Baillie Gifford™

Future Focus

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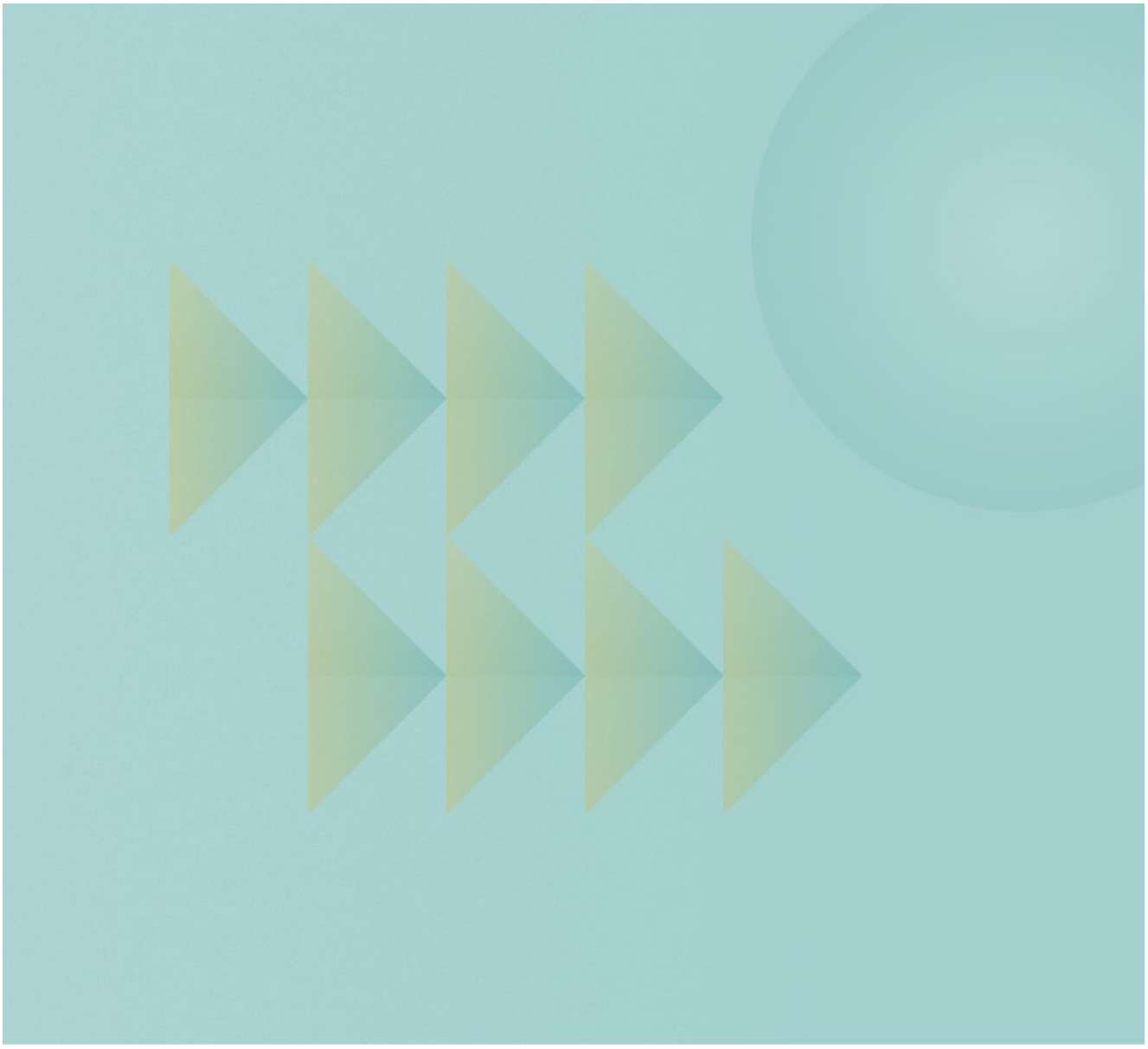


All investment strategies have the potential for profit and loss, capital is at risk. This paper is intended solely for the use of professional investors and should not be relied upon by any other person. It is not intended for use by retail clients.

Welcome to the inaugural edition of *Future Focus*, a series of exploratory articles on investment specially tailored to US financial professionals.

We have hand-picked a selection of Baillie Gifford articles that we think give you insight into how we explore the world, how we uncover groundbreaking companies led by innovative leaders, and ultimately, how we can develop your portfolios. We aim to provide you with fascinating stories that bring the firm's investment strategies to life.

As long-term growth investors, it's vital that our research is drawn from a wide range of sources. This starts with recruiting from a diverse pool of academic and cultural backgrounds. The result is an investment floor filled with an eclectic blend of genuinely curious minds. After all, to outperform, we have to think differently.

That said, we don't profess to have all the answers. That's why Baillie Gifford partners with over 20 academic institutions and industry experts around the globe. This helps to unlock our understanding of how the world is evolving – and which companies are at the forefront of change.

We pursue outliers, that small cohort of companies that generate meaningful returns. We aim to leverage their long-term competitive advantages to generate significant returns for clients.

Our unique partner-ownership structure, established in 1908, means we have no outside shareholders. This enables us to be patient and allows for the realization of the gains that come with holding investments over extended periods.

In this launch edition we explore the distinct benefits of founder-led companies, we hear from an intrepid investor as he explores companies in Seoul and Mumbai, we discuss how mental models can lead us on a path of discovery. We highlight the technology shaping our futures and speak with 'evolutionary economist', Prof Eric Beinhocker, to discuss how companies must adapt to evolving needs.

Future Focus is a biannual publication for financial intermediaries looking for diverse thought pieces, global perspectives and actionable insights. We hope you enjoy this and future editions as much as we enjoy crafting them for you.

- **Matthew Coyle and Joseph Stellato,** Client Relationship Directors

Why technical leaders have the advantage in the AI era

In the age of AI, having a leader with technical expertise can make all the difference. Investment manager Tom Slater explores how Meta, Shopify, Roblox and Spotify all benefit from chief executives with deep understanding of developing technologies.

Tom Slater, Investment Manager

Mark Zuckerberg: more chips please. © Shutterstock / Frederic Legrand – COMEO

In combat, the US Air Force follows a protocol called the OODA loop: observe, orient, decide and act. Experience shows that agile pilots who cycle through it quickest are more likely to win dogfights.

The process also applies to business. We've observed that 'technical leaders' often gain the upper hand when stakes are high precisely because their expertise helps them speed through the loop to outmanoeuvre the competition. These chief executives don't need to write and test software or configure datacentres themselves but do require a deep understanding of the technologies and complexities involved.

We live in a world of exponential technological progress, where companies constantly have to adapt to innovations. But the pace of evolution isn't constant. Sometimes, there are periods of relative stability.

Take the 2010s. We knew the main parts of the technology stack – the internet, mobile communication, satellite navigation, etc – and the challenge was to find novel, effective uses for them.

However, artificial intelligence means the 2020s might be more like the preceding period when many of those foundational technologies were still being established, and computer capabilities were in flux. At times like these, you want a leader who doesn't need consultants to tell them what a developing technology can and can't do and who can spot how their business can best exploit it to move quickly and gain a first-mover advantage.

So, as an investor in exceptional growth, Baillie Gifford benefits from owning companies with technical leaders and plenty of potential AI applications. One of these is Meta.

Zuckerberg's conviction

Founder Mark Zuckerberg's credentials hardly need rehashing. Ever since coding the original version of Facebook in his Harvard University dorm room, he has repeatedly demonstrated an ability to turn emerging technologies into practical products at speed.

"Some of the most rewarding work involves getting deep into the details of technical projects," he wrote years later, after building an AI system as a personal challenge to identify visitors to his home and entertain his daughter.

To illustrate how Zuckerberg's deep knowledge can pay off, consider his outsized purchase of NVIDIA's top-of-the-range H100 AI chips in 2022. Meta needed extra processing power to improve its Reels short video recommendations to catch up with ByteDance's TikTok. Rather than simply buying enough chips to achieve this, Zuckerberg doubled the order. He foresaw that Meta would soon need extra capacity, even though he didn't yet know what for.

This aggressive investment in infrastructure was a non-obvious use of capital at the time. But it paid off. When OpenAI revealed its ChatGPT chatbot, others rushed to buy H100s, constraining supply and causing a price spike. However, Meta was able to develop its generative AI large language model (LLM) Llama and the services it powers more quickly and cheaply than it could have done otherwise.

In the past, we recognised Zuckerberg's ability to allocate capital as a strength, as demonstrated by his acquisition of Instagram and WhatsApp. He saw the potential in these assets long before others. However, we had concerns that regulators would prevent further takeovers of this scale. What's now changed is that AI gives Zuckerberg new ways to exploit his skill at spending on the right things.

Meta has many ways to profit from Llama. It has already made its platforms more attractive to advertisers by letting them automatically generate text tailored to their brands and adjust images to suit whether they appear on Facebook Stories, Instagram's Explore grid, third-party apps or elsewhere.

Even more promising is Meta's use of Llama to power chatbots for businesses. The AI agents can handle customer queries, take bookings and make sales on Messenger and WhatsApp. About three billion people use one or both of these chat apps, but historically their revenues have been meagre. Now, there's a massive opportunity to make money.

Intriguingly, Meta has made Llama open source, meaning others can access, modify and distribute it for free. That's in stark contrast to OpenAI, Google and others that lock their code away and charge a fee for access to their models to recoup some of the billions of dollars of training costs.

Zuckerberg's insight is that by making Llama free for others to use on their own hardware, the wider development community will help find ways to reduce its running costs, which might be more valuable to Meta in the long run. Furthermore, he undermines his competitors' business models in the process.

Shopify's AI shift

Shopify is another portfolio company benefiting from technical leadership. Chief executive Tobi Lütke taught himself how to program in BASIC on an Amstrad computer in the 1990s and continues to find inspiration in learning computer languages. In fact, he credits one – Nix and its focus on reproducibility – with directly influencing a human resources shake-up that led Shopify to become more consistent and efficient at allocating staff to projects.

Lütke has also applied his engineer's mindset to Shopify's core offering: software to help merchants sell goods online. The company initially focused on providing smaller businesses with a complete solution. But over the past decade, it has also targeted larger, more lucrative enterprise customers. These clients tend to want more customisation.

So the firm launched Shopify Plus, which offers functions such as product search and shopping carts as individual modules. And more recently, it added Shopify Functions, which lets merchants override the software's default behaviours by adding their own code.

Shopify could only achieve this because, in 2016, Lütke decided to shift its service's underlying architecture from a monolithic, highly interconnected model, in which even a small change to the system could cause a cascade of problems, to a component-based design. This meant each part would have its own boundary and be developed and maintained independently.

His critical insight was that your architecture defines the range of business strategies you can pursue.

Today, Shopify is at another turning point. Lütke has told staff that AI will lead to a "decade of high velocity and massive change" and should become their focus.

Early efforts include Sidekick, a chatbot assistant that makes it easy for merchants to use natural-language requests to run their stores, such as by offering sale discounts or altering which products have prominence. In addition, Shopify is making things easier for customers with better-informed search results, recognising, for example, that a request for 'Christmas-themed shoes' should surface red-and-green footwear.

It's not yet clear how AI will reshape commerce. Perhaps virtual agents will eventually anticipate our needs and negotiate prices for us. However, having a technical leader gives Shopify the best chance of strategic flexibility in the future.

Roblox chats

Generative AI is also reshaping what's possible at Roblox. Its chief executive, David Baszucki, began his career by writing a popular 2D physics simulator for the Macintosh computer in the 1980s. Its success inspired him to develop a 3D follow-up that took advantage of the cloud and people's ability to play together, which became the video game platform.

One of the company's fundamental strengths has been Baszucki's unwavering focus on what's important to Roblox's audience. For example, the firm has prioritised making creators' games run without lag when many players are interacting rather than trying to provide photorealistic graphics or more video frames per second.

The firm is taking a similar pragmatic approach to AI. For example, in February it began using an LLM to automatically translate chats in real time between players conversing in any of 16 supported languages. It has also developed tools that suggest code to game developers and help them design characters and other virtual items.

These steps magnify the experiences creators can deliver on Roblox, encouraging players to spend more time and money on the platform. However, the firm has avoided using the most powerful AI models, as processing each query would have been cost-prohibitive.

Instead, it has contributed to more economical open-source alternatives based on Baszucki's understanding that Roblox's competitive advantage lies in the wealth of proprietary data to which it can apply those models.

Spotify and artificial artists

Spotify's founder, Daniel Ek, is a fourth example of a technical leader and the one who introduced me to ChatGPT. He was gripped from the start, becoming one of the first to license OpenAI's technology to power Spotify's AI DJ, which entertains subscribers between tracks.

Generative AI is likely to lead to an explosion in new material on the audio platform. It will make it easier to remix existing songs and create new ones. Entirely manufactured artists may even become commonplace. The ramifications are also huge for the podcasts and audiobooks Spotify hosts.

One of Spotify's challenges has been agreeing on how much the record labels and creators earn from each streamed song. How will that change in a world of AI content? How will the service's algorithms account for different subscribers' perceptions of the material? And how will Spotify avoid becoming oversaturated with artificial artists?

These are unanswered questions. However, having somebody who deeply understands the technology and is agile in decision-making is invaluable when navigating a rapidly changing environment.

We, too, must keep cycling through the OODA loop to observe, orient, decide and act regarding how artificial intelligence affects our portfolio. But, as discussed, that goes far beyond thinking about the technology.

The coming changes will play out over many years, and we will gain our edge from broad exposure to smart, adaptable leaders from whom we can learn. In the AI age, partnering with such entrepreneurs has never been more critical.

Author

Tom Slater
Investment Manager

Tom joined Baillie Gifford in 2000 and became a partner in 2012. After serving as deputy for five years, he was appointed joint manager of the Scottish Mortgage Investment Trust in 2015. He is also head of the US Equities Team. He has worked in the Developed Asia, UK Equities and Long Term Global Growth teams. He graduated BSc in Computer Science with Mathematics from the University of Edinburgh in 2000.

Trip Notes: Seoul and Mumbai

Discover the South Korean retailer with faster delivery times than Amazon and the Indian bank capitalising on the country's rising middle class. Baillie Gifford's Lawrence Burns shares details of a recent trip to Asia and why he expects to invest in more exceptional companies in the region.

Lawrence Burns, Investment Manager

The Lotte World Tower on Seoul's Han River

As a first-timer in Seoul, I was struck by how the giant metropolis felt at once huge and compressed. About 26 million people live in and around South Korea's capital, over half the country's population. And the city itself is home to nearly twice as many residents per square foot as New York, making it one of the most concentrated on the planet.

My hotel was close to the Lotte World Tower, a slender 123-storey cone climbing over half a kilometre high. Through enormous windows at the top, I took in the urban sprawl radiating from both banks of the Han River. To the north, countless tower blocks stretched towards Mount Bukhan's granite peak. A little over 20 miles beyond lay North Korea.

Seoul's human density is a boon to Baillie Gifford holding Coupang. The nation's leading ecommerce firm has said 70 per cent of South Koreans live within 10 minutes of one of its warehouses. That has enabled its Rocket Delivery service, which out-Amazons its US counterpart by guaranteeing delivery of items ordered before midnight by seven the next morning.

This is also one of the few places in the world where the economics of selling fresh groceries online are compelling. It helps that Coupang's deliveries are so fast that its transit vehicles don't need cold-chain storage. It also matters that retail space in Korea is so expensive and thus sparse that brick-and-mortar stores offer a limited and costly choice of goods.

I was told the cheapest place to buy milk in Korea is on Coupang. It is therefore remarkable, but perhaps not entirely surprising, that Coupang claims to have the biggest fresh grocery business in Korea out of both online and offline competitors.

Coupang's progress

I visited Coupang's HQ just after the Lunar New Year, the local equivalent of dropping by shortly after Christmas. Founder-leader Bom Kim had recently come to see us in Edinburgh, so I took the chance to get better acquainted with chief financial officer Gaurav Anand, an online retail veteran with experience in the US and India. He proved just as evangelical as Bom about Coupang's mission to offer the best selection, prices and convenience.

We discussed the advantages of fresh groceries and the company's expansion into Taiwan, where it has just opened a second logistics centre and plans a third. It's challenging the island's leading player, Shopee, owned by another of our holdings, Singapore-based SEA.

We believe each business has different strengths. Coupang is stronger in standardised products with fast delivery. Shopee excels at selection, discovery and providing shopping almost as a form of entertainment. What we have learned over the years is that there is no single model to address all ecommerce needs. The access we have to both management teams helps guide us and test our hypothesis.

Farfetch takeover

Anand also updated me on Coupang's takeover of upmarket fashion and beauty marketplace Farfetch. South Koreans are the world's biggest spenders on luxury, purchasing $325 worth of high-end handbags, clothes, watches and other items per capita in 2022, according to one study.

This is a sector where access to supply trumps price because the companies involved can be picky, preferring to forgo a sale rather than be associated with a vendor that might debase their brands.

Coupang now has a chance to leverage Farfetch's brand positioning and combine it with its own efficient logistics network. But might the acquisition distract management?

We have expressed concerns. The firm is already busy with plenty of new business initiatives, including Coupang Eats meal deliveries, Coupang Pay money transfers and Coupang Play video streaming. However, Anand and others have assured us that a separate team is running Farfetch, and it isn't taking up huge amounts of Bom's or other senior executives' time.

Among other companies I visited was Lotte, one of the country's mightiest chaebols, or conglomerates. It has partnered with our British holding Ocado to build six automated warehouses in South Korea.

The buildings will debut a vertical design, with multiple layers of robots whizzing about grids, grabbing goods-filled storage bins to fulfil customer orders. The innovation is a necessity given that industrial space is at such a premium.

Improving India

Whereas South Korea had seemed orderly, India offered a more hectic experience. My Uber nearly crashed at least three times on the drive from the airport, with everyone following their own rules on the road. This environment would probably be the greatest test on Earth for Tesla's full self-driving software!

This was my third visit to India's commercial hub. Improvements since my first, a decade earlier, were obvious. An eight-lane coastal motorway and a 22km-long sea bridge are two striking examples of layered-on mega-infrastructure. Massive new shopping malls are packed with international stores, and you can also see organised, branded retail becoming more common elsewhere. Meanwhile, many of the cramped four-storey chawl tenement blocks that provided industrial workers with low-cost housing have been replaced by gleaming 40-storey skyscrapers.

Banking merger

I was keen to catch up with our sole Indian holding, HDFC Bank. It's the result of a merger between the firm's mortgage business and its banking subsidiary last year in a deal that created the world's fourth-largest lender in valuation terms.

Baillie Gifford first invested in the home-loan parent 20 years ago, and a large part of the attraction was its exceptional management culture. Several executives from the banking side are now in leading roles, so this was a chance for me to meet them and check if our investment case had changed.

You can't answer that question from a single meeting, but you can get a feel. Mine was that there are reasons to stay invested and continue to monitor the situation. As more Indians open bank accounts, borrow and raise finance, HDFC has a multi-decade opportunity to extract a kind of royalty from the growth of India's urban middle class. Moreover, becoming a single entity should lead to more cross-selling of products and data sharing to improve them.

Simultaneously, HDFC's Commercial and Rural Banking division is opening branches outside the big cities, where GDP is growing even faster and the bulk of the population still lives. For many farming communities, this is the first time they have had access to credit from a trusted brand rather than loan sharks charging predatory rates.

WhatsApp's appeal

By chance, Meta's local chief scheduled an event during my visit, which I attended.

India is among Meta's largest global user bases. More than half a billion people in India use its WhatsApp chat app and 60 per cent of them message and interact with a business at least once a week using the app. The usage of these apps appears even deeper and broader in India than it does in the west. Meta views India as a testbed for innovation.

I also met several promising local companies specialising in tourism, financial services, logistics and private healthcare.

India's market has tended to go through cycles of enthusiasm. At the time of writing, euphoria rules. So while many of these businesses have strong prospects, their current valuations make them less attractive than other options.

The point of these investment trips, though, is to build knowledge and networks to lay the long-term foundations for future investments. Having a global canvas matters when searching for outliers.

Author

Lawrence Burns

Investment Manager

Lawrence joined Baillie Gifford in 2009 and became a partner in 2020. He is a member of the International Growth Portfolio Construction Group and co-manager of the International Concentrated Growth and Global Outliers strategies. He has been deputy manager of Scottish Mortgage since 2021. He has also worked in the Emerging Markets and UK Equities teams. Lawrence graduated BA in Geography from the University of Cambridge in 2009.

Why founder-led companies are often winners

What's the common factor shared by companies that can switch direction in the blink of an eye? They're usually still led by visionary founders, as investment manager Tom Slater explains.

Tom Slater, Investment Manager

Most of us think of the Amazon Prime subscription service as a wonderful retention tool, bringing the best customers back again and again. That wasn't always obvious. When Prime launched in 2005, Amazon was barely profitable. Yet here was a programme offering two-day delivery on unlimited items that suddenly turned the firm's most profitable customers into its biggest loss-makers.

Along with many other lessons since Baillie Gifford first invested that year, Amazon taught us a lot about the importance of founder-leaders. Jeff Bezos's ability to focus on whatever created the most long-term value allowed him to use his authority as founder to make counterintuitive decisions.

Over nearly three decades, this allowed him to push through change despite the opposition of many around him. His successor, Andy Jassy, is matching that power, thanks to having led its Amazon Web Services cloud computing division since its inception.

Looking for the long-term thinkers

For us, the critical point is to find leaders running businesses for the long term who can escape the market's focus on earnings over the next one or two quarters. Doing so lets them make decisions in investors' best long-term interests.

Without our intending it – or even initially tracking it – the founder-leader factor has grown in importance within our investment thinking. Today, we invest in many companies led by founders, including Peter Carlsson at battery maker Northvolt, Marcos Galperin at ecommerce and payment giant MercadoLibre, and the Collison brothers at payment processor Stripe.

Is there such a thing as an archetypical founder? Not exactly. There are different nuances in different parts of the world. But whether it's in the US, Europe or China, we see the same sense of personal ownership and responsibility for what happens in the business, an urgency to get things done and an unwillingness to let bureaucracy get in the way of the company's mission.

It's hard for professional managers to match that sense of priority and to make transformative decisions that push the whole organisation to change. Not least because their incentives are often a performance bonus tied to earnings.

You can do all sorts of things to a business to boost short-term performance, including cutting your spending on research and development and marketing. But that can be very damaging to long-run outcomes. We like management teams that invest in the brand and optimise performance over a 10-year time horizon.

Getting it done

A strong founder-leader can take radical decisions to make sure change happens. This is important in a market environment that's constantly shifting, both in terms of technology and consumer tastes. Against that background, stasis can be very damaging. Ambition and adaptability become vital.

Take Shopify: the ecommerce software provider flourished during the Covid pandemic by helping small businesses compete against larger retailers. The firm then moved into delivery and logistics, a lower-margin business that the founder-leader Tobi Lütke described as a 'side quest' to its main mission.

Shopify has been loss-making for most of its history, but rising interest rates meant the cost of building and connecting logistics infrastructure increased. Adapting to this changing business environment, Lütke abruptly switched course in May 2023, selling Shopify Logistics and cutting the size of the business by 20 per cent.

The company moved towards generating more cash when borrowing costs were rising. It's an example of a founder taking tough decisions to give the company flexibility to compete in a very different environment.

Continuity counts

In the past 20 years, it's become more common for founders to lead their firms for longer. Part of the reason is that financial backers have become less likely to push them out to bring in the 'grownups', but it's also because companies have grown more quickly under their creators' tenure.

We like that they have skin in the game financially. This forces them to think about long-term value appreciation as a key barometer of success, aligning their goals with ours.

Founders make an impact at every stage of the company's development, and often a business's very existence comes down to its creator matching the strength of his or her idea with the will and ability to make it happen.

Typically, the founder factor becomes less important as the business approaches maturity, when you're less likely to see such radical shifts in the product portfolio or the pace of change.

The prime example here is Apple. Since Steve Jobs died and Tim Cook took over, we arguably haven't seen products that have had the impact of the iPhone. But in terms of dollars of value created, it's been much larger under Cook than Jobs. So it's not that businesses can't continue to be successful after the founder goes, it's just that they sometimes become less radical.

Alphabet is in the same category. Compared with co-founder Larry Page, Sundar Pichai hasn't done anything particularly revolutionary, but the company continues to grow and is one of the biggest, most profitable businesses on earth.

No magic bullet

I should stress that having a founder-leader is no guarantee of success. There are plenty who haven't worked out. The interplay between a business and its founders can often be problematic. Some founders are pushed out, and some businesses simply outgrow them.

You see that particularly in enterprise software – cloud-based applications that help businesses become more efficient. The founder might have built a useful tool or product, but the challenge in scaling that kind of business is going out and selling it to big organisations.

That involves a very different skillset around managing a sales force, managing relationships and all sorts of the more boring things that enterprises are interested in. So it may make perfect sense to bring in a different chief executive.

We look for companies that are changing their industries, providing goods and services in new ways and answering unmet needs. These are not normal companies. When you have a mission like this, having talented individuals at the helm has been utterly crucial.

We're not in thrall to the 'cult of the founder'. After all, we've long admired the Dutch firm ASML, which makes the machines that manufacture semiconductor chips. It's not founder-led.

Nor do we see the continued presence of a business's original leader as a panacea to the many problems that growth businesses face. It's simply that we see businesses that are founder-led playing an outsized part in creating the great companies of the future.

Author

Tom Slater
Investment Manager

Tom joined Baillie Gifford in 2000 and became a partner in 2012. After serving as deputy for five years, he was appointed joint manager of the Scottish Mortgage Investment Trust in 2015. He is also head of the US Equities Team. He has worked in the Developed Asia, UK Equities and Long Term Global Growth teams. He graduated BSc in Computer Science with Mathematics from the University of Edinburgh in 2000.

The evolutionary economist

Radical economist Eric Beinhocker argues that the economy isn't a machine to keep in balance but an evolving system that adapts to human needs. Learn why he thinks companies must become more adaptable to meet tomorrow's needs.

Gary Robinson, Investment Manager

Photography by Duncan Elliott

According to Eric Beinhocker, the wealth of nations stems not from growing GDP but from the success of companies adapting to address our problems. Gary Robinson, investment manager in Baillie Gifford's US Equity Growth team, spoke to the Oxford University-based professor

A career as a software entrepreneur, then a venture capital investor, then a business consultant, taught Prof Eric Beinhocker that his college teachers and textbooks had misled him.

The economy, he found, is not a machine *kept in balance by rational behavior*. Instead, it's a dynamic, innovative, evolving system that comprises billions of human impulses, actions and reactions.

Beinhocker's study *The Origin of Wealth* (2007) suggests prosperity stems from evolutionary processes very much the same as those governing the natural world. Wealth-creating companies search for new ways to meet customer needs and in the process create new technologies, products and services that continuously change the economic system.

Now director of the Institute for New Economic Thinking at the University of Oxford's Martin School and a visiting professor at the Santa Fe Institute in New Mexico, Prof Beinhocker is preparing a new book that seeks to redefine the market economy and show how to build a more just and sustainable system.

Gary Robinson: Where did you get your interest in how wealth is created?

Eric Beinhocker: Working with small businesses, I found that that world was hugely dynamic and innovative. The way we made money was not when things were in equilibrium, as the textbooks said, but when they were out of balance and change was happening. It motivated me to explore new ways of describing the economy, which is when I came across the work of the Santa Fe Institute on complex adaptive systems.

GR: What are complex adaptive systems?

Since the 1970s, scientists have observed how systems built up of networks of small units or agents interact and evolve in complex and dynamic ways. Those agents then create higher-level patterns, the way water molecules combine to create a whirlpool. They're called "adaptive" because the agents can change their behaviors. These complex adaptive systems describe everything from our bodies to biological ecosystems, to the internet and artificial intelligence.

The economy itself fits this description. It contains individuals and firms interacting in lots of complex networks and relationships. These interactions create patterns: booms and busts, inflation, business cycles, unemployment, etc. Understanding how these macro patterns emerge from the bottom up seemed more productive than the traditional top-down view.

GR: How does evolutionary theory help us to think about the economy?

EB: Evolution is a simple process of experimentation where a variety of designs is created, some survive better than others, and the successful designs grow. With organisms, it goes on through variations in their genes followed by selection based on fitness, then reproduction. But the same kind of process goes on in technology.

Take the bicycle. No one type of bicycle will be the best forever. Since Victorian penny-farthings, people have tinkered with different designs. Some worked better than others, and eventually they settled on the design of two wheels, pedals, a chain, etc. But even that's kept developing and evolving. Today, we have road bikes, mountain bikes, city bikes and ebikes: all variations on that theme.

In such evolutionary systems, there's a process of niche creation and niche filling. For example, no one knew we needed mountain bikes until enthusiasts in the 1970s came up with that design. A whole new niche was born and then filled by various companies innovating around that design. We see this evolutionary process in every industry, from the proliferation of flavors of potato chips to the race to find applications for AI.

GR: How can companies extend their lifespan in this competitive ecosystem?

EB: Make evolution your friend. Try to harness it inside your organization. Markets are brilliant evolutionary systems in that they foster variety and experimentation between companies. Labor and capital markets provide the talent and funding to scale up the winners – and scale down the losers. But too many companies focus on exploiting whatever niche they've been successful in versus exploring for and creating new ones. To do that you need to create internal variety and experimentation, be flexible in moving talent and capital to scale up the future winners, and not be afraid to fail. The key is to fail small and often, and scale up and win big. Hanging on to legacy businesses past their peak is the downfall of many companies. But it's hard when careers are at stake, and there's a vested interest in maintaining what's gone on in the past.

GR: How important is a company's view of the short-term versus the long-term?

EB: As well as managing the tension between operating well and innovating, durable companies manage the tension of multiple time horizons. They need to "wear bifocals": If they take their eye off the short term they may not be around for the long term. But if they're able to keep that long term in focus and make the appropriate trade-offs and take investment risks for that longer term it can pay off.

GR: Shifting gears a bit, why did you found the Institute for New Economic Thinking (INET)?

EB: Through the 1990s and 2000s there was a growing sense that standard economics was not up to describing the modern economy, and might even be leading to wrong answers. When the 2008 crisis hit, we saw the standard models fail very badly at central banks and finance ministries. Some of us decided it was time to do something about it. I left consulting to set up INET Oxford to explore how we could make better models of the economy and contribute to solving social and public policy problems. We saw enormous opportunities in incorporating modern computational techniques using the vast quantities of data now available.

GR: Are there trade-offs between maximizing long-term shareholder value and benefits to society?

EB: They don't automatically go together. I saw this in my consulting work. We did a good job of helping companies maximize shareholder value and become incredibly efficient, but, within that framework, businesses have huge incentives to dump their problems back on society. For example, many large US firms have boosted their profits by keeping wage growth below productivity growth. That may be good for the company's shareholders and its executives paid with stock options. But that isn't great for the workers themselves just clinging on, for taxpayers who are supporting those workers with food stamps, nor for other businesses who want those workers to have income to buy stuff from them.

GR: Can you tell us more about your next book?

EB: I'm co-authoring it with Nick Hanauer, a US-based entrepreneur, venture capitalist, and policy innovator. We're exploring the core theme that economies are built not on survival-of-the-fittest, cut-throat competition but on cooperation. Large-scale cooperation enables us to solve our complex problems. It follows that building trust and fair social contracts in societies is key to creating economic prosperity. Fairness and trust aren't things we try to create *after* we get prosperity, they're a major cause of prosperity. Traditional economics has this backwards. There is a view that things like pollution or social problems are "externalities" where we can clean up the messes left by markets after the fact. We argue that extreme concentrations of wealth, political systems rigged in favor of the powerful, and a degraded environment have corroded trust, perceptions of fairness, and belief in the future – all critical to our future prosperity.

The answer isn't cleaning up more and bigger messes. It is reworking the system to stop creating the messes in the first place. How we do that is a harder question, but there are a lot of new ideas out there that make us believe it's not impossible.

Mavericks v the mainstream

The idea of a shape-shifting economy is rooted in the new complexity science of the 1960s and 70s applied in physics, biology, computing and other disciplines.

In the late 1980s, led by Prof W Brian Arthur and others at the Santa Fe Institute, theorists began adapting this way of thinking to economics. Looking to other scientific fields and applying advances in computing power and data, scholars proposed a new conception of economies as dynamic, evolving networks made up of real human beings.

Successive global crises – and failures to foresee them – have moved this controversial re-imagining closer to the mainstream. Now it's referenced by central bankers and international organizations, including the OECD.

And it's useful. During the Covid-19 pandemic, a team at INET Oxford, led by Baillie Gifford Professor J Doyne Farmer, built a model that accurately predicted the impact of lockdown on UK GDP. His colleague Eric Beinhocker is a longtime advocate of complexity economics as a tool for addressing inequality, ecological collapse and other pressing problems.

Thinking further

Prof Beinhocker's perspective gives us a new lens through which to view the complex system that is the economy.

Baillie Gifford's diversity of thinkers and rigorous in-house specialist research are central to our investment approach. However, we complement our own resources with new insights from authors and academics such as Beinhocker who help us to think distinctively and encourage the flow of new ideas.

Author

Gary Robinson

Investment Manager

Gary is an investment manager in the US Equity Growth Team. He joined Baillie Gifford in 2003 and became a partner in 2019. He worked on our Japanese, UK and European Equity teams before joining the US Equity Growth Team in 2008. Gary is a generalist investor but retains a special interest in the healthcare sector, dating back to his undergraduate degree. He graduated MBiochem in Biochemistry from Oxford University in 2003.

Beyond Silicon Valley

The US's most exciting and transformative companies are increasingly spread across thriving centers of innovation. Discover how Baillie Gifford maps the US's new economic geography.

Ian McGugan, Journalist

Baillie Gifford's hunt for transformational companies in the US continues to reach far beyond Silicon Valley, to include cities ranging from Boston to Houston, Pittsburgh to Salt Lake City.

“We aim to own the most ambitious and exceptional growth companies in the world, public or private,” says Claire Shaw. “As more technology clusters form across the country, these concentrations bring big benefits to portfolio businesses.”

Many transformative US companies are choosing to establish themselves in emerging, alternate hubs of innovation, far from northern California’s traditional tech industry.

Why? Shaw cites supportive regional “ecosystems” comprising university research centers, alert venture capitalists and appropriately skilled workers. When these factors are present, entrepreneurial ambition tends to thrive.

In some cases, the availability of pre-existing infrastructure is a powerful lure. Texas is a good example, as it has become a hub for green energy innovation despite recent partisan opposition within the state’s government.

In other cases, it’s quality of life that beckons. Compared to Silicon Valley, where the cost of a simple three-bedroom home can easily top $1.5m, many US cities look affordable. Lower state taxes and proximity to the outdoors add to the appeal.

Silicon Valley remains the red-hot center of hi-tech, Shaw cautions. But the last decade has seen a blossoming of potentially world-changing businesses across the US.

Boston’s biotech cluster

Massachusetts contains many of the planet’s most innovative biotechnology companies. The state has overtaken California as the global leader in terms of job growth, investment and biotech infrastructure.

Cambridge-based Moderna, one of Baillie Gifford’s US Equity Growth holdings, hit the headlines during the pandemic when its mRNA-based vaccines helped lead the fightback against Covid-19. Now Moderna is repurposing the technology and using it as a platform to develop everything from better flu vaccines to personalized cancer vaccines.

“It applies a Silicon Valley mentality to the drug industry,” Shaw says. “It’s ‘coding’ genes and proteins like software to produce drugs for flu strains and latent viruses such as herpes, and it’s pursuing a personalized cancer vaccine based on the genetic sequencing of a tumor.”

Other notable northern US innovators include **Insulet**, a Boston-area company building insulin pumps for people with diabetes. “Its pump can be connected to continuous glucose monitors creating a closed-loop system almost like an artificial pancreas,” says Shaw. “Both types of diabetes are growing, which means more patients needing constant monitoring of their glucose. Insulet’s pumps can be connected to the monitors and help patients’ levels stay within a safe range.”

Texas’s climate hub

The modern petroleum industry began in Texas in 1901 so it’s fitting that the US oil boom’s birthplace should be helping to mitigate its long-term effects, with many businesses moving in and making it into a green energy innovation hub. Tesla’s gigafactory in Austin, opened in 2022, is a symbol of the state’s ability to attract manufacturers.

Texas is attracting some of the world's leading companies in "cleantech," thanks to strong universities, ample venture capital and highly trained energy workers whose skills are easily transferable from oil and gas.

Houston-based Solugen is working to decarbonize the chemicals industry, a major CO_2 emitter. It's replacing the fossil-fuel "feedstock" found in cleaning products, fertilizers and concrete with sustainable alternatives such as corn sugar and biomass.

The world leader in carbon capture technology Climeworks takes a more direct approach. The Swiss-based company recently made state capital Austin its US base. Its technology sucks CO_2 out of the air and stores it deep underground. "It's a negative emissions technology," Shaw says. "It's based on the assumption that abatement by itself is not enough." She cites the Biden administration's $1.2bn support for a south Texas direct air capture hub, with the promise of thousands of new jobs.

Pittsburgh's Robotics Row

A half-century ago, Pittsburgh was famed for its steel. Today, the Rust Belt city has a reputation for research into self-driving technology, with a cluster of autonomous vehicle (AV) firms benefiting from the supportive environment.

Much of the credit for this transformation goes to Carnegie Mellon University. It had the foresight to start a robotics institute in 1979, when self-driving vehicles and AI chatbots were still science fiction.

Supported by local government, the university helped spawn a Pittsburgh neighborhood dubbed Robotics Row, which is packed with AV startups and research labs.

One resident is **Aurora Innovation, founded by former Uber and Tesla engineers and led by chief executive, Chris Urmson, former leader of Google's self-driving car program and a Carnegie Mellon alumnus. Aurora** develops software to drive trucks on highways, promising a more efficient transport network.

"The trucking industry has cult status in the US but has trouble attracting drivers in a tight labor market," Shaw says. "They're a really interesting company in that they're not trying to develop the vehicles; they develop the software then partner with truck companies such as Volvo and DAF Trucks parent, PACCAR."

Utah's Silicon Slopes

Salt Lake City ranked as the hottest jobs market in the United States in 2023, according to the *Wall Street Journal*. Utah's booming tech sector can take much of the credit.

What makes the state so attractive? Affordable homes and access to the great outdoors help. So too do friendly business laws, tax incentives and readily available land for construction, according to the news*paper.* Such selling points have helped make Salt Lake City and the next-door city of Lehi, known as Silicon Slopes, a magnet for tech companies.

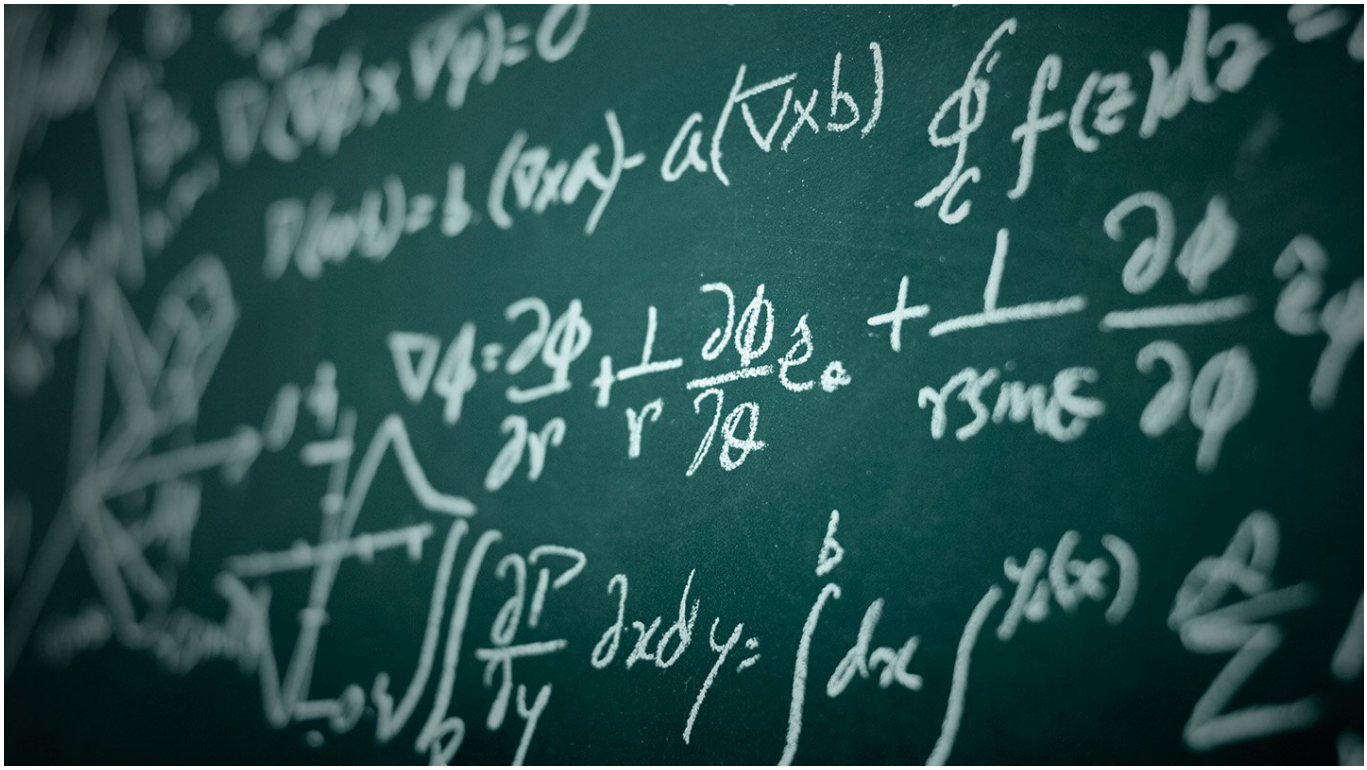
Recursion Pharmaceuticals is a company aiming to use machine learning to industrialize drug discovery. "They're running millions of miniaturized experiments based on cell analysis that would take a PhD student years and do it in a fraction of the time," says Shaw.

Attracting talent to Utah is not a problem. Shaw recounts how Recursion's chief executive, Christopher Gibson, has described the ease of drawing workers to the state: "He told us that if you create an incredible culture and an incredible company, you can recruit and retain people from all around the world. That's exactly what Recursion has done."

Ian McGugan is a business reporter for *The Globe and Mail* and was founding editor of *MoneySense*, a Canadian personal finance magazine. He lives in Toronto.

The lessons investors can learn from the economic lawgivers

How do we understand the world around us to make good investment decisions? One way is using economic laws. Four of our investment managers share the tried-and-tested mental models that guide their thinking as they back tomorrow's growth companies.



Investment management is as much art as it is science. The quirks of human behaviour mean it doesn't obey the strict formulae that govern maths and physics. But there are mental models investors can use as a guide. Along with experience, knowledge and intuition, these so-called 'laws' can help them navigate the complexities of companies and markets.

We asked four of our investment managers to pick the one they most often call on when deciding whether to invest in a company.

The Jevons Paradox

“In the long term, an increase in resource use efficiency will generate an increase in total consumption, rather than a decrease.”

Ben Durrant, Investment Manager, Emerging Markets

The Jevons Paradox, named after British economist William Jevons (1835–1882), explains why we never solve congestion by building highways. New roads just create new drivers.

Another aspect of the paradox is that businesses can grow revenues while driving down unit costs, because falling prices stimulate an increase in total demand. We find this across several sectors.

Samsung SDI, for example, has been instrumental in lowering the cost of electric vehicle (EV) batteries. Over the past decade, a fall of 80 per cent to $150 per kilowatt-hour has stimulated demand by making EVs more affordable. Despite this steep price deflation, Samsung SDI’s revenues have risen five-fold thanks to enormous volume growth.

The Jevons Paradox also underpins our investment in Delhivery, one of India’s leading logistics businesses. In India, logistics costs about twice as much relative to GDP than in other countries.

As Delhivery invests in more efficient infrastructure, driving down costs, we expect its use to increase disproportionately. India currently ships three billion ecommerce parcels a year. That sounds like a lot until you realise China ships 100 billion. Should India reach that level, even if per-parcel charges fall by two-thirds, revenue would increase 10-fold: that’s the Jevons Paradox in action.

Henry Adams’ Law

“Faced with dramatic shifts, humans tend to underestimate potential benefits and overestimate risks.”

Praveen Kumar, Investment Manager, Japanese Equities

According to US historian Henry Adams (1838–1918), exponential change, when a process increases or decreases at an ever-faster rate, outstrips our ability to understand reality. Fear of the unfamiliar, he noted, makes human beings cautious.

To me, this seems to apply particularly to investing in Japan. The country is still riddled with inefficiencies, with most large corporations being domestically focused and conditioned to think about growth in increments rather than leaps. The slow progress of digitisation exemplifies this resistance to change – Japan is one of the last bastions of the fax machine. Market participants display a small risk appetite. Many struggle with big shifts.

I like to ask what other people are missing. With Japan, it's often the need to embrace change and think several years ahead. That's why I focus on the myriad of small and medium-sized companies shaking things up. They're piloted by young, creative founders with fresh business models.

Take real estate portal GA Technologies. It uses artificial intelligence to buy and sell properties and help customers apply for mortgages, facilitate rentals and track financial returns. Japan's real estate sector is among the least developed in terms of use of technology, and GA is dragging the industry into the 21st century, so many still struggle to understand the company's value proposition and raison d'être.

There are many others. Though Japan is a developed market, it sometimes resembles an emerging one, with lots of scope for exponential change. Adams' Law helps us to understand why that makes it a growth investor's dream.

Wright's Law

"The more we make of a product the more we understand what it takes to make it better and thus cheaper."

Lawrence Burns, Investment Manager, International Concentrated Growth

Wright's Law was developed by Theodore Wright (1895–1970), an aeronautical engineer who looked at plane manufacturing in the early 20th century.

He found a pattern: for each cumulative doubling of production, costs fell by a fixed percentage. This is known as a technology's 'learning rate', which helps us to forecast the decreasing cost of technologies as a function of the volume produced.

Learning rates are a particularly powerful concept because they can be applied to a range of different technologies. Research by the Santa Fe Institute shows that many technologies exhibit a phenomenon whereby the more we make, the better we understand how to build them. Learning rates, therefore, provide a statistical basis for predicting technological progress.

When we first invested in Tesla, we took confidence in the high learning rates of batteries. This provided a strong basis to believe that electric vehicles would benefit from a far faster rate of improvement than internal combustion engine vehicles. It informed our view that cheaper electric cars were a nearly inevitable outcome. The falling costs for batteries continue and underpin the opportunity for other companies, such as the European battery manufacturer Northvolt.

Rachleff's Law

"When a great team meets a lousy market, the market wins. When a lousy team meets a great market, the market wins. When a great team meets a great market, something special happens."

James Dow, Investment Manager, Global Income Growth

Many economic laws refer to technological or price-related phenomena. What they often ignore is the role of people in driving progress. This is why we like Rachleff's Law, named after venture capitalist Andy Rachleff (b1960).

Good investments require a company to tap into an attractive market with the right products and services. But great investments demand more – the right people, processes and culture not just to survive but to thrive and even dominate attractive markets.

That's why we're dedicated to researching company culture: because we understand the role people have in the enduring success of a business. Atlas Copco is a good example. The Swedish industrial equipment company was founded in 1873 and the Wallenberg family has controlled it for most of the time since. Over their generations of ownership, a culture of continuous improvement has emerged.

Individual teams are empowered to find new avenues for growth. One of those has been the fast-growing semiconductor market, which requires vacuum-making equipment such as that made by Atlas Copco for use in chip manufacturing. The company's continued entrepreneurialism has helped Atlas Copco stave off maturity and compound its earnings relentlessly higher – growth which may yet continue for years to come thanks to the "great team" that Rachleff champions.

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