
A CAMBRIAN MOMENT

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A CAMBRIAN MOMENT

Cheap and ubiquitous building blocks
for digital products and services
have caused an explosion in startups.
Ludwig Siegele weighs its significance

PREFACE

It seems the world is awash with digital entrepreneurs.

An extraordinary boom in digital startups is about to reshape today's business landscape increasingly dominated by the technology giants like Google, Facebook, Twitter and Instagram.

We have written before about the creative disruption that occurs in a digital economy as well as the flurry of entrepreneurial activity that typically follows as apps are superseded within moments of being launched.

Today's digital startups are following in the tech giant's footsteps by disrupting an even greater number of industries from travel and banking to logistics and entertainment. Growing wildly, they are infiltrating every part of a hyper-connected economy. Rising investor confidence in digital businesses have caused vibrant startup hubs to flourish in the world's major cities.

These digital startups – that produce popular messaging and other iPhone apps – are able to compete for an important reason. They're built to do one very simple thing better than anyone else. Born out of complex software, they create new products that meet specific consumer needs by improving existing ones.

And this is where they get interesting. Startups can quickly and easily stitch together a brand new app from freely-available digital code and software at practically no cost. This has kick started a global entrepreneurial boom.

So when *The Economist* published an article comparing the explosion in digital startups to the Cambrian Explosion – a period in evolutionary history that began about 540 million years ago – we were intrigued.

The following article, 'A Cambrian Moment' says that's when the basic building blocks of life had just been perfected, allowing more complex organisms to be assembled more rapidly.

"Similarly, the basic building blocks for digital services and products have become so evolved, cheap and ubiquitous that they can be easily rearranged and replicated."

Every point in the article strikes a chord since we closely follow how each stride in new technology disrupts the status quo.

What's particularly fascinating is that with these new 'life' forms or 'building blocks', new digital products can be launched quickly and easily with almost no capital. Anyone with a new idea can do it.

At the heart of the article is a prediction that proliferating digital platforms will be the cornerstone of tomorrow's economy. The author refers to 'the platformisation of everything'. In the startup world that means new firms will combine and recombine open-source software, cloud computing and social networks to produce a new digital experience. Permutations are endless.

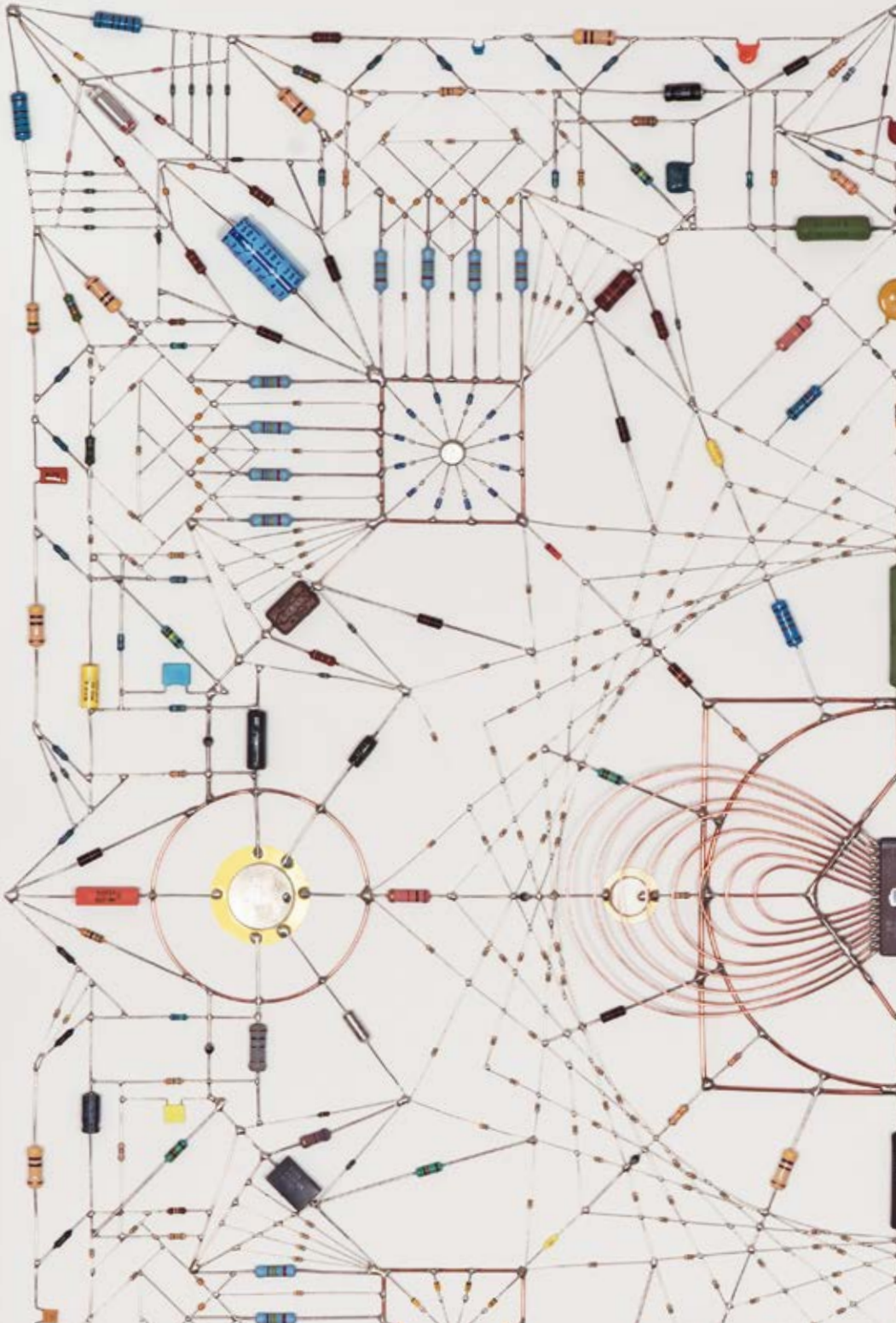
The author argues that if these 'building blocks' are available to everybody then once platform thinking takes hold – both in terms of providing platform services and consuming them – we'll see even more rapid changes across the whole economy. He concludes that companies must either turn themselves into open platforms or become agile 'ecosystems' to support startups.

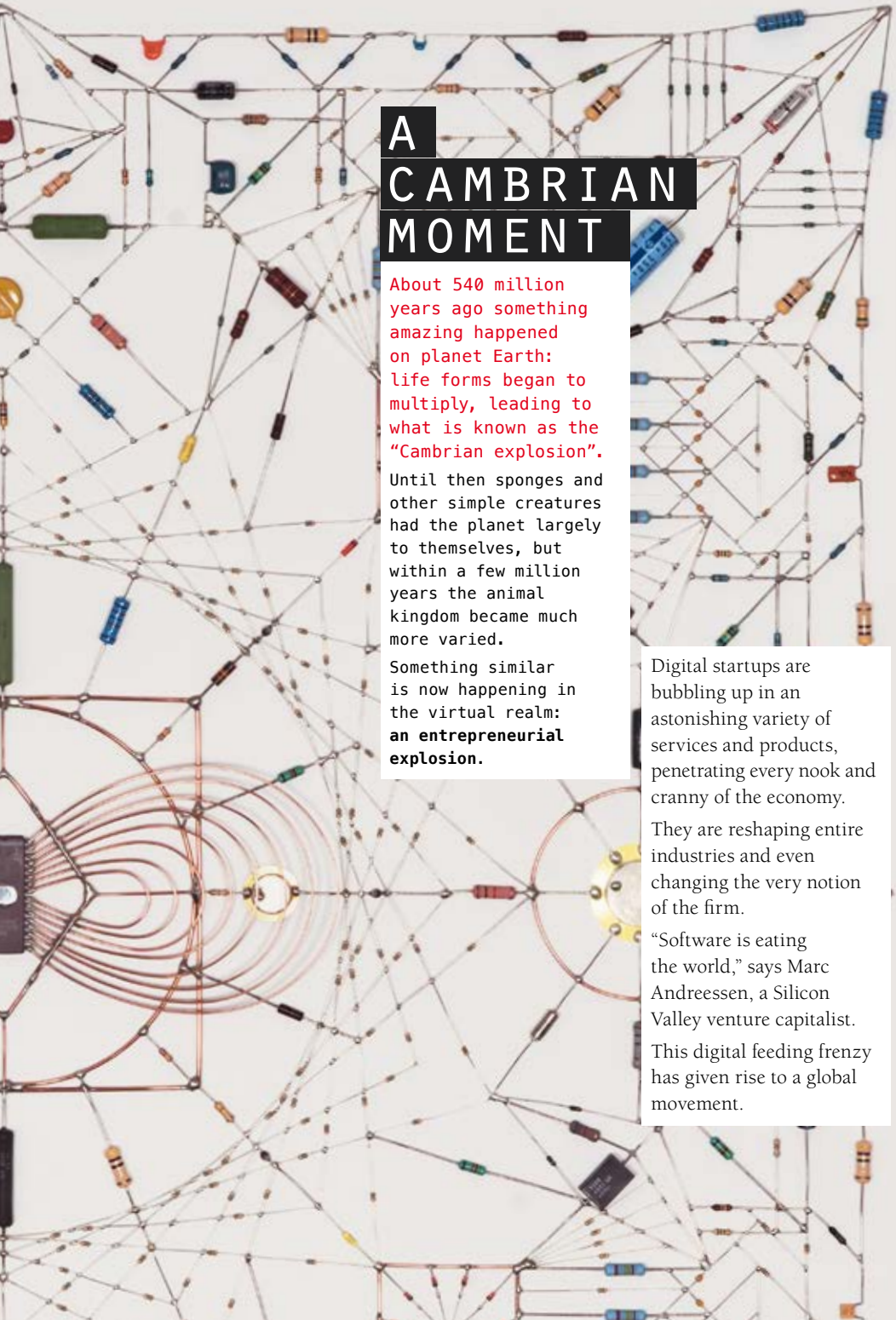
Smart companies know that iGoogle is already creating platforms that allow startups to offer banking services. Some smaller banks, including Bancorp, hold funds for online banking apps like Simple. Big payment processors, such as First Data and TSYS, are opening up their networks.

The impact of platformisation is monumental which makes this article both timely and compelling. We are rapidly approaching a time when customers will reach across platforms that are both digital and physical. This is referred to as 'the internet of things', which is when everything in everyday life, from household appliances to cars, is internet-controlled.

Whenever this kind of fundamental change occurs, the global business scene splinters into two: those companies that have a hard time adapting and those that power ahead. This will doubtless present many interesting investment opportunities.

KERR NEILSON
Managing Director
August 2014





A CAMBRIAN MOMENT

About 540 million years ago something amazing happened on planet Earth: life forms began to multiply, leading to what is known as the "Cambrian explosion".

Until then sponges and other simple creatures had the planet largely to themselves, but within a few million years the animal kingdom became much more varied.

Something similar is now happening in the virtual realm: **an entrepreneurial explosion.**

Digital startups are bubbling up in an astonishing variety of services and products, penetrating every nook and cranny of the economy.

They are reshaping entire industries and even changing the very notion of the firm.

"Software is eating the world," says Marc Andreessen, a Silicon Valley venture capitalist.

This digital feeding frenzy has given rise to a global movement.

Most big cities, from Berlin and London to Singapore and Amman, now have a sizeable startup colony ("ecosystem"). Between them they are home to hundreds of startup schools ("accelerators") and thousands of co-working spaces where caffeinated folk in their 20s and 30s toil hunched over their laptops.

All these ecosystems are highly interconnected, which explains why internet entrepreneurs are a global crowd. Like medieval journeymen, they travel from city to city, laptop not hammer in hand. A few of them spend a semester with "Unreasonable at Sea", an accelerator on a boat which cruises the world while its passengers code.

"ANYONE WHO WRITES CODE CAN BECOME AN ENTREPRENEUR – ANYWHERE IN THE WORLD," SAYS SIMON LEVENE, A VENTURE CAPITALIST IN LONDON.

Here we go again, you may think: yet another dotcom bubble that is bound to pop. Indeed, the number of pure software startups may have peaked already. And many new offerings are simply iterations on existing ones.

Nobody really needs yet another photo-sharing app, just as nobody needed another site for pet paraphernalia in the first internet boom in the late 1990s.

The danger is that once again too much money is being pumped into startups, warns Mr Andreessen, who as co-founder of Netscape saw the bubble from close by: "When things popped last time it took ten years to reset the psychology." And even without another internet bust, more than 90% of startups will crash and burn.

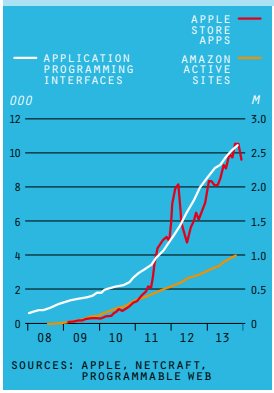
But this time is also different, in an important way. Today's entrepreneurial boom is based on more solid foundations than the 1990s internet bubble, which makes it more likely to continue for the foreseeable future.

One explanation for the Cambrian explosion of 540 million years ago is that at that time the basic building blocks of life had just been perfected, allowing more complex organisms to be assembled more rapidly.

Similarly, the basic building blocks for digital services and products – the "technologies of startup production", in the words of Josh Lerner of Harvard Business School – have become so evolved, cheap and ubiquitous that they can be easily combined and recombined.

Some of these building blocks are snippets of code that can be copied free from the internet, along with easy-to-learn programming frameworks. Others are services for finding developers, sharing code and testing usability. Yet others are "application programming interfaces" (APIS), digital plugs that are multiplying rapidly.

AWESOME WEB SERVICES



They allow one service to use another, for instance voice calls (Twilio), maps (Google) and payments (PayPal). The most important are "platforms" – services that can host startups' offerings (Amazon's cloud computing), distribute them (Apple's App Store) and market them (Facebook, Twitter). And then there is the internet, the mother of all platforms, which is now fast, universal and wireless.

STARTUPS ARE BEST THOUGHT OF AS EXPERIMENTS ON TOP OF SUCH PLATFORMS, TESTING WHAT CAN BE AUTOMATED IN BUSINESS AND OTHER WALKS OF LIFE. SOME WILL WORK OUT, MANY WILL NOT.

Hal Varian, Google's chief economist, calls this "combinatorial innovation". In a way, these startups are doing what humans have always done: apply known techniques to new problems. The late Claude Lévi-Strauss, a French anthropologist, described the process as *bricolage* (tinkering).

Technology has fuelled the entrepreneurial explosion in other ways, too. Many consumers have got used to trying innovative services from firms with strange names.

And thanks to the web, information about how to do a startup has become more accessible and more uniform. Global standards are emerging for all things startup, from programming tools to term sheets for investments, dress code and vocabulary, making it easy for entrepreneurs and developers to move around the world.

INVENT YOURSELF A JOB

Economic and social shifts have provided added momentum for startups. The prolonged economic crisis that began in 2008 has caused many millennials – people born since the early 1980s – to abandon hope of finding a conventional job, so it makes sense for them to strike out on their own or join a startup.

A lot of millennials are not particularly keen on getting a "real" job anyway. According to a recent survey of 12,000 people aged between 18 and 30 in 27 countries, more than two-thirds see opportunities in becoming an entrepreneur. That signals a cultural shift.

"Young people see how entrepreneurship is doing great things in other places and want to give it a try," notes Jonathan Ortmans of the Ewing Marion Kauffman Foundation, which organises an annual Global Entrepreneurship Week.

Lastly, startups are a big part of a new movement back to the city. Young people increasingly turn away from suburbia and move to hip urban districts, which become breeding grounds for new firms. Even Silicon Valley's centre of gravity is no longer along Highway 101 but in San Francisco south of Market Street.

Describing what sorts of businesses these startups engage in would at best provide a snapshot of a fast-moving target. In essence, software (which is at the heart of these startups) is eating away at the structures established in the analogue age.

LinkedIn, a social network, for instance, has fundamentally changed the recruitment business. Airbnb, a website on which private owners offer rooms and flats for short-term rent, is disrupting the hotel industry. And Uber, a service that connects would-be passengers with drivers, is doing the same for the taxi business.

Technological change has created a set of new institutions which governments around the world are increasingly supporting.

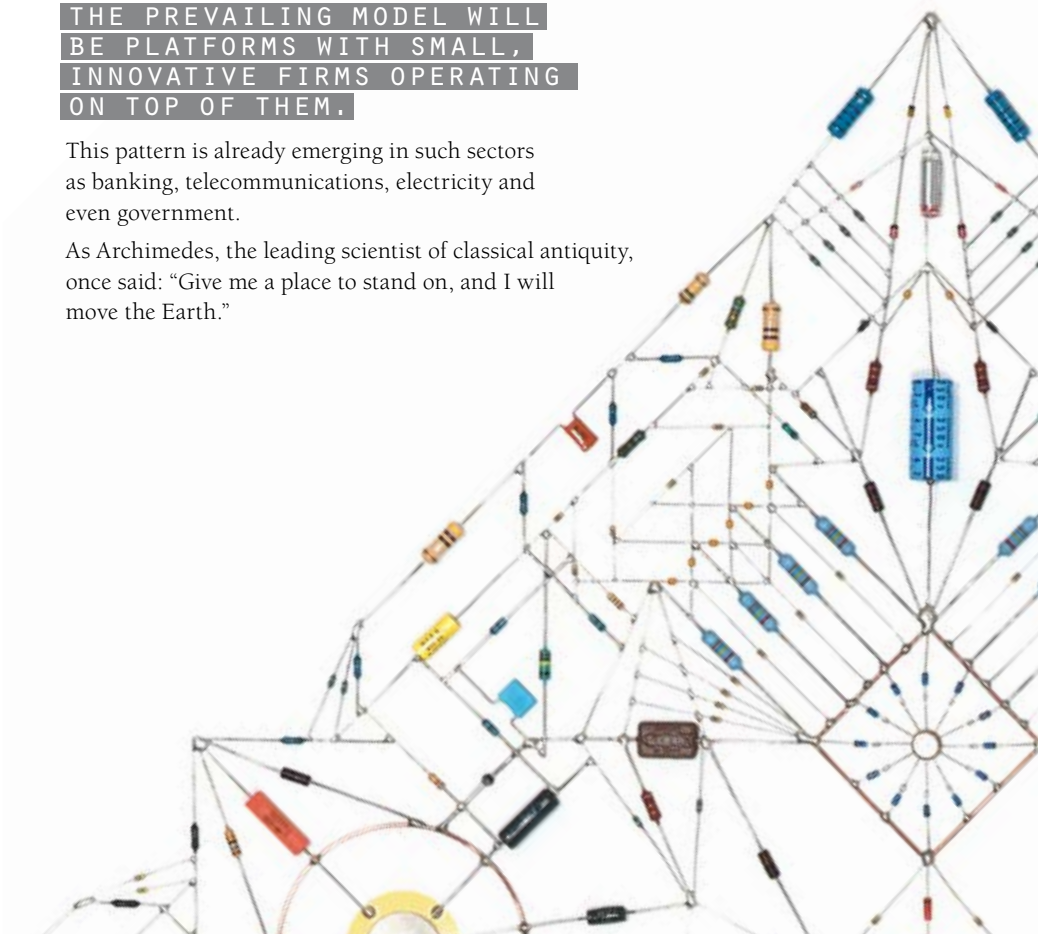
Startups run on hype; things are always "awesome" and people "super-excited". But this world has its dark side as well. Failure can be devastating.

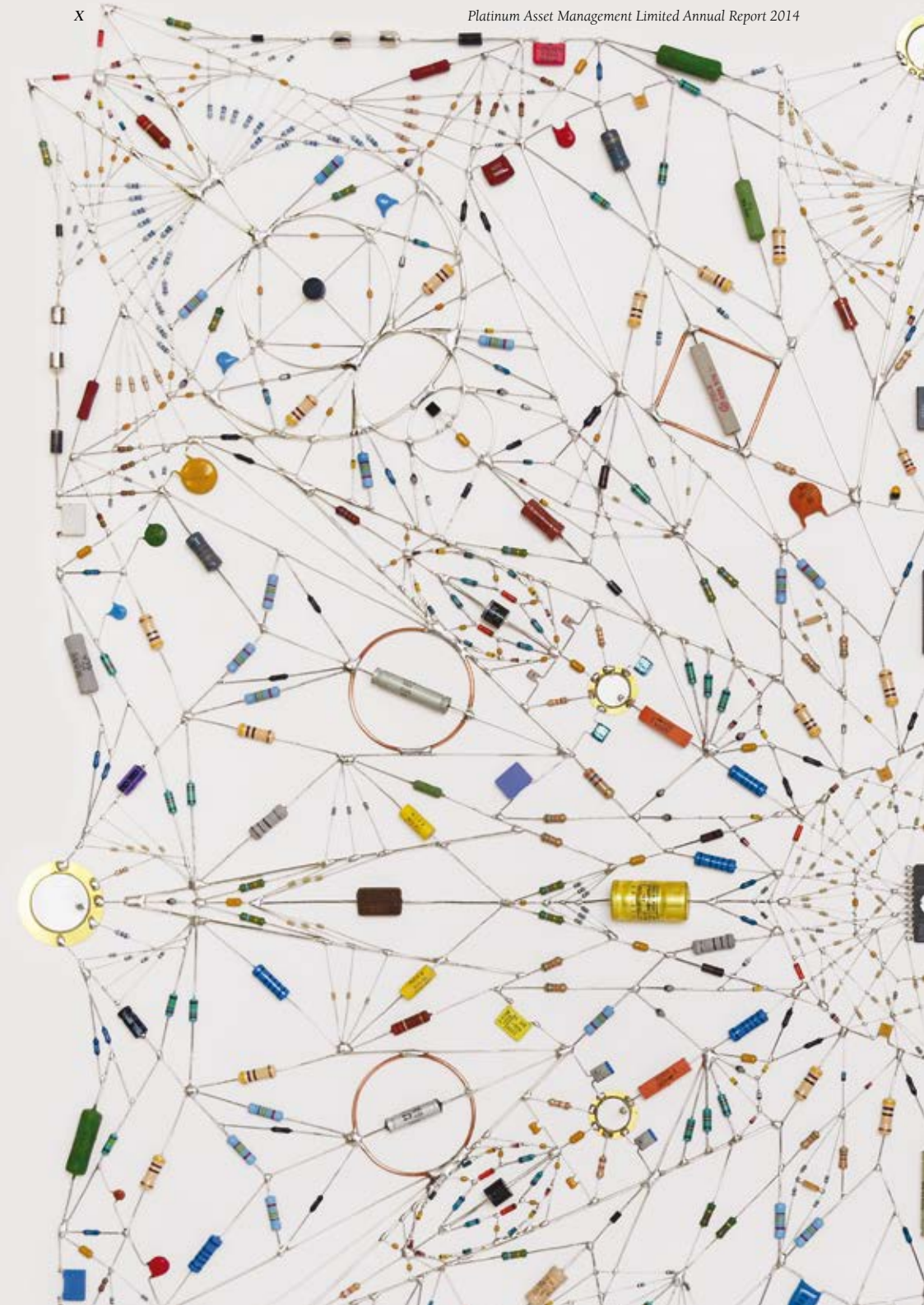
Being an entrepreneur often means having no private life, getting little sleep and living on noodles, which may be one reason why few women are interested. More ominously, startups may destroy more jobs than they create, at least in the shorter term.

THE WORLD OF STARTUPS TODAY OFFERS A PREVIEW OF HOW LARGE SWATHES OF THE ECONOMY WILL BE ORGANISED TOMORROW. THE PREVAILING MODEL WILL BE PLATFORMS WITH SMALL, INNOVATIVE FIRMS OPERATING ON TOP OF THEM.

This pattern is already emerging in such sectors as banking, telecommunications, electricity and even government.

As Archimedes, the leading scientist of classical antiquity, once said: "Give me a place to stand on, and I will move the Earth."





CREATING A BUSINESS

TESTING, TESTING

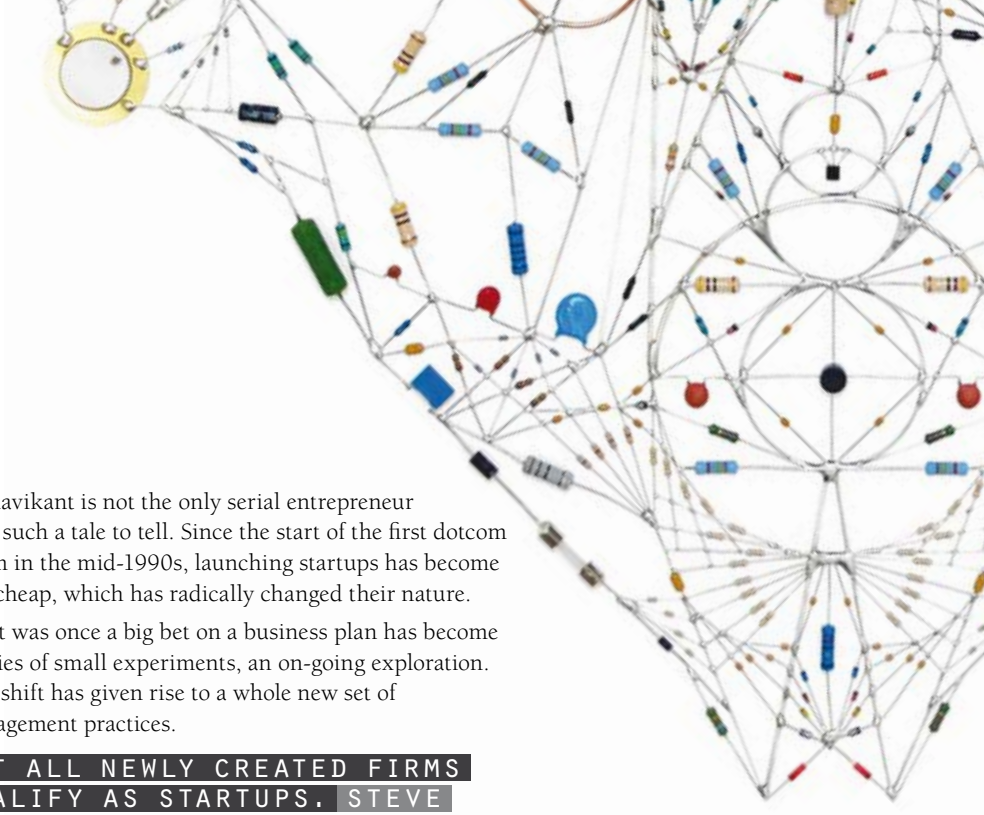
Launching a startup has become fairly easy, but what follows is back-breaking work

"We even had to host the servers in our own office." Naval Ravikant laughs as he describes how in 1999 he and some friends founded his first startup, Epinions, a website for consumer reviews.

They had to raise $8 million in venture capital, buy computers from Sun Microsystems, license database software from Oracle and hire eight programmers. It took nearly six months to get a first version of the site up and running.

By comparison, setting up Mr Ravikant's latest venture, AngelList, a social network for startups and investors was a doddle. The cost was in the tens of thousands of dollars, which he put up himself.

Hosting and computing power was available, for a small fee, via the internet. Most of the software needed was free. The biggest expense was the salary of the two developers, but thanks to nifty programming tools they were able to do the job in a few weeks.



Mr Ravikant is not the only serial entrepreneur with such a tale to tell. Since the start of the first dotcom boom in the mid-1990s, launching startups has become dirt cheap, which has radically changed their nature.

What was once a big bet on a business plan has become a series of small experiments, an on-going exploration. This shift has given rise to a whole new set of management practices.

NOT ALL NEWLY CREATED FIRMS QUALIFY AS STARTUPS. STEVE BLANK, A NOTED EXPERT IN THE FIELD, DEFINES THEM AS COMPANIES LOOKING FOR A BUSINESS MODEL THAT ALLOWS FOR FAST, PROFITABLE GROWTH. THE AIM IS TO BECOME A "MICRO-MULTINATIONAL", A FIRM THAT IS GLOBAL WITHOUT BEING LARGE.

Many of them are simply small businesses that use digital technology. A growing number are "social enterprises" – firms with a social mission.

In the past, startups almost universally began with an idea for a new product. Now the business usually begins with a "team" – often two people with complementary skills who probably know each other well.

These "founders" (a term now used in preference to "entrepreneurs") often work through several ideas before hitting on the right one.

Such flexibility would have been unthinkable during the first internet boom. Startups had to build from scratch most of the things they needed, particularly the computing infrastructure.

TODAY NEARLY ALL OF THE INGREDIENTS NEEDED TO PRODUCE A NEW WEBSITE OR SMARTPHONE APP ARE AVAILABLE AS OPEN-SOURCE SOFTWARE OR CHEAP PAY-AS-YOU-GO SERVICES.

A quick prototype can be put together in a matter of days, which explains the astonishing success of organisations such as Startup Weekend.

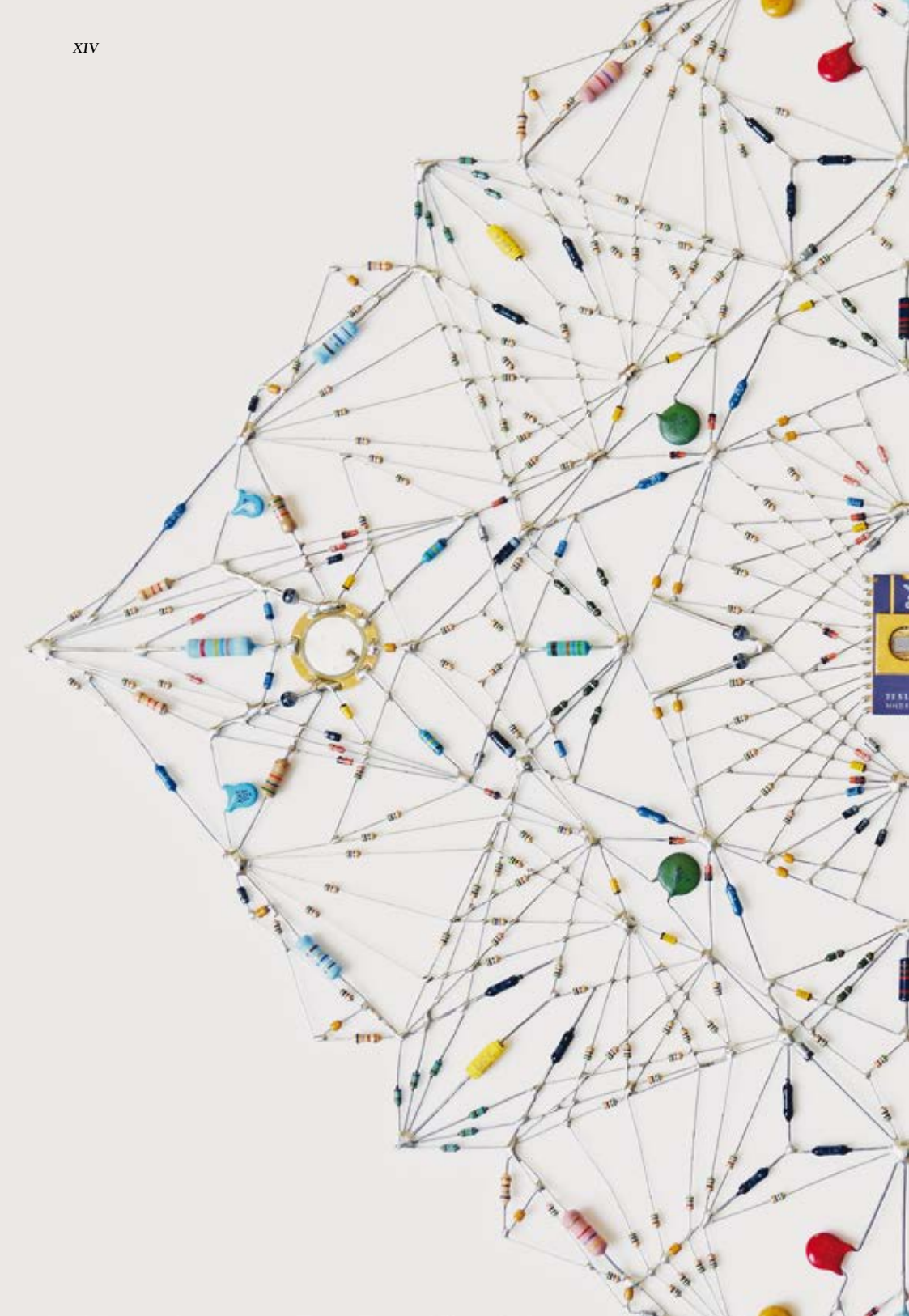
Since it was created in 2007, its volunteers have organised more than 1,000 weekend hackathons with over 100,000 participants in nearly 500 cities, including such far-flung places as Ulaanbaatar in Mongolia and Perm in Russia.

Perhaps the biggest change is that computing power and digital storage are now delivered online. At Amazon Web Services, the biggest "cloud" provider, the basic package is free and includes 750 hours of server time. And if a new website or smart-phone app proves hugely successful, new virtual servers can be added almost instantly for a small fee.

A whole industry of services to help startups tweak their offerings has sprung up, too. Optimizely, itself a startup, automates something that has become a big part of what developers do today: A/B testing.

In its simplest form, this means that some visitors to a webpage will see a basic "A" version, others a slightly tweaked "B" version. If a new red "Buy now" button produces more clicks than the old blue one, the site's code can be changed there and then. Google is said to run so many such tests at the same time that few of its users see an "A" version.

To see how people actually use their products, startups can sign up with services such as usertesting.com. This pays people to try out new websites or smartphone apps and takes videos while they do so. Firms can tell the service exactly which user profile they want (specifying gender, age, income and so on), and get results within the hour.



ACCELERATORS

GETTING UP TO SPEED

The biggest professional-training system you have never heard of

It feels like some prayer meeting. Two middle-aged men start by telling the audience how important it is to pitch in.

A booming voice announces the acts, greeted by loud cheers; then some enthusiastic young people jump onto the stage and start talking about their missions.

One wants to help women sell their unused clothes and shoes; another to teach children to manage money more responsibly; a third to bring the reinsurance market online at last.

TechStars, a chain of accelerators (in essence, schools for startups), is known for putting on a good show. But such graduation ceremonies can now be watched almost anywhere: everyday is "demo day" somewhere around the world.

Accelerators' champions already see them as the new business schools. "I'd rather get $100,000 and be a case study than pay $100,000 to read case studies," says Dave McClure, the founder of 500 Startups, an accelerator based in Silicon Valley.

The exact number is unknown, but f6s.com, a website that provides services to accelerators and similar startup programmes, lists more than 2,000 worldwide.

Some have already become big brands, such as Y Combinator, the first accelerator, founded in 2005. Others have set up international networks, such as TechStars and Startupbootcamp.

Yet others are sponsored by governments (Startup Chile, Startup Wise Guys in Estonia and Oasis500 in Jordan) or big companies. Telefónica, a telecoms giant, operates a chain of 14 "academies" worldwide. Microsoft, too, is building a chain.

PREDICTABLY, MANY OBSERVERS TALK ABOUT AN "ACCELERATOR BUBBLE". YET IF IT IS A BUBBLE, IT IS UNLIKELY EVER TO DEFLATE COMPLETELY. ACCELERATORS ARE TOO USEFUL FOR THAT.

Not only do they bring startups up to speed, provide access to a network of contacts and give them a stamp of approval. They also perform a crucial function in the startup supply chain: picking the teams and ideas that are most likely to succeed and serving them up to investors.

Business schools emerged in the second half of the 19th century to meet an educational need not provided for by other institutions. Accelerators are trying to fill a similar gap today. But they also call to mind another sort of educational institution that became popular during the dotcom boom: incubators.

The idea was to give startups a home and offer them technical, legal and other services. Yet many of the fledglings did not fly. The incubators often felt too cosy, and their operators had no interest in pushing out their tenants as long as they were paying rent.

The mixed success of incubators was one reason why Paul Graham, a former software entrepreneur and angel investor, chose a different set-up for Y Combinator, which went on to nurture such successes as Dropbox and Airbnb.

Y Combinator

Founders who take part in its programme have to move to Silicon Valley for the duration, but Y Combinator itself is not much more than an assembly hall in the heart of the region where participants meet for weekly dinners, listen to guest speakers and talk to Mr Graham and his partners.

It started as a summer programme and the roots still show, with courses running for three months, about the length of an academic summer break. Teams all join at the same time, in batches. Applicants are rigorously screened and the best invited for interview. For the latest batch 74 (including six not-for-profits) were selected from a field of more than 2,600. Those lucky few get paid between $14,000 and $20,000 to attend. In return they have to hand over about 7% of their firm's equity.

Y Combinator is still the most successful startup school. Its boss maintains a steely control reminiscent of Apple's late Steve Jobs, but others adopt a more open approach.

TechStars, the model for most accelerators, has even created a Global Accelerator Network for startup schools. This is not an entirely disinterested move: it aims to create a platform for like-minded organisations in which its programmes will have Ivy League status.

Founded in Boulder, Colorado, by David Cohen and Brad Feld, two angel investors, TechStars is also highly selective and takes an equity stake in the companies it accepts, and it, too, admits new startups in batches for three months at a time. But it feels more like a real school than does Y Combinator: founders toil together in classes of a dozen people, and they have teachers-cum-mentors who serve as sounding boards. The company has replicated its model in five American cities and in London.

The chain's classroom in Britain's capital is a floor in Warner Yard, a co-working space in the district of Clerkenwell.

TEAMS SHARE TABLES, BUT BANTER IS KEPT TO A MINIMUM. "GET SHIT DONE," READS ONE SCRIBBLE ON A BLACKBOARD. "WASTING TWO OUT OF SEVEN DAYS IS NOT AN OPTION," PROCLAIMS ANOTHER.

Dominating the room is a big digital clock counting down to demo day when they all have to present their projects.

THREE MONTHS IN PURGATORY

"That clock is basically your life," says Laurence Aderemi, chief executive of Moni, a mobile service designed to make it easy to send money abroad. He initially sat right in front of the clock, but moved his seat after it appeared in a nightmare.

Twelve-hour working days are at the lower end of the scale. If necessary, founders dispense with sleep altogether and work non-stop. Some sever all contact with friends and family during the programme.

Most accelerators do not have much in the way of a fixed curriculum. Managers of startup schools regularly meet up with the founders and organise a few classes on such matters as taxes and payroll. They also make extensive use of mentors, mostly experienced entrepreneurs, investors or other experts who have seen it all before.

For mentoring to work, founders and mentors have to be well matched, so TechStars programmes start with a mentoring marathon: over ten days founders meet more than 100 people for half an hour each.

SeedCamp, another accelerator based in London, regularly brings together two dozen invited startups with nearly 400 experts over the course of week.

This can be both useful and confusing. At a recent SeedCamp session the four mentors quizzing the founder of Legal-Tender, a marketplace for legal services, soon home in on the central problem of such a business: reaching a point where demand and supply feed on each other. But they offer different kinds of remedies: one suggests starting off with recruiting legal firms, another specialising in certain kinds of legal work, and a third working with a professional organisation.

Mentors usually do not get paid, but they seem to enjoy the experience. "It's rejuvenating my brain," says Kevin Dykes, a serial entrepreneur who is a regular at Startupbootcamp in Berlin, "but I also want to give back to the community."

Some mentors become paid advisers or even investors. At TechStars they are often the first people to put money into a startup after demo day.

Cynics say that mentoring is just a form of due diligence and a way of creating a "proprietary deal flow" – meaning privileged access to good deals. Some accelerators themselves have funds for additional investments in alumni's businesses, or work with venture-capital funds that put money in all the startups in a batch, sight unseen.

THEY SEE IT AS A BET ON AN INDEX FUND, HOPING THAT AMONG THE STARTUPS WILL BE A FEW BIG WINNERS – AN APPROACH TO VENTURE INVESTING KNOWN AS "SPRAY AND PRAY".

But demo day remains all-important for attracting investors. Startups are told to think about their pitches from the day they enter the programme. The last few weeks are often dominated by rehearsals. The presentations themselves are usually only a few minutes long, but they have to do far more than provide information about what the firm does, the pedigree of the founders and the size of the market.

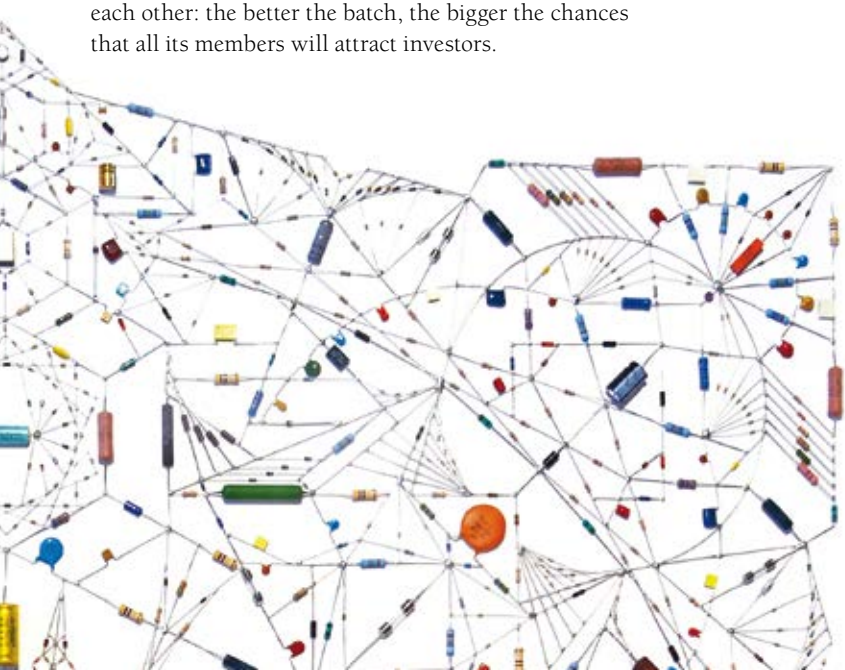
To persuade an investor to ask for a follow-on meeting, they must be masterpieces of storytelling about the startup's chances of success.

"You have to pull them into your reality-distortion field," says Paul Murphy, the founder OP3Nvoice, another TechStars London startup that sells technology to search audio and video recordings.

THE COMPETITION IS NOT SO MUCH THE OTHER FIRMS PRESENTING BUT THE INVESTOR'S SMARTPHONE, WHERE ANOTHER MESSAGE IS ALWAYS DEMANDING ATTENTION.

When you add it all up, accelerators are quite different from business schools. "One helps you with that startup, the other provides you with a framework for 20 years," says Jon Eckhardt, who heads the entrepreneurship centre at the University of Wisconsin-Madison and has co-founded an accelerator.

Still, he thinks, for most founders, startup schools are probably worthwhile. Much of the learning takes place among the founders themselves, says Susan Cohen of the University of Richmond, Virginia, who has written a dissertation on the subject. Teams are keen to help each other: the better the batch, the bigger the chances that all its members will attract investors.



But founders may lose a slice of equity and time, which is at a premium in the fast-moving tech world. "You know what I'm tired of? Rich guys launching 'startup accelerators' so they can rip off new startup founders," said Ryan Carson, a British entrepreneur, on his blog.

Others worry that startup schools drain scarce talent from fast-growing companies and accelerate too many ideas that struggle to find funding.

More fundamentally, it remains to be seen whether accelerators are good business. For many, making money is not the goal: big companies often launch them to tap into the startup community or as a marketing exercise; governments subsidise them to foster their entrepreneurial ecosystem; and many angels see their investment in them as a way of giving back. But most accelerators that take equity in their startups hope that at least some will return a respectable multiple of the investment.

It will take time to find out whether those hopes are fulfilled. Most accelerators were established after 2010, and most startups that have gone through them are still works in progress. Research about accelerators is in its infancy and there are no generally agreed ways to evaluate their performance.

182
ACCELERATORS
NURTURED
MORE THAN
3,000
START-UPS

RAISED
$3.2B
IN FUNDING
GENERATED
$1.8B
IN "EXITS"

Still, a financial picture of the industry is starting to emerge. Jed Christiansen, who works for Google in London, tracks 182 accelerators which have nurtured more than 3,000 startups.

Between them, those have raised $3.2 billion in follow-on funding and generated "exits" worth $1.8 billion. This landscape is dominated by American firms, with Y Combinator and TechStars franchises leading the pack.

This suggests that accelerators are a winners-take-most market. Founders are highly mobile, and the best will try to get into the leading startup schools, making it harder for the rest to turn a profit.

"There will be a washing out," predicts Alex Farcet, the founder of Startupbootcamp.

But accelerators alone will not ensure success. It takes a much broader ecosystem for a startup to thrive.

BUSINESS COMMUNITIES

ALL TOGETHER NOW

What entrepreneurial ecosystems need to flourish

The term "ecosystem" for economic clusters was popularised 20 years ago by James Moore, then a business consultant and now a human-rights advocate, who was fond of ecological metaphors.

These days the emphasis is less on "eco" than on "system".

For some experts, such as Daniel Isenberg of Babson College, entrepreneurial ecosystems are made up of "domains", including markets, policy and culture.

Others describe them as collections of actors that play certain roles, such as providing talent, finance and infrastructure. Yet others talk about them as a set of "resources" entrepreneurs can draw on.

In some ways, ecosystems can be seen as exploded corporations. Finance departments have been replaced by venture-capital funds, legal ones by law firms, research by universities, communications by PR agencies, and so on.

All are nodes in a loose-knit support network for startups that does what in-house product-development teams used to do.

Silicon Valley is the original entrepreneurial ecosystem, but in recent years such communities have popped up all over the world. They often form in places where young people want to live: Berlin, Boulder, London.

Perhaps the most unexpected one is Amman's; despite the political turmoil in the region and a civil war in Syria next door, Jordan's capital has a few hundred startups. Israel boasts the largest number of startups per person.

DON'T BE SELFISH

"Startup Communities" by Brad Feld, co-founder of the TechStars accelerator network, is a to-do list for "building an entrepreneurial ecosystem in your city", as the subtitle puts it. Mr Feld describes startup communities as self-governing bodies of craftsmen akin to medieval guilds.

The first point of his "Boulder Thesis" (named after the city in Colorado where he lives) is that entrepreneurs must lead. A second is that a startup community must be open to anyone who wants to join. But the main message is that you must "give before you get".

For an individual, giving before getting is good business. In a fast-moving and uncertain industry he may need someone's help some day.

"It's about building social capital," says Hussein Kanji of Hoxton Ventures, a London venture-capital fund. More important, though, business in ecosystems is not a zero-sum game.

TOM EISENMANN OF HARVARD BUSINESS SCHOOL EXPLAINS THAT STARTUP COLONIES ARE PLATFORMS WITH STRONG NETWORK EFFECTS, A BIT LIKE WINDOWS AND FACEBOOK: THE MORE MEMBERS THEY HAVE AND THE MORE ACTIVITY THEY GENERATE, THE MORE ATTRACTIVE THEY BECOME.

This helps explain some of these ecosystems' other characteristics: their tolerance of failure, the endless succession of startup-related talks, meetings, parties and, above all, the constant hype. But what really gets those network effects going is "exits" – a sale to a bigger company or a listing on a stock exchange.

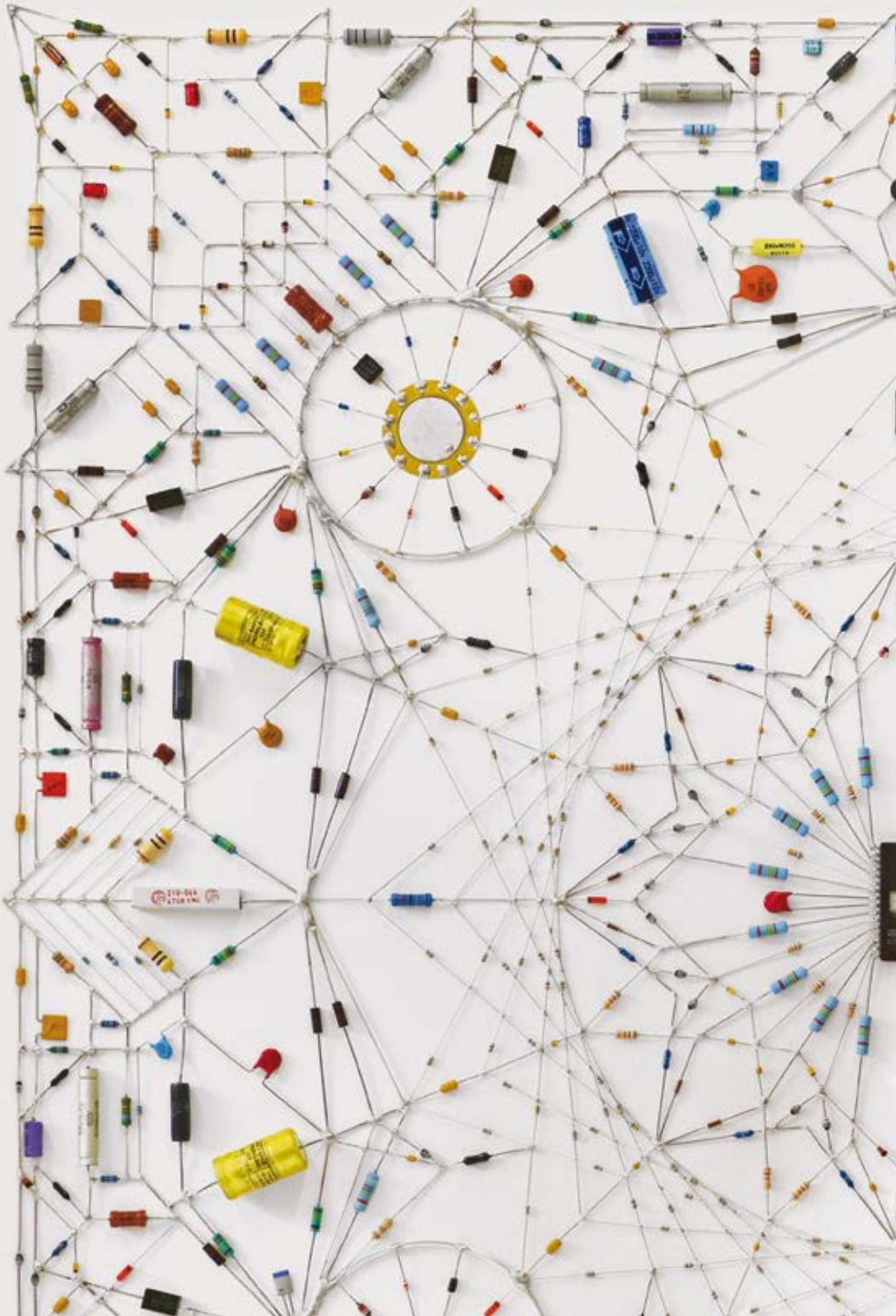
Newly enriched founders often become investors themselves and employees start their own companies. Silicon Valley spawned a succession of "clans" emerging from companies such as Fairchild Semiconductor, Netscape and PayPal.

Government policy can make a big difference. Even in Silicon Valley, defence dollars during the second world war and the cold war primed the pump before venture capital took over.

But ecosystems are more fragile than their leaders' confident manner suggests. Network effects can easily go the other way. And governments have to tread carefully because national ecosystems increasingly form part of larger global organisms. Founders and investors, already used to entrepreneurial globe-trotting, will readily consider moving to another place if it seems to have more to offer.

Often that place is America. With its huge market and vast pool of venture capital, it is still the destination of choice for founders the world over, even though the country's restrictive immigration policy since September 11th 2001 has made it more difficult for them to settle there.

If Asia and Europe do not watchout, their best startups could still end up in Silicon Valley or in one of America's newer ecosystems, such as Austin, Boulder or New York.



PLATFORMS

SOMETHING TO STAND ON

Proliferating digital platforms will be at the heart of tomorrow's economy, and even government.

Providing the right platform is sometimes all it takes.

Instead of planning new pedestrian plazas by the usual bureaucratic means, New York City's department of transportation just marks an area on a street with temporary materials and then lets local organisations, architects and citizens decide what to do with it.

The programme has so far produced 59 plazas, including the Pearl Street Triangle in Brooklyn, a small urban oasis with big potted plants and shaded seating.

In the physical world, platforms can be simply something to stand or build on, like a New York City street.

They can also be basic inputs for many other activities and products.

Railways allowed services such as mail order to develop; the power grid brought forth a plethora of electrical household appliances; and standardised containers boosted global trade.

Even Barbie dolls can be seen as platforms for all kinds of profitable add-ons, such as shoes, wigs and handbags.

But although physical platforms have been around for a long time, the idea did not attract much attention until the rise of the software industry in the 1980s and 1990s, explains Michael Cusumano, also of MIT Sloan School of Management.

The industry quickly split into two parts: operating systems (the platforms) and applications that ran on top of them.

Bill Gates, the founder of Microsoft, realised much earlier than his rivals that power (and thus profit) rests with those who control the operating system, in his case Windows.

He also saw that the key to creating a successful platform is building a thriving ecosystem around it to get the network effects going.

The more programs that run on Windows, the more users will want it, and therefore the more attractive it will be to developers.

BEYOND RAILWAYS

Some platforms are internal to a company. In the car industry a vehicle's main components, including steering, suspension and power train, are often shared by different models.

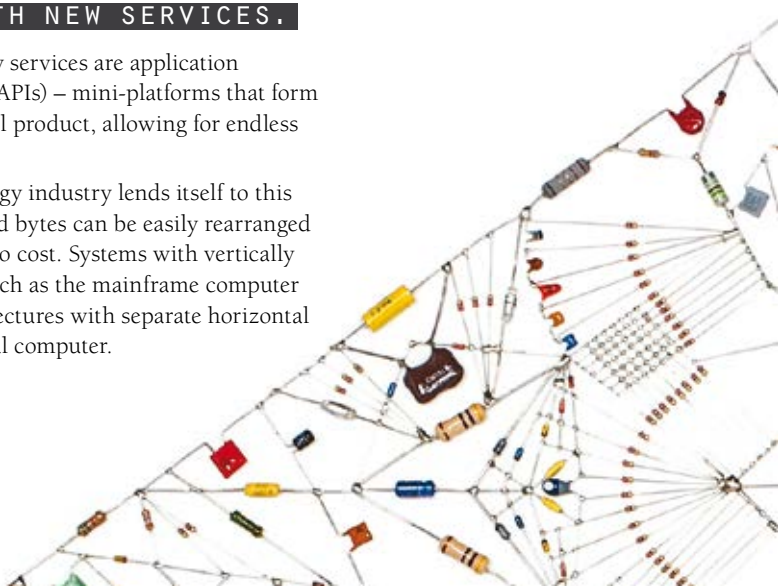
Other platforms, such as Windows, serve an entire industry. Yet others are "closed", meaning that access is tightly controlled, as for Apple's iPhone. The most widespread are the "open" ones, which everyone can use without asking, such as Linux, the open-source operating system.

Intrigued by Microsoft's success and its subsequent antitrust woes, academics such as Annabelle Gawer of Imperial College Business School dug deeper and found that platforms are a common feature of complex systems, whether economic or biological. The core building blocks are kept stable so that the other parts can evolve more rapidly by combining and recombining them and adding new ones.

THAT IS WHAT IS HAPPENING IN THE STARTUP WORLD: NEW FIRMS COMBINE AND RECOMBINE OPEN-SOURCE SOFTWARE, CLOUD COMPUTING AND SOCIAL NETWORKS TO COME UP WITH NEW SERVICES.

In fact, many of these new services are application programming interfaces (APIs) – mini-platforms that form the basis of another digital product, allowing for endless permutations.

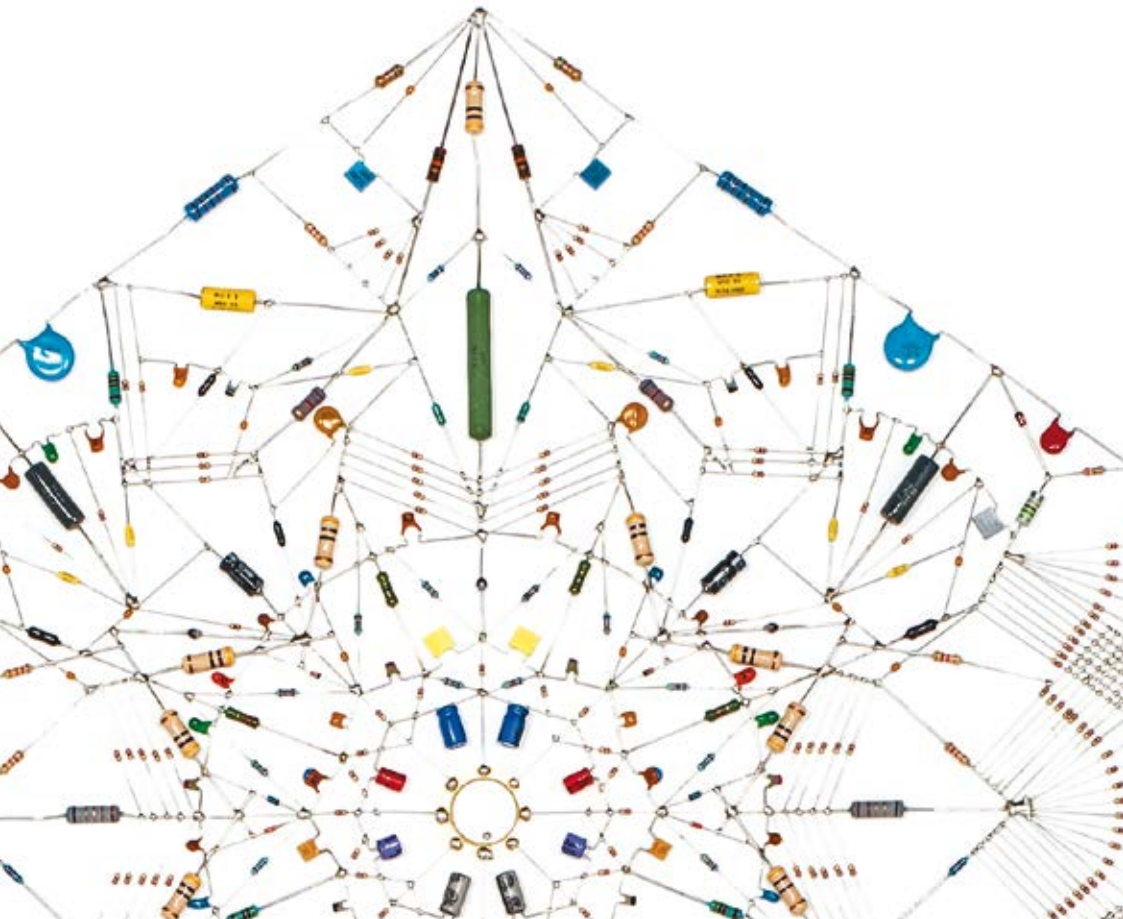
The information-technology industry lends itself to this treatment because bits and bytes can be easily rearranged and replicated at almost no cost. Systems with vertically integrated components such as the mainframe computer tend to give way to architectures with separate horizontal layers such as the personal computer.



Today the IT sector looks like a very flat inverted pyramid: the bottom, where economies of scale rule, is made up of just a few powerful platforms; the top, where creativity and agility are at a premium, is becoming ever more fragmented. There is not much in between.

As software eats more and more industries, they will increasingly take on this shape, predicts Philip Evans of Boston Consulting Group.

By lowering transaction costs, IT allows big chunks of the economy to reshape themselves and turn into what he calls "stacks" – industry-wide ecosystems that will have large platforms at one end of their value chains and a wide variety of modes of production at the other, from startups to social enterprises and communities to user-generated content.



STACKING UP

Outside the IT industry such stacks have only just begun to form. In finance, credit-card networks have long operated as platforms, allowing banks to issue their own plastic money.

Yodlee, which aggregates financial data for more than 55 million bank customers, now allows startups and other firms to plug into its systems. Some smaller banks, including Bancorp, also see themselves as platforms, keeping the books for innovative online banks such as Simple. Big payment processors, such as First Data and TSYS, are also expected to open up their networks.

In telecommunications and electricity, regulators have pushed firms to go horizontal by forcing them to unbundle their services. As power grids become cleverer, smart-meter apps are likely to appear. A new grid in Amsterdam, for instance, is set up in such a way that startups can use it to develop energy-saving applications.

Powerful platforms will also emerge in industries that produce piles of data, such as health care. They can provide startups with opportunities to mine the data to find digital material for new services.

This "platformisation" is spreading even to the very stuff of life. Synthesising DNA is still much more expensive than sequencing it, but the costs are coming down rapidly, and an ecosystem for this ultimate platform is already beginning to form.

Half a dozen cities around the world are now home to bio-hacker spaces (such as New York's Genspace) where genetic hackers learn how to build simple biological machines. Autodesk, a software firm, is developing design tools for DNA, code-named "Project Cyborg".

As with hardware, America's west coast and China's Pearl River Delta may be able to collaborate on this one day – though not everyone would welcome the idea because the implications of such biological machines can be quite scary.

Silicon Valley is already home to a few biosynthesis startups, for example Cambrian Genomics, which is developing a machine to print DNA cheaply. Shenzhen is the base of BGI, formerly known as the Beijing Genomics Institute, which does DNA sequencing on an industrial scale.

IN BUSINESS THE EFFECTS OF PLATFORMS ARE ALREADY MAKING THEMSELVES FELT. COMPANIES MUST EITHER TURN THEMSELVES INTO ONE OR BECOME AGILE ECOSYSTEMS, COMPLETE WITH STARTUPS AND ACCELERATORS, SAYS JOHN HAGEL OF THE DELOITTE CENTRE FOR THE EDGE, A RESEARCH ARM OF DELOITTE, A PROFESSIONAL-SERVICES FIRM.

Coca-Cola, for instance, is planning to launch accelerators in nine cities, including Berlin and Istanbul. Such efforts will change the understanding of what constitutes a firm, says Mr Hagel.

The spread of platforms will bring radical changes for workers, too. Many more will become founders or be employed by startups. "They will be labourers in the technological gardens where a thousand flowers bloom, but only a few will grow to become really big," says Thomas Malone of the MIT Sloan School of Management.

And experts note that some people may find it hard to get used to such a fast-moving world of work.

Governments will also have to adapt. Antitrust authorities will need to be alert because platform operators, which are open quasi-monopolists, will have strong incentives to maintain their dominance.

The most powerful of them, such as Amazon, Facebook or Google, will amass huge amounts of information and will form the central data banks for the knowledge economy.

No less than companies, governments will have to consider what role they want to play in this new world. Currently they resemble a "vending machine" offering a limited set of choices, says Tim O'Reilly, an internet expert. But they would work much better as a platform for a "thriving bazaar" of government services, offering basic building blocks that others can use.

This suggests that the state needs to limit what it does but do it well. "It has to be both narrower and stronger," says Paul Romer of New York University. In a future digital world big business and big government may play similar roles, as platform managers and curators of ecosystems.

Cities or even governments may offer services to other cities and countries in fields such as online identity and regulatory oversight.

ALL IN ALL, THE IMPACT OF PLATFORMISATION WILL BE MONUMENTAL. THOSE WHO SEE THE CURRENT ENTREPRENEURIAL EXPLOSION AS MERELY ANOTHER DOTCOM BUBBLE SHOULD THINK AGAIN.

Today's digital primordial soup contains the makings of the economy and perhaps even the government of tomorrow. ■

The Economist, "Special Report Tech Startups, A Cambrian moment", January 18th, 2014.

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