

# Short Briefings on Long Term Thinking

December 2023

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**The Amazon way: mixing ones and zeros with nuts and bolts**

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*Your capital is at risk.*

**MB:** Let me take you back to 1997.

This was a significant year for Amazon. The company listed on the NASDAQ. But at this stage, it was still comparatively tiny. The online retailer just sold books, and its annual sales were a mere \$15 million.

So, it was a bold move when it announced it was opening up a giant warehouse in Delaware. The company proudly stated it spanned three football pitches, and founder Jeff Bezos travelled across the USA to cut the ribbon.

These days Amazon's warehouses are up to 20 times their size and they span the globe. But what's interesting about Amazon, is people often view it as a digital disrupter. But it's so much more than this. Its mastery of infrastructure and the physical world are also core to its success.

Welcome to a special episode of *Short Briefings on Long Term Thinking*. I'm MB, managing editor at Baillie Gifford. Over the next 30 minutes or so we'll hear from Kirsty Gibson about how Amazon and other companies blend their digital and physical operations. Kirsty's an investment manager in the US Equities Team and co-manager of the American Fund and the US Growth Trust.

We recorded this conversation as part of Baillie Gifford's recent Disruption Week series, which you can find out more about in our show notes. I began by asking Kirsty to give some historical context about how these physical and digital worlds came together.

**KG:** So, for much of the last century, companies operated in the physical world. And so their competitive advantages were built on the fact that they had physical assets and they had access to capital, in order to be able to fund them. So think of the aerospace industry, the energy generation sector, the chemicals industry, aviation, energy generation, and even industries like the newspaper industry or retail. Now, the proliferation of the internet, that gave rise to a new type of business model, a digital business model. And this was a capital light model, where companies with great

ideas, who were nimble, who had creativity and an ability to attract really great talent, well, they started to build up really strong competitive positions. So, think of Alphabet or Google, as we would commonly know it.

We started to see these certain types of industries – the advertising industry, the analytics industry, and the socialising industry, if we can call it that – move into the digital realm. And they started to build businesses of formidable strength, built on strong return profiles, data flywheels and network effects.

Now, the physical businesses, they continued to exist, but for some, that physical asset that had been their greatest strength, well, that suddenly became their greatest weakness. And that's because they dug their moat so deep, in order to compete with the competitors that they could see today, that they lost their ability to be agile. And they could not keep up with those new competitors that were coming kind of left of field.

And so, for some like Blockbuster, for example, they were just simply outcompeted by new players that were coming into the market like Netflix, and the rise and advent of streaming. And so, the transformation that we've seen over the past decade, well that's been dominated by those digital-based businesses, and we remain very excited about the digital businesses that we continue to invest in on behalf of our clients today. But the challenge with those digital businesses is there are certain industries that just cannot be disrupted by digital offerings. And so, the digital disruption that we've seen, well, that's actually been quite narrow in the number of sectors that is disrupted.

So mainly advertising, media, analytics, and to some extent, commerce. So, what's really exciting right now is that we're seeing this new sort of wave of transformation, gaining momentum. And that's been driven by businesses that are combining those two things. They're combining the physical and the digital together. And this is exciting, because it's potential to disrupt a whole new wave, a whole new swathe of industries. We're talking, the restaurant industry, the healthcare sector, the chemicals industry and even something like transportation.

**MB:** And you divide these companies into two broad categories. What are they?

**KG:** So that first category would be companies that are looking to change an entire system. This is a capital-intensive endeavour. This is what we'll see when we'll come on to discuss Amazon, but you know, having to build out all that distribution capacity, but also companies like Rivian or Tesla, who are both in the electric vehicle area, you know, they have to build out those manufacturing plants.

Then the second group of businesses that are driving this kind of digital and physical transformation together. Well, they're looking to build their businesses upon existing infrastructure, but they need that existing infrastructure to continue to exist in order for them to succeed. So, examples would be Twilio in the communication sector, Aurora in autonomous trucks, or DoorDash in food delivery. Now, these businesses are much more capital light for sure, than that first category that I outlined. But they face a different type of challenge, which is a different friction point, which is that the need to convince an existing industry to embrace what they are doing?

**MB:** Well, let's have a look at that first type of model that you mentioned, the companies that are combining and investing in both digital and physical infrastructure, because Amazon is the classic example there.

**KG:** Yeah, absolutely. So, if you if you think back to when Amazon was founded, eBay was actually founded at a broadly similar time. And eBay was founded on the principle of being a marketplace. It was basically where buyers and sellers could come together. But eBay itself was just a digital marketplace at the time. Amazon, on the other hand, they wanted to sell books. And this was a transaction, which, up until this point, had been entirely actioned in the physical world. Amazon wanted to sell books online. And it wanted to do this because having that online offering meant that you were not constrained by shelf space, which meant you could offer almost any book.

Now, you then fast forward a few years and you see Amazon start to invest in something like AWS, or Amazon Web Services that you mentioned earlier. And again, this is a physical offering. It's ultimately a lot of servers. It's about being able to offer a datacenter and a cloud offering at scale.

When Amazon entered into books, this was a long time before the Kindle, people wanted to receive the book that they had ordered. So, Amazon had to invest in both its digital offering – that would be its website, the ability to be able to make that purchase – but also some of that back-end infrastructure around the ability to make payments. But it also had to invest in the physical, because they needed locations in which to store this inventory, these books that they wanted to offer.

So, what I think is really interesting about Amazon, is that Amazon's strength comes from the combination of those two business models together. Yet to us as a consumer, or a business consuming their cloud compute offerings through AWS, Amazon feels like a digital business. But actually, much of what it does is physical by its very nature. And the company themselves have said that during the pandemic, they basically built the equivalent of a FedEx within themselves in order to make that distribution quick within their ecosystem.

And so, what this offering does to consumers is that the digital allows ease of access, allows lots of choice, and it allows efficiency, which means that Amazon can offer lower prices. And the physical side of their business, in terms of the retail offering, allows speed because they are much more in control of how quickly they can deliver products to individuals. And on the AWS side of their business, ultimately, again, it's about scale, which comes down and, therefore, allows them to offer much lower prices.

**MB:** And I think what's interesting about the early days of Amazon is that maybe the likes of Borders and others didn't see it as a particular threat, did they? Because they thought that bookstores would remain and thrive.

**KG:** Yeah. And I think it's because it's hard. Like it's hard to reinvent a whole system, because then the existing system is set up. And they have all have the advantages of that period of time. So,

when you're trying to set up a new system, you can't just say, 'Oh, we're just going to sell books online', you have to invest in that entire ecosystem surrounding that offering in order to be able to succeed. And that takes time to play out.

**MB:** So, we've looked at Amazon, give me some more examples of other companies that invest heavily in both physical and digital infrastructure.

**KG:** Absolutely. I mentioned one earlier, which would be companies in the in the electrification of transportation. So, Rivian's a really good example here. Rivian is following in the footsteps of Tesla, they're making an electric pickup truck. And they're investing in the physical – they have to invest in the manufacturing facilities in order to be able to make these trucks. And what's really interesting about manufacturing is you're only as fast as your slowest part. It's all well and good if you can make a truck *minus a door* within a day - which you can't, by the way, just to give an example. But if the door's not on, it's not a truck.

And so, the challenges that they're overcoming at the moment, in the physical sense, are all about scaling up that manufacturing. Because this is a company that has to scale, in order to be able to leverage that fixed cost base to deliver the margin profile that they hope to in the long run.

But on the flip side of that, they are investing in the digital as well. Tesla set the tone here. This is about software upgrades that you can do over the air. So, this is about saying, 'Our customers are saying', as Rivian discovered recently, 'that the ride experience is not as good as we hoped it would be. So, we can make a tweak, we can send over the air a software upgrade to your car. And we can alter the pressure within certain parts of the suspension, and we can make it a much smoother ride.' That's just a completely different way of operating to a traditional car OEM. And something that they just don't have the skill set in order to be able to compete with.

And then we have other businesses like Solugen, for example, a private company, which is looking to disrupt the chemicals industry by bringing together, physical infrastructure and making these small plants in which they can produce chemicals of different sorts. And the reason they can operate in small plants is because their yield is much higher, because they're taking the best parts of synthetic biology and industrial biotechnology, and they're combining that with metal catalysis, which is very well known in the chemicals industry. And they're combining those two things together. And they're using software to understand which enzymes they think are going to perform most effectively at scale. So, they're not doing stuff in the lab, and then waiting until they get to this pilot plant and discovering that that enzyme doesn't work. They're using software modelling to learn from their previous experiences, which helps to speed up that iteration process as well.

**MB:** Because the chemicals industry is quite a dirty industry and they're using sugars.

**KG:** Yes, they're using a sugar do that. Rather than having to use oil-based products, they can use enzymes, natural things that we would find in nature.

**MB:** And going back to Rivian, their SUVs are only available in the US at the moment. There must be a huge amount of initial cost when you're investing in both a software and a hardware element. In terms of building that, is that a greater risk for a company?

**KG:** It creates barriers to companies. You're not going to have 100 players, probably, going after the same markets, because you're going to have to raise lots of capital. And people are going to start backing those companies that, quite early on, show promise of being the ones that are going to be successful. There is a risk, there is a challenge to these businesses, in that they do need to raise money.

I think what's interesting for someone like Rivian is that they've been able to raise quite a lot of capital, because Tesla has set the tone for everybody else. Tesla went through this process, no one believed that Tesla would be able to create an EV company at scale and be profitable while they are. And because they set that tone, and they went through 'production hell', as they like to call it, and they went through periods of time in which they were almost running on fumes, and they needed to raise money quite desperately. Rivian came to market at IPO with \$20 billion of cash. And they're currently sitting at just over \$10 billion, because they obviously do have to spend a lot to leverage that fixed asset. They need to get to a point where they're making enough cars per week, per month, per year, in order to pull up the margin profile of the business, but they have at least a lot of capital to get them to that point.

**MB:** And what was it that convinced you so much about Rivian?

**KG:** Part of it, I think, comes down to the founder behind this business. He decided to create this company, and he decided that the pickup truck in America is kind of an iconic car. I don't know if you've actually seen one of these Rivians in action, but there's a lot of people in the US that say they are highly practical, they're a great car, they're very fast, they're very enjoyable for people to ride, and they just happen to be electric.

The selling point is not that they are electric. And I think that's what's really interesting here is that it becomes about, this is just fundamentally a better car, a better pickup truck, or more enjoyable pickup truck to drive, and it has great utility, you can have a barbecue fitted underneath if you want various other bits and pieces. And it's creating that experience around it that Rivian stands for, outdoor living and that ability to go off roading.

**MB:** Let's have a look at the second model that you referred to at the beginning, the idea of digital companies-that will rely on physical assets, but not necessarily own them. And I know DoorDash fits in here, doesn't it?

**KG:** Yes. DoorDash is a food delivery company in the US. It delivers the food from restaurants, but it also delivers food from convenience stores, shopping, and also from grocery stores. And what's interesting is DoorDash operates a three-sided marketplace. And it needs all three parts of its marketplace to be working together in order for this model to work. It's not as simple as saying, 'Oh,

we're just going to blast this out to loads of locations at really fast speed'. There is a sort of cadence that they have to go out in, in order to develop those three parts.

And those three parts are: the consumer, you or I using their app to order food; the second part is suppliers, the suppliers in this case would be the restaurants, the grocery stores or the convenience stores; and then they have the delivery drivers, which happen to be called 'Dashers', because it's DoorDash. And those individuals interact with DoorDash through three separate apps that the company has actually designed for them. But ultimately, each one of those parts of the ecosystem interact with the physical world, which means that DoorDash has to understand both the digital and the physical world in order to make this work.

So, restaurants, for example, need to be able to tell them how many orders they've got, how long they have to produce them, when their expected pickup time is etc. And then they have to coordinate that with the Dasher, to make sure the Dasher actually turns up at the right time. So, if the food is supposed to be hot, that it actually is hot. And for Dashers, that also means, in their app, they get suggestions on where to park and which escalator to take within a shopping mall.

DoorDash has actually said that they think the parts of the delivery from collection is actually 30 separate steps that you have to be able to identify. And that's because you're navigating a physical environment that changes on a day-to-day basis, depending on traffic flow, depending on how busy certain locations are, depending on how busy the restaurant that you're interacting with is.

**MB:** That's quite interesting in terms of how a company can think about that big picture model, but also about what escalator to take in a mall. It's being able to have that huge, big picture, but also the detail. But also, I think DoorDash seems to be doing something that's very different from others, in terms of creating a community, and having a wider audience. Why is it so different?

**KG:** DoorDash also invests in having first-party distribution centres. And in these distribution centres, it allows their suppliers – their restaurants – to place products within those distribution centres so that people can order off the app and receive products, even out of normal opening hours. It is allowing them to also create their own offerings, they call it DashMart. A can of Coca-Cola is the same whether you buy it from 7-Eleven, or Costco or from DoorDash. So, they don't really need those things, too. They can just sell them directly themselves.

But what I think is really exciting, and the potential opportunity, because ultimately DoorDash wants to become the infrastructure for logistics more generally, is this idea that if you were a company that operated on the East Coast of America, and you were interested in expanding into the West Coast, that's a big decision to make. You'd have to deploy quite a lot of capital in order to set up your first restaurant, or your first store. What happens if you could just pay for a small section of a DoorDash distribution centre and have your product available on the app?

It would help you understand demand, it would help you understand the extent to which you maybe did want to deploy capital into that area, or whether it was like, 'actually this is a profitable way for us to distribute our product, but it wouldn't be worth our while to actually have a store.' So I think

that's really interesting as well, because that's contributing to much more, about the sort of ecosystem of society, as opposed to just saying, 'you know, we just take Coca Cola cans and ship them out to anybody who wants them at any time of night.'

**MB:** And another good example of a company that has incredible software and digital expertise that relies on the hardware separately is Aurora?

**KG:** Yes. So, Aurora is an autonomous trucking company, but they basically make the software, they design the software, and they're in the process at the moment of training those trucks. They're closing what they call their safety case relatively soon. And that basically means that they're heading towards the ability to put these trucks on the road, without drivers in them. Now at the moment, they are on the road, they just have a driver in them who's sort of hovering over the wheel. But these trucks are driving autonomously, they have a route that drives from Dallas to Houston, Texas, and back again, they are delivering proper product for their customers.

But Aurora doesn't own the trucks. And I think this is really interesting, because it's this idea of identifying what you're good at. And if there are other players in this industry, who've been in this industry for 80, 90, 100 years, like your PACCARs, who have the Peterbilt brand, or your Volvo Trucks, why not leverage the skill set that they already have, and say, 'Actually, we don't need to build trucks. We're just going to work in partnership with you. And we will help you to create autonomous trucks.'

And that's important because there's a massive supplier shortage in the US when it comes to truckers. And yet trucking is such a fundamental part of distribution within the US, that dates all the way back to just after the Second World War. And so, you've got more demand for products because Amazon is saying we want to deliver stuff quicker. And you've got a supplier shortage. There's a gap in the market for some other offering. What Aurora is trying to do is say that we can offer this software, we can improve these trucks, and we can also partner with other players in the industry, like Continental, for example. And they will help build the computer itself that we put the software in, and then we don't have to bear all that upfront cost for ourselves. We can share that cost out among the ecosystem.

**MB:** And the strategic partnerships here are absolutely critical aren't they. You've been to Dallas, you've been on one of these trucks haven't you? Tell me about it.

**KG:** So, in September this year I was very lucky. It was a nice early start in the morning, so I didn't disrupt their actual trucking lane that they have. They took me very kindly out on a 45-minute ride on one of these trucks. And it was amazing because I thought that the driver would sort of negotiate us onto the highway and then press a button and we'd be off. But no, the driver basically turned it into a car park and then we pressed the button, and the Aurora truck took us out of the gated area, took us along the road, took us over a bridge, merged onto the highway and did the same thing in reverse when we came back in as well. And it just felt like sitting in... I mean, it's not like I've ridden in many trucks before, but it felt perfectly safe. It didn't feel like an unusual

experience. It wasn't stopping all the time. It was driving at 60mph quite happily, it was letting other cars come in, it was moving over if it saw a wide load coming, etc.

**MB:** So, we've talked about the two different models in terms of companies that are heavily investing in both digital and physical assets, other digital companies that are relying on other people's physical assets. But this doesn't always kind of neatly define your investment thesis, does it? And there's one company that I wanted to bring up that does both digital and physical, but your investment case for them is purely digital.

**KG:** So that would be Meta. And, yes, Meta is an interesting one because Meta, obviously, it does have a physical offering. It bought Oculus in 2014 for \$2 billion. And it's been investing in creating its Quest headsets etc., and its Reality Labs part of its business is obviously significantly loss making at the moment. We sold meta a few years ago, on the US Equities Team, and we've bought it back recently.

We sold it on concerns about what we'd call the three Rs: regulation, relevance and recruitment. It feels like the regulatory environment has changed somewhat. It's not to say that there isn't pressure on big tech, but it's not to the same extent. They've sat in front of Congress, they've said their piece, there are bigger fish to fry at the moment. And I think they handled it relatively well.

The relevance one was interesting. So, when we sold our holding, TikTok had really started to take off. It seemed to be quite difficult for, potentially, for to compete. We were concerned that, connected to the recruitment point, they weren't going to be able to get the talent in order to create this internally. And they certainly were not going to be able to acquire a business like this, because the FTC was probably going to block them.

Actually, they've done really quite well there. Reels, which is their TikTok competitor, has now reached a \$10 billion run rate in revenue terms. And that's up from \$3 billion this time last year, so, that one's ticked off as well. And in terms of recruitment. Why would people come to meta now? I think, ultimately, it comes down to AI.

Meta has such a colossal dataset that they own, and ultimately, you look at large language models, a lot of those are publicly available, made with the publicly available data. For me, what's really interesting about Meta is that they can provide additional context, using a dataset that others don't have access to. And that is a tool that, if you're an engineer who's studied something to do with AI, and you're up-and-coming, where do you want to go and use your skill set, to really feel like you can make a difference? Well, Meta is probably going to be up there on your list of potential companies now.

**MB:** So, you mentioned that you bought Meta, sold it, and then bought it again. Is that unusual?

**KG:** It's not unheard of, but it's not necessarily typical as well. When we make investments, we have to have to have that kind of opposability of mind. You have to be able to believe in something quite strongly, but also recognise the fact that you might be wrong. And so ultimately, with Meta, we sold



it and the investment case has changed. And there's no reason why you can't then revisit it, it doesn't necessarily mean that you sold it for the wrong reasons, the first time around. But it's having that opposability of mind, that ability to hold two ideas in your head at the same time, I think is really, really important.

**MB:** And then how do you challenge yourself as a team because I guess as long-term investors – the average holding period at Baillie Gifford is around about eight years – can it be difficult to make those sell decisions?

**KG:** Yes, it can be difficult because you want companies to succeed. And I think one of the things that I use as a mental note to myself is recognising if something is about conviction or if something is about hope. You can have conviction in something, things might not be playing out exactly as you hoped, but you can still have conviction in that business. But when that conviction switches to 'Oh, I just simply have hope in this business', that's not enough to be able to hold that company anymore.

One of the things we do on the US team, is that we write a forward-looking hypothesis for every company that we own. And this is ultimately laying out how we expect the investment case to play out over time. And they can evolve, and they can change, because seven, eight years is a long period of time. And these companies are moving and they're changing. But if we see something that means that case is fundamentally broken, that is a reason to sell a company, that's a reason to no longer keep holding it. As much as you would like it to work, the signal is telling you that it's not working out and you have to be honest with yourself there.

**MB:** If you could pick one company with the highest potential upside, what would it be?

**KG:** I think I'd pick a company like Ginkgo Bioworks. Ginkgo is an industrial biotechnology company in the US, basically trying to build a platform and saying that they believe that biology is code. It's not zeros and ones, it's As, Ts, Cs and Gs. And we've got to the point where we have a much better understanding of biology and the ability to use biological tools to produce lots of different products.

Now, ginkgo is still quite early in its opportunity, but the potential for a business like that is just so vast. They're working with Pfizer, they're working with Roche, they're working with Merck, they're working with Novo Nordisk, they're working with Syngenta. There's just so many large companies, the credibility of this business has grown quite significantly in the last few years. When we first invested in Ginkgo, as a private business, many of the companies that were using its platform were industrial biotech startups. And that's great, that's part of their business. But what's been really interesting, more recently, is that they've managed to get companies who have their own internal R&D departments already, like the Mercks, like the Novo Nordisks, to start using their platform.

**MB:** If there's one thing that you'd like to leave the audience with, Kirsty, what would it be?

**KG:** I think it's that building these businesses is going to be hard. These are not companies that are going to be able to turn on their offerings overnight, and just roll out a software offering, and have it

spread around the world really, really quickly. But I think the investments that these companies are making in themselves, but also their broader ecosystems, really stand them in good stead to disrupt industries but to also sustain as businesses in the long term.

**MB:** And that was Kirsty Gibson joining us during Disruption Week. And you can hear from some of our other investors who took part in the event at [bailliegifford.com/disruptionweek](https://bailliegifford.com/disruptionweek) where you'll discover interviews and articles about artificial intelligence, nuclear innovation and how our investment teams think about climate change. In addition, you can find previous episodes of *Short Briefings on Long Term Thinking* at [bailliegifford.com/podcasts](https://bailliegifford.com/podcasts) or via Apple Podcasts, Spotify and other platforms. All those details are in our show notes. But for now, goodbye and thanks for investing your time with us.

### Show notes

Amazon and DoorDash take different approaches to bridging the physical and digital worlds. Amazon has built an extensive infrastructure of warehouses, logistics networks and data centres to directly control its operations. DoorDash instead relies on partnerships with restaurants and stores for deliveries, limiting its capital investment. In this podcast, Baillie Gifford investment manager Kirsty Gibson analyses the advantages of each model and how both approaches can pose a disruptive challenge to more traditional businesses.

Amazon and DoorDash exemplify two distinct approaches to rooting a business in both the physical and digital worlds. Amazon has done so by investing deeply in physical infrastructure, including its vast logistics operations and data centres. DoorDash, by contrast, has focused on partnering with others to offer meal and grocery deliveries. Baillie Gifford investment manager Kirsty Gibson explores the merits of each approach and discusses how the two companies and others like them can pose a disruptive challenge.

### Background

Kirsty Gibson is an investment manager in Baillie Gifford's US Equity Growth Team and is joint manager of the American Fund and US Growth Trust.

In this episode of *Short Briefings on Long Term Thinking*, she explores how a growing number of companies are posing a challenge to incumbents by innovating in both the digital and physical realms. The podcast draws on an interview she gave as part of Baillie Gifford's Disruption Week 2023 event.

In addition to discussing how Amazon and DoorDash put this into practice, Gibson also discusses the chemicals maker Solugen, self-driving lorries pioneer Aurora and electric car maker Rivian, among others.

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