owned by Intuit. “Outside the US government, they are the only entity that has the power to levy a fee across virtually every transaction. Maybe that made sense in the early 1960s, when computer infrastructure was expensive and proprietary. But now, with cheap bits everywhere, the actual cost to do a transaction is pennies.”

There is, in other words, a massive inefficiency to be exploited. And so, an army of engineers and entrepreneurs is rushing in, hoping to do to the pay-



1200 BC: Shells

Rare or exotic items like shells, whale teeth, and metals were used for trade by cultures around the world because their scarcity and beauty lent them great symbolic value. (The earliest Chinese character for money was even a cowry shell.)

ment world what has already been done to the music, movie, and publishing businesses—unseat a legacy industry built on access and distribution, drive the costs to zero, undercut the traditional middlemen, and unleash a wave of innovation. Square’s Dorsey sees his company as creating a new, open system that allows users to swap funds instantly, without a series of interlopers grabbing their share. “We bring an engineering discipline to this problem,” he says. “What we want to know is, how can we get right to the source?”

For businesses that depend on moving money, the distributed, lower-cost, easier-to-access future can’t come soon enough. Mitchell Wolfe, an ecommerce veteran who ran Compaq’s Canadian Internet sales team before moving on to a series of startups, has been wrestling with the payment industry for 15 years. “There’s friction all over the place,” he says. He once helped build an ecommerce system for a Persian rug vendor and was stunned to find that the rug dealer’s bank required it to keep \$250,000 in its account in case a charge was disputed. The lesson stuck. When he started bTrendie, a members-only site that sells clothes and gear for pregnant women and new mothers, he decided to do as much as possible through PayPal. Now he accepts payments from customers into the same PayPal account he uses to pay his vendors. The money flows instantly, bypassing direct contact with banks or credit cards. That means no charges for moving money internationally, no extra staffers, no long delays while he waits for transactions to process, and he can keep better track of his cash and data. For Wolfe, the old payment world is a vestigial appendage. “The less you have to deal directly with the banks and credit card companies,” he says, “the better off you are.”

The New Ways to Pay

The credit card is in decline. Here are a few hints of what might replace it. —D.R.

Twitpay

Type a friend’s Twitter handle, a dollar amount, and *twitpay* to transfer funds to their PayPal account.

Zong

Instead of entering credit card information anew for every online purchase, users fill in their phone number and the charge shows up on their monthly bill.

Square

The latest from Twitter cofounder Jack Dorsey, this ³/₄-inch cube turns any iPhone into a credit card reader.

GetGiving

This mobile app uses PayPal to enable charities to accept small donations without the usual exorbitant credit card transaction fees.

Hub Culture

Travelers can avoid the hassle and fees of swapping dollars for euros by transacting in virtual currency in this international network of workstations.

THIS IS



640 BC: Coins

Historians credit the Lydians of Asia Minor (now Turkey) with developing the first coins. Made of electrum—an amalgam of gold and silver—the innovation was promptly adopted by the Greeks, sparking a commercial revolution in the sixth century BC.

THE KIND OF revolutionary fervor that PayPal was always intended to foment. Peter Thiel, PayPal’s cofounder and a die-hard libertarian, launched the company as a means of creating a stateless monetary system, making it possible for anyone to switch, instantly and easily, between global currencies. “PayPal will give citizens worldwide more direct control over their currencies than they’ve ever had before,” he told new employees in 1999, according to the book *The PayPal Wars*.

“It will be nearly impossible for corrupt governments to steal wealth from their people.”

But for most of its history, PayPal acted more as an enabler—a way of extending the credit card model of payment into the online realm—than as a bomb-thrower. Customers didn’t want to use PayPal to escape the tyranny of government currencies. They wanted to use it to spend money online without having to give out their credit card information to a million different vendors. By the turn of the millennium, PayPal pretty much operated as an online credit card company, charging vendors a percentage of every transaction to move funds from a buyer’s bank account to a seller’s bank account. Still, there were some hints of PayPal’s revolutionary capabilities. Unlike credit card companies, PayPal had no need to build and maintain an expensive digital network between vendors and banks around the world; it operated over the Internet. There was no need for a credit card reader, cutting point-of-

sale system providers—and their vigorish—out of the equation. While credit card companies still paid fees to banks, a legacy from the days when they had to buy their cooperation, PayPal piggybacked on a communications system that enables digital transactions like direct deposits and automatic bill payment without charging a fee. Furthermore, PayPal users could keep their funds within their PayPal accounts, accruing interest and continuing to trade them with other PayPal users without ever once involving banks or anyone outside the PayPal ecosystem—a friction-free shadow

economy in its own right. All of these advantages meant that PayPal could charge lower transaction fees than traditional credit card companies. That may have been a good business model, but it wasn't exactly a game changer.

In recent years, many other companies have come up with their own PayPal-like innovations, creative tweaks to further squeeze some margins out of the traditional credit card model. Apple's iTunes and Research in Motion's payments program reduce transaction fees by bundling a customer's purchases before sending them to a credit card company for processing. (That's why you don't usually see a series of 99-cent charges on your credit card bill; they are processed as one lump sum.) Virtual currencies, from Microsoft Points to Linden Dollars, encourage

"in-world" trade, incurring credit card and banking fees only when their users buy in. By reducing their exposure to traditional transaction systems, these companies are able to wring extra pennies of profit out of each sale—which can aggregate into millions of dollars, turning their payment platforms into profit generators in their own right.

PayPal moved even further away from its revolutionary roots in 2002, when it was purchased by eBay for \$1.5 billion. Suddenly the service, always a favored payment method on the site, became almost entirely focused on making auctions easier. Between 2005 and 2008, PayPal went from serving as the payment provider for 47 percent of eBay auctions to facilitating more than 60 percent (eBay expects it to hit around 75 percent by 2011). That was a fine strategy as long as eBay was growing. But in CEO Meg Whitman's last years at the company's helm, as the auction platform started to see a slowdown in revenue growth, it became clear to the PayPal team that it was time to get aggressive again. PayPal started working with outside vendors, and by 2007 it was transacting \$47 billion worth of business a year—still a pittance compared to the trillions that moved through financial institutions. Scott Thompson, then PayPal's CTO, started meeting with Osama Bedier, vice president of merchant services technology, and his team. How, Thompson asked, could PayPal capture more of that business?

Bedier's team argued that PayPal's users seemed to have plenty of ideas. They had long pushed for PayPal to expand into new businesses—payroll, invoicing, business-to-business money transfers. But building out any one of those services would take years, and the timing wasn't right. Bedier pointed out that PayPal's



AD 800: Paper

A shortage of copper and the hassles of transporting heavy coins prompted China's Tang dynasty to start issuing paper notes. Dubbed "flying cash," this first paper-based money was used by merchants and the government.

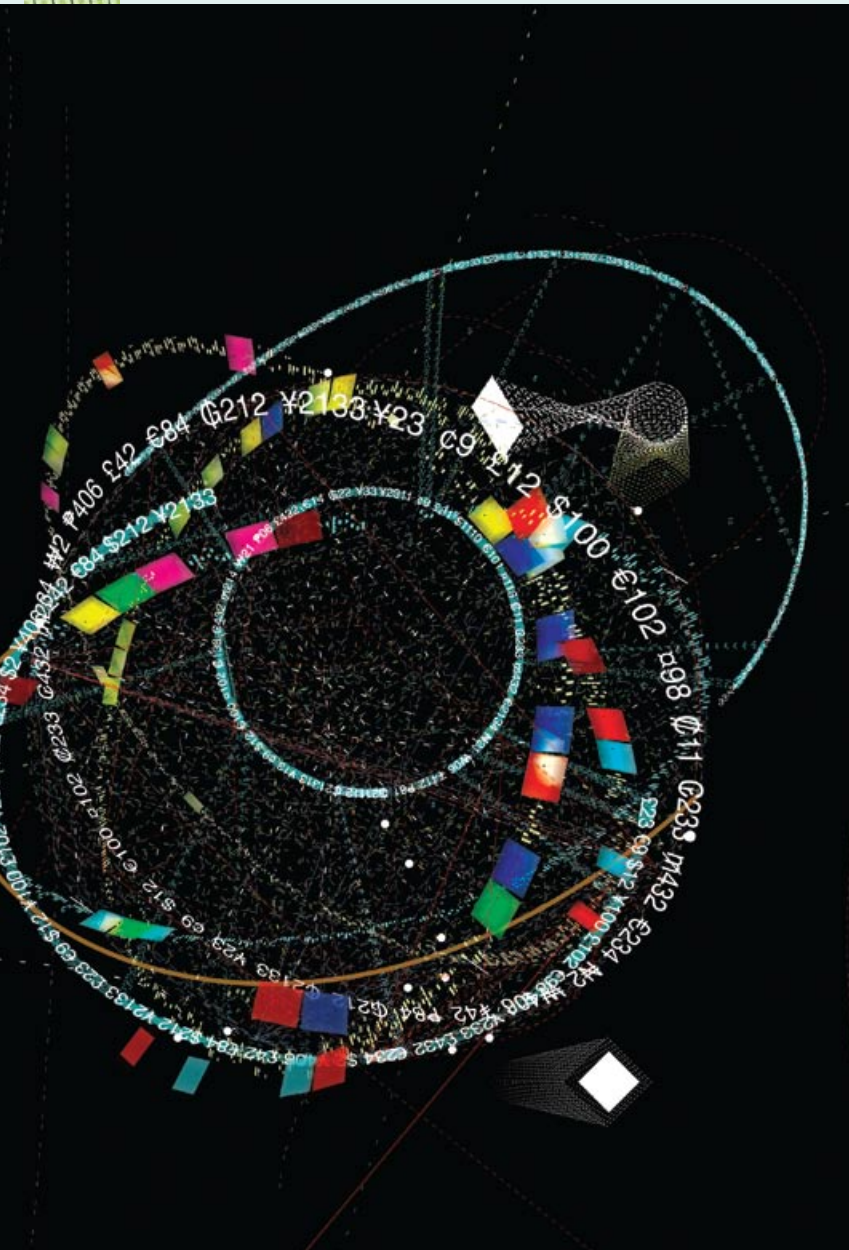


ILLUSTRATION BY **STUDIO TONNE**

users had been responsible for many of the company's most successful innovations: Users dragged PayPal onto eBay in the first place. (The company had initially resisted the move.) Other users cobbled together PayPal-enabled "tip jars," which quickly spread across the blogosphere. What if the company opened up its code, embraced its developers, and turned its service into a platform? What if PayPal asked its users to create the tools and functions that would make it grow?

Thompson loved the idea in theory but was skeptical that Bedier's team could pull it off. Thompson, who had recently left Visa, was hardly used to Silicon Valley's freewheeling, experimental culture. With his Boston accent, bushy Cliff Clavin mustache, and fondness for pleated pants and button-down shirts, he looked like a dotcom engineer's straight-laced father. "Where I come from, you can't just let developers come in here and open accounts and move money around," he says.

Bedier was used to blasting through objections. Born in Cairo, he had spent a few years in Oregon as a preteen while his father earned a PhD. When the family moved back to Egypt, Bedier put together a plan to return to the US. He persuaded his father to have a friend, an IT manager at Oregon State University, take legal guardianship. Bedier never left the States again. Now he turned his powers of persuasion on Thompson. He said he would prove he could make a more open system work.

But first he had to figure out whether developers would play along. So in late 2007, he started on a road trip to meet with the people who were already building on PayPal's limited open code. He met with more than 100 developers, most of whom were eager to help build an easier, more flexible system. PayPal had been requiring buyers and sellers to go through several steps to complete a transaction—go to its site, fill out forms, authenticate accounts. The developers envisioned something larger, a true digital currency that could be used on any Web site, that enabled money to move as easily as email: Send funds with a click, from and to anywhere and anyone on the Net.

In April 2008, Bedier led a meeting at eBay's North First Street headquarters, where he presented his idea to CEO John Donahoe and his lieutenants. When Bedier was finished, he was stunned to get applause. "It was like a lightbulb clicked on," Donahoe says. "I basically said, 'You have unlimited funding.' This is the highest-potential business I've ever seen in my career."

Bedier hired executives from the banking and airline industries to help him design the platform. Soon other PayPal engineers were asking to be transferred

to the project. They saw it as a return to PayPal's original ambitions, when Peter Thiel and his cofounder Max Levchin sought to create an entirely new currency—not just a tool to help people sell used roller skates to one another. (In homage to this legacy, Bedier's team called the project X.com, the name of Elon Musk's payment company, which PayPal merged with back in 2000.) In November 2009, PayPal released the platform. In addition to the do-it-yourself ethos, X.com would sport a feature that should have terrified the traditional payment conglomerates: a new fee structure that charged vendors about one-third of what credit card companies were charging.

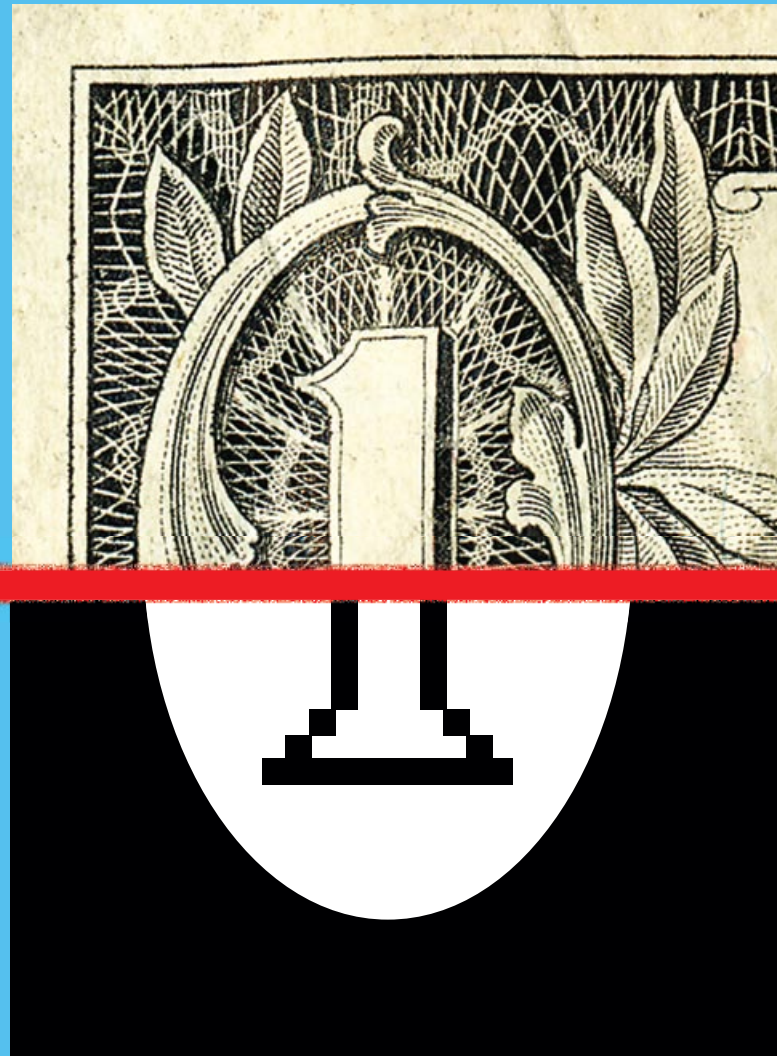


ILLUSTRATION BY OLIVER MUNDAY

WHATEVER THE FUTURE

OF PAYMENTS looks like, it will probably be brought about by people like Christian Lanng. A tall and wide 31-year-old with a booming, operatic voice, Lanng is sitting on the couch of his venture backer's house in Copenhagen. When he talks about the way banks and credit card companies process payments, he gets so upset that his entire body tenses and his voice rises until it's echoing off the stark white walls. "This is the main battleground of capitalism!" he says. "This is the heart of it."

Lanng rests his MacBook on a tree-stump table in front of him. For the last seven months, he and a dozen or so other coders have been building an e-invoicing company called Porta. (At press time, Lanng was planning to rename the company TradeShift.) Already, the service has signed up two regions in northern Europe and one of the biggest cities in Brazil, but Lanng envisions something much bigger. He sees dynamic invoices that pay themselves—that constantly monitor exchange rates, say, or the price of lumber, and then automatically send out an order to withdraw funds or to make a purchase just when the price is cheapest. Most of the information is already

available—there are plenty of databases that provide real-time pricing information, and he already has all of his clients' account information and vital data. But Porta doesn't have the technology or expertise to handle the transactions themselves. That's why Lanng is coding with X.com.

For now, PayPal has shied away from using revolutionary rhetoric. In discussing its role, company executives sound less like Thiel, bent on overthrowing the system, and more like a would-be thief strolling through a jewelry store, determined to appear nonthreatening. ("We're not an alternative to credit cards. We use credit cards in the PayPal wallet!" Donahoe says. "That's part

of the beauty of PayPal.") And consumers, who have traditionally been shielded from credit card companies' vendor fees and practices, may not care, or even notice, whether vendors use PayPal.

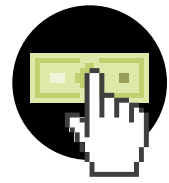
But even if PayPal never fires a shot, it is clear that people are looking for an alternative to credit cards. In 2009, US consumer credit card debt saw a sustained drop for the first time in decades, fall-

ing for 10 straight months as the recession took hold. Meanwhile, to fee-socked consumers struggling to make their payments, the credit card companies have become symbols of an uncaring, greedy bureaucracy. "As a longtime participant in the credit card industry, I'm interested to watch what's going on right now, because credit card companies are actually yanking in credit, they're raising fees, and people are choosing not to use credit cards," says Jack Stephen-

son, PayPal's head of strategy. "And the attitude a lot of people have about their credit card company is not a warm and fuzzy feeling right now. So I don't think, at least anytime in the next three to five years, that PayPal needs to do anything to convince people not to use credit cards online. I think people will make that choice on their own."

A generation ago, when people made the choice to switch to plastic, credit cards did not just replicate cash; they fundamentally changed how we used money. The ease with which people could make purchases encouraged them to buy much more than they had in the past. Entrepreneurs suddenly had access to easy—though high-interest—loans, providing a spark to the economy. Now, while it may be hard to predict what innovations PayPal's platform will enable, it's safe to say that the payment industry is going to change dramatically. As money becomes completely digitized, infinitely transferable, and friction-free, it will again revolutionize how we think about our economy. [W](#)

DANIEL ROTH (dr@danielroth.net) wrote about Oracle in issue 18.01.



1995: Digital

Cryptographer David Chaum wanted consumers to be able to transfer money digitally, just like banks. His e-cash was an anonymous form of money first issued by an American bank in 1995. The company declared bankruptcy in 1998, but the concept has since been built upon by dozens of digital and virtual currencies.



1949: Plastic

When the check for dinner arrived, Frank McNamara realized he didn't have enough cash to pay his bill. What the world needed, he realized, was an alternative to currency. One year later he returned to the same restaurant with what would become the first modern credit card, the Diners Club Card.