INVESTING FOR THE FUTURE – IN CONVERSATION WITH THE SCOTTISH MORTGAGE MANAGERS

Manager Tom Slater and Deputy Manager Lawrence Burns discuss the evolution of the management team and process, the current environment and the long-term prospects for the Scottish Mortgage Investment Trust.

All investment strategies have the potential for profit and loss. Past performance is not a guide to future returns.

A Key Information Document for the Scottish Mortgage Investment Trust PLC is available by contacting us.

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Stewart Heggie (SH): So, hello, and welcome everyone to the Scottish Mortgage Investors Forum. I'm Stewart Heggie, an investment specialist on Scottish Mortgage. And I'm joined today by one of our managers, Tom Slater. And Deputy Manager, Lawrence Burns.

Now, as many of you will be aware, this event was meant to take place in January. We could have done a webinar but we took the view that whilst digital alternatives are a nice add on, we want to see you all face to face if at all possible. One downside of that is unfortunately James Anderson has been unavailable to attend today and he sends his apologies.

So, let's move on to the format. We'll begin with a conversation between myself and the managers. And that should last about 40 minutes or so. And that should leave ample time for questions from the audience. By way of background, we want this forum to be helpful to you and your clients when discussing Scottish Mortgage. So, we're going to cover three main topics. The first is the evolution of the management team and process. It's now been a year since Lawrence joined the strategy and we announced that James would retire at the end of April this year.

The second is the current environment. In recent times we've had concerns over rising inflation rates and interest rates. Which has had a compressing effect on the valuation of many higher growth companies, including Scottish Mortgage itself. And we now have a human crisis in the Ukraine to consider. We know these topics are going to be on your client's minds, so, we'll certainly discuss them.

And the third topic will come as no surprise, it's the long-term prospects for Scottish Mortgage. Our managers are trying to identify the world's most exceptional growth companies, and when they do, to become long-term and patient owners. To bring you all up to speed since we last saw you in person a couple of years ago, over the last two years, 35 new names have been added to the portfolio. And around two thirds of those have been private companies. So, we've got lots to discuss there.

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So, let's begin with team and process. Tom, for 13 years, you've been managing the trust alongside James and together you've constantly tried to evolve the process and really improve and try and become better investors. Lawrence, you've now got a year under your belt, but, in fact, I know that this style of investing is not new to you. Can you tell us more about your investment background and what's led you here today?

Lawrence Burns (LB): Yes, sure. Thanks, Stewart, and thank you as well for everybody coming and attending. It's nice to be able to meet and see people in person for a change. I joined Baillie Gifford about 12 years ago. And I've spent most of that time being obsessed with radical change, where it is, what it looks like, where we can find it. And investing and learning from companies that are either driving that change or are beneficiaries of that change. We'll talk about this a lot, that pursuit of outliers, the pursuit of extreme returns. It's an investment style that first, is an interesting one to pursue.

But I also think it is helpful because when you do get those things right, the impact can be material for clients and shareholders. You can get a company that you'll be aiming for outlier returns going up five, ten or 15-fold. And the good thing there is you will always make mistakes in fund management, no matter what your investment philosophy, you will never get everything right. But the good thing is that when you're pursuing those extreme returns, you don't have to get everything right. You can rely on getting only a few things right to make a good return.

And that's a style of investing and the types of companies that are in SM are companies that I've followed and known for many years. I've worked on our international strategies for the last decade, comanaging them with James Anderson, so I worked closely. So, there's a lot of commonalities, both in the companies in SM and the companies I've been involved with before. But also, commonality in terms of that high growth philosophy. But it's also right to say even versus other things I've done that SM is special.

It's special in terms of the breadth of opportunity that it has. The ability to pursue extreme returns wherever they are, both geographically and being agnostic between public and private. Extreme returns are rare, so having that broad as possible canvas is helpful and matters to finding them and owning them well.

SH: And Tom, does the change in the team line-up change your approach or outlook in any way?

Tom Slater (TS): No. As you mentioned, I've been managing the trust with James for more than a decade. And the approach has evolved over that period. We've worked to continue to refine what it is we're trying to do for people. And as you alluded to, try to get better at that core task of how do you find these outlier companies and, trickier, how do you hang on to them for long enough that you actually accrue that return in the portfolio? So, none of that changes. And as Lawrence says, he's worked with James a long time on other strategies.

So, what we're trying to do from a philosophy and process has been clear for a while now. And it's a slightly different team executing against that.

SH: One of the changes in recent years has been investing in private companies. And many of our clients here today will hold Scottish Mortgage within allocation to global equities that will differ from them, from some of the others. And the fact that it holds private names. Tom, we're now a decade on from your first investment in a private company, which at the time was Alibaba. And up until the end of last year, you've now invested in 82 private companies, 35 of which have IPO-ed.

How has the private company landscape changed since you first made that investment ten years ago?

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TS: When we started down that path, the contention was that we weren't trying to do something new, but that if we were going to continue to invest in the world's most exciting growth companies, we had to go and find them where they were. And that more and more of them were choosing to stay private. Now, if you look at the number of private companies that were valued at more than $1 billion, at the time, so this is 2012, there were just over 100. Today, the latest number from TechCrunch is there's about 2,400.

So, the number of companies that are staying private has lived up to that hypothesis. There's all this growth that's happening out with the public markets. So, with that the players in that space have slightly evolved. There's a potentially different set of investors, different pools of capital. But what hasn't changed is that private companies get to choose their own shareholders. And they have to have a reason that they want you to be an owner. And so there, the way you behave more broadly has a direct bearing on the access that you can get and the opportunities that are available to you.

SH: And these returns being made in private markets have not gone unnoticed by the investment community. And people are trying to find new ways of accessing private companies. SPACs would be a good example of that. Is there now a risk that there is too much money chasing too few assets?

TS: Of course, there's a risk. Over the course of that ten years, we've seen several ways of capital flow into looking at these opportunities. So, if you go back a decade it was the mutual funds in the US who were looking at this but then drew back because of their open-ended structures and the regulator became uncomfortable with that. You've seen SoftBank and the Vision Fund, $100 billion flow into this. More recently there's been hedge funds, Tiger Global is the standard bearer for this.

So, there has been a lot of capital sloshing about for private companies for most of the past ten years. And that's not changed. When you talk about doing 80 investments, that sounds like a lot, but actually, ten years, it's eight a year. So, we generally will invest in a small fraction of what's available to us. As we become better known for doing investments, there are a lot more companies approaching us directly. So, one of the challenges is drinking from the fire hose, trying to sort the wheat from the chaff in that inbound.

But companies are making a decision about their shareholders and they will have some objective that they're optimising for. So, why was SPACs popular for a time? Well, if your objective is to maximise your current evaluation, potentially get a big chunk of capital through the door on day one and then we'll worry about the rest later, choosing to have a SPAC investor potentially makes sense. That's not the type of calculus that will lead a company to choose us as their investor.

For those companies that we invest in, what they're looking for is a long-term partner. So, they've seen that we've supported Tesla in public markets through some volatile times. They've seen us own Amazon shares for almost two decades. And they think, right, my business is on a trajectory towards the public markets, who do I want my partners to be through that? And having permanent capital, having a reputation as a long-term owner is what gets you access. It's not about being prepared to pay the highest price.

And the challenge for people trying to get into this, you see lots of people saying oh, we're going to start doing private companies. That's all well, you can have good intentions, but why are the most attractive companies going to want to have you as a shareholder? That comes back to what do you think your competitive advantage is as a manager?

LB: It's fair to say that the way I tend to think about it is in the public space one of our edges is that reputation of being able to give long-term patient capital and be partners. And the edge there is the access you get to company CEOs, like you've had with Elon Musk in the past, like we've had with Jack Ma and others. I was in Germany and asked to see Zalando and the founder turned around and said, well, we won't give you one hour, we'll spend five hours with you. And that access is powerful and helpful.

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But it becomes even greater as you're saying as we move into private markets. Where it's not just the access to understand the business better and to understand the vision but it's actually the access to invest. So, the edge in some ways becomes even stronger in the private setting.

TS: To add to that, a willingness to be the most stupid person in the room. A lot of these people are brilliant, and if you can get some of that access, just trying to translate some of the insights that you get from that into what you're doing back in the portfolio.

LB: James and [unclear] have both said that it's uncomfortable to be the stupidest person in the room, but it's also the best way to learn.

SH: On that note, we'll move on to the current environment. And there're three main topics that seem to have been raised by clients recently. First of all is the crisis that's unfolding in the Ukraine. Second is the impact of a sustained period of higher inflation. And the impact that might have on portfolio companies. And the third is Chinese regulation. Tom, it's not an easy one, but could you start us off on the Ukraine situation?

TS: Sure. The starting point for me is be careful what you ask your fund manager. There's this constant evolution to talk about whatever the topic of the day is. Today it's the Ukraine, the week before last it was inflation. Before that it was the virus and become an epidemiologist. And that is not our domain of expertise. And we ought to be humble on that front.

On Ukraine specifically, there's little first order relevance to the portfolio, exposure to Russia, etc. The challenge that arises from it is if Putin's trying to tear up the existing world order, what does that mean for investments in China? What does that mean for the trend to globalisation that we've seen over the past couple of decades? We've got two internets at the moment, do we stop there? Or do we see it splintering further? So, it's this gradual process of trying to think through the second order impacts. That's accepting we live in a whole new world from the one we were dealing with last week.

SH: Thank you. Lawrence, our clients know that our investment horizon reaches beyond short-term moves in inflation. However, inflation in the United States is currently at about 7%. And if that were to persist for the next three to five years, how does that factor into your thinking?

LB: Yes. As you know and many people want to know the current market narrative is that theoretically inflation may lead to higher interest rates and that may reduce the value of earnings far out. And a lot of our companies have earnings that are far out because we're expecting them to grow a lot and be a lot bigger in the future hopefully. You go through a period of adjustment, but ultimately the goal doesn't change. The goal is how do you pursue those extreme returns and outliers?

And one of the ways I tend to think about it is if we look at the past outliers, so Amazon and Tesla, I don't think their success was a massive product of their macroeconomic environment. The transition to ecommerce was secular. The adoption to electric vehicles was secular from some of those things, and they would have been hugely successful companies and investments, to an extent, irrespective of some of those macroenvironmental points.

And if you look at Moderna today, nothing is ever certain in the future, but as we look through its questions of what else can they do beyond COVID? And that answer won't be depending on inflation and interest rate. And that's one of the things where in some ways our time horizon and what we're aiming for in those extreme returns makes our job easier. Because we're focusing on such extreme results in terms of companies. And yes, what we're seeing from our different companies is operational performance is good

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and has been good even in areas where there's volatile macro, Mercado Libre are still growing in revenue 60% in US dollars and that's in Brazil and Argentina, which is a difficult environment.

And we're continuing to see good operational progress. And that gives us a lot of conviction in terms of where these companies end up on a five-to-ten-year view.

TS: I'll probably add to that Lawrence, I absolutely agree with your point about what's the dominant driver for a company's growth. I think back to 2008, 9, the US economy shrank 6% in 2009. Amazon in its core media business, so the oldest part of the business at that point grew about 16% that year. So, there were a couple of things at play, one was the transition from offline to online was more important than the growth, or in that case, shrinkage, in the absolute size of retail sales.

And it was also that a time of stress drove change and behaviour. Which has underpinned the next decade of growth, so it wasn't just about that piece. The other point I'd add on is about this theoretical repricing of growth, that you get this first order effect where people say interest rates are going up, therefore the discount rates for future cash flows have got to go up and they're worth less today. So, growth ought to underperform.

Now, whether academic theory like that really drives markets is a subsidiary question which I'd leave. But the second order piece is do companies have pricing power? Because it's all well saying those are the cash flows, you discount them back. But in an inflationary environment, companies with pricing power, you can see the impact of that through the PnL. And it's not necessarily the same cash flows that you're discounting back. So, the market has done some of the first piece but not necessarily thought through the implications of the inflationary environment that we've been in.

SH: Good. Lawrence, could you provide us with an update of how the Chinese holdings are navigating the current regulatory changes?

LB: Yes. The first perspective we have on this is that regulating technology is a global issue, not just a China issue. We see this in the EU with regulation around gig economy workers linked to some of the delivery platforms, which is following similar regulatory moves in China. We see it in the US where DOJ will challenge Google on various practices. What we're seeing in China is therefore an answer to a global question that we're struggling with everywhere of how do you interact as a society with these incredibly powerful technology platforms?

The difference in China comes from the nature of the system and the approach. And so, it is an approach that is faster, so DOJ will take several years before it even gets to trial with Google. It is an approach that is far broader simultaneously, and it is an approach that is done in a much more non-negotiable way. And that is something that is difficult for the markets to digest in a difficult 12-month period as you have that material regulatory adjustment.

In terms of the companies, again, we think about this on a global basis, not just a China basis. But it's possible that it becomes as important if not more so in China that ultimately, companies need to be aware of what is their impact on the broader society? Because it's by driving those societal benefits that gives you a degree of protection from whether it's regulatory backlash or whether it's consumer backlash or whether it's someone coming up with a better business model to innovate because you have these negative externalities.

And so, we spend a lot of time going through our individual Chinese holdings, both trying to go through the mechanics of what does a regulation mean? What does that mean for our investment scenarios on a five-to-ten-year view? And also, trying to grapple with, which is an open question of, where are the

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boundaries of acceptability with profitability and scale? And how does that interact with these societal benefits? And for us it's put a lot more emphasis in terms of you have to have these clear societal benefits in order to be tolerated.

William Li, the founder of NIO, and James and I visited him a number of years ago, made the comment it's much easier to go with the grain of society than against it. And that's a key thing whether you're in China or elsewhere.

TS: If I look at some of the changes we've made in the portfolio over the last two or three years and I mentioned this, you talked about Lawrence, you didn't take any of the blame for this one, but one of the mistakes that we've made is saying that we think the big platform companies are going to find growth more challenging. Because of some of the societal issues and some of the regulatory issues. But the way we've implemented that in the portfolio has been to sell down the Western ones. So, selling Facebook, selling Alphabet, reducing Amazon.

And it's interesting that as you say, progress has been slower in addressing some of those points in the West. And the authoritarian regime in China has addressed this much more directly.

SH: Having discussed the current environment, let's move on to the third topic, which is the future. Now, we were discussing the healthcare allocation last week, and I think I'm right in saying it was in 2008 it had reached zero within the portfolio. It's now about 22% and you've talked to holdings being Moderna and Illumina are both healthcare names. So, Lawrence, the recent Moderna share price move would indicate that your view differs greatly from the market.

What gives you such high conviction that this is a long run opportunity and not just a one trick pony?

LB: Moderna is a one trick pony. It's just that that trick isn't just COVID. Which is saying just COVID is something. But that one trick is a broad and important one and that trick is mRNA. Moderna wasn't built to solve the COVID crisis, it was built as a platform for mRNA. The ability to get the body to effectively build a protein by design. And because that technology is so powerful, it became a quick solution and an effective solution to the coronavirus pandemic. Which a number of us are grateful for in terms of its impact.

One of the reasons we're able to be here today. One of the attractors of Moderna is simply that it's something that goes far beyond the COVID vaccine. It's the breadth of their portfolio. They have about 40 programmes currently in development, only ten of them are COVID related. They'll have programmes around flu, they'll have programmes around HIV, zika virus, cancer, cystic fibrosis, a huge range. The COVID business on its own is potentially valuable because it's likely that COVID will be endemic, and particularly as you can go and combine your COVID vaccine with a flu vaccine, that becomes powerful.

But in some ways the market, because of the near-term importance of COVID, both from a news flow and a profit sense, is not paying much attention to what else could this platform be used for? And that matters because the platform is incredibly broad. And that's something that could drive profits and healthcare benefits for the next decade potentially, as they apply that mRNA technology to a larger range of healthcare issues.

SH: Tom, there are several areas in the intersect between information technology and biology that can have a positive impact on patient outcomes. And we've got a number of portfolio companies addressing those. Could you tell us about some of them?

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TS: Yes, sure. The point I'd add on Moderna which interests me is this idea that the next generation of software companies won't look like the previous generation. So, if you're going to go look for the next Alphabet, don't go and look for somebody that's doing the same thing 20 years later. The attraction of Moderna is that it is effectively writing software code, it's just that it's not zeros and ones, it's GTAs and Cs. It's programming. And that's where some of the similarities are.

But I also think, you made the point of it being out of favour and one of the lenses I find helpful, going through a more difficult period like the one we've seen over the past year, is challenging some of the assumptions that you've had. And it's a Munger quote saying invert, always invert. So, could the converse of what we believe be true? We've thought that genomics is a particularly important technology that's going to help drive personalisation of medicine for individuals.

There's no evidence at all that that trend is reversing. In fact, I would argue that it's accelerating. And that goes for a number of the other contentions in the portfolio, whether it's the transition from our model of IT from on-premise to the cloud. Whether it's the digitisation of commerce. There are all of these themes running through the portfolio. You go through them one by one, and to me it seems that the case for them is strengthening. Now, your question was about the application of IT to healthcare and that is exactly an example of this.

There's been this powerful, almost universal technology created. The ability to generate, to store, and increasingly drive insight from vast amounts of data. And that is a description of some of the big problems we face in healthcare. So, for example we own Tempus, what they're doing, they're now testing the genomic profile of about 20% of cancer patients in the US. And then they're using that data to suggest treatment pathways in a way that a human physician would not have the encyclopaedic knowledge of all the trials and the developments that are taking place.

So, they can assist a physician in doing that. You have something like Recursion which is applying this technology to the process of drug discovery. So, getting away from the single PhD student at the lab bench testing a single hypothesis. And instead, a hypothesis-free approach. So, let's induce all disease states in cells and let's test all available compounds against them. And so, what you do there is you reduce the cost of experimentation by about 90%. You reduce the cost of drugs coming to market by 90%.

And it's a completely different paradigm. And we're still in the early stages of the application of some of these technologies. And it's over the next five to ten years that you're going to start seeing a meaningful impact from some of that work.

LB: And that's an important point, because so far some of the benefits of computing technology, we've seen them strongly in the world. They've transformed areas like retail, media, advertising. Giving us the behemoths of Google, Amazon, Facebook, Netflix. But we're now seeing some of those underlying foundational technologies impact other industries. Healthcare is chief among them. In 1990, when they tried to sequence the first human genome, it took them 13 years and it cost $2.7 billion. Today Illumina can do it in a few days for something like $300.

And that's been an output of cheaper, faster processing in data storage. And so, we're seeing these foundational technologies start to impact other industries and other areas that are more diverse than what we've had over the last ten years. Because ultimately retail, media and advertising aren't a huge part of most economies. But we're seeing that change and disruption spread out. And healthcare, indeed, I'll go wider and say biology is chief among that.

SH: On this spreading out point, much has been made over the years of Scottish Mortgage being an early holder in many of the American and Chinese companies that have grown into giants, some of which are

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the names you've mentioned. But, in fact, it's also been invested in world-class businesses that have emerged from elsewhere. So, there are European names such as ASML, Ferrari, Spotify, Kering. Lawrence, we also now have a significant holding in Latin America, Mercado Libre, and I know that you've known this company for several years.

Can you outline why it's well suited to Scottish Mortgage?

LB: Yes. It's well suited because it's trying to do not just one, but two things that are material. And they're trying to do it across a region that's about 700 million people in Latin America, and a $4 trillion regional economy. And their aim is, they say it clearly to us, to democratise commerce and to democratise access to financial services. And so, that sets your opportunity set. It's commerce and finance, which are two large parts of the economy.

And ecommerce penetration today in Latin America has risen, but it's still only 10%, that's around a third of where the UK is, which itself is a moving target. So, there's a large opportunity still in retail. And what's patricianly interesting is the opportunity that's emerging for them in finance. So, that's in payments, credits, savings, insurance. And digital finance is an area that interests us, and it particularly interests me in emerging markets where the value add is even greater than it is in the West.

If you've ever been into a bank in Brazil, for example, you'll probably have to put your stuff in a locker, go through a security turnstile, there will probably be an armed guard. And when you've done all that, you'll still be treated more like a threat than a valued customer. The Brazilian banking system and a number of them in Latin America, it's high annual and monthly fees, it's poor customer service, it's the highest interest margin spreads in the world.

And so, what Mercado Libre are doing, again, using some of that digital technology, is, actually, if you can conduct those services through an app, you don't need the expensive branch network or the hundreds and thousands of employees. So, not only can you offer more convenient service, but you can offer service that previously banks didn't give to large sections of the population and emerging markets, because it wasn't profitable to service a small loan using a bank branch network. But it is using an app.

And again, it's synergistic with the commerce business because the banks would say well, we can't lend to these people because we don't know them, we don't have data and there aren't appropriate credit bureaus. And Mercado Libre go, well, actually for years we've been getting ecommerce data from hundreds of millions of people and merchants. And so, we do have some degree of financial profile. And we can use that and other innovative data to build our underwriting models and try and slowly learn how to do that.

And so, you end up with a large opportunity. And again, going into macroeconomics here, Argentina and Brazil are tricky places to do business. There is high inflation, there are difficulties. But over the last five years, Mercado Libre have still been able to grow their revenues by eight-fold in US dollars, which again, speaks to that secular being able to overpower sometimes some of the more difficult macroeconomic conditions.

TS: I'll just pick up on that piece about payments or finance and payments more broadly. Because that's one of the emergent themes in the portfolio. It spreads across the private and the public space, so in public equities we own things like Adyen, a firm which we owned as a private company and now it's a public company. We own Stripe or SaltPay, both private. And what's becoming clear is there's some interesting things going on in payments, which has traditionally been a boring part of the ecommerce landscape.

But increasingly as you're seeing data cross transactions. So, what I mean by that is if you go into a shop and buy something with your credit card, the shop doesn't know anything about you and the credit card

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company doesn't know anything about what you're interested in. But what we're seeing in some of these payments companies is you're now seeing data across those transactions. And that's allowing these companies to create a lot more value from merchants.

And so, that's likely to be an increasingly important area. If I as a payments company can bring you, the merchant, more customers, then you're going to pay me more for that than you would just the service of allowing somebody to swipe their card. So, just to draw it out, you're right in that it is more impactful in certain areas that don't have a modern payments infrastructure. But equally, it is something that we are seeing in lots of different parts of the world coming together as a clear trend.

LB: Much like Adyen in Europe where they're a beneficiary of behind the scenes building the financial payments infrastructure, and really a beneficiary of some of the things you were talking about of creating complexity and fragmentation in payments. That payments are in some ways becoming even more of an important thing to solve because you have people wanting to pay not just on Visa and Mastercard, but on Alipay, on Klarna, on cryptocurrencies.

And so, being able to offer payments as a service almost and support, indeed, many of our holdings [unclear] and supports is a helpful place to be as we see the increasing complexity within the payment space.

TS: An upside [?] to a change in expectations and behaviour that's been accelerated by COVID. So that if you ran an offline store three years ago, that's possibly all you did. And maybe you had some ecommerce competitors. But today, it's likely that you've developed an online presence, you probably have your own website, you're probably selling through Facebook and Instagram and some of these other platforms. You still have the physical store. You're maybe doing delivery as well as people coming into store.

So, you have all these different challenges that come from the complexity of all these modes of operating. And it's what drives some of the demand. And then turning it back into what we were talking about before, is that merchant going to go back to just doing physical store sales only? Hopefully, a lot of the challenges that we've experienced through COVID go away over the coming months. But we won't go back to the where we were two years ago. It's a completely different operating landscape.

And you see that in these companies that have been seen as prime COVID beneficiaries which saw big spikes in their share price and then have fallen back. But if you look at the underlying operating performance of these companies, it continues to be robust.

LB: And some of what you've seen of the COVID is one is the sales of some of these companies has risen a lot. But they've also been able to inject certain scale games that have allowed them to build out a more efficient infrastructure than they had previously. So, if you go back to the Mercado Libre one, they're now delivering products. Even though they're delivering more, they're delivering it faster than ever before because they've been able to effectively bank these scale gains. And you see that a lot where it's not just the sales going up but the proposition has got better over the period of the last couple of years as well.

SH: Just picking up another theme that's running through the portfolio. The need to decarbonise our economy is clear. And the corporate sector will have a large part to play in tackling that problem. And through our hopefully plentiful investment opportunities. We've spoken about Tesla and the transition to electric vehicles in the past, but beyond that, where do you see portfolio companies having a meaningful impact?

LB: So, the energy transition is huge in its scale. It's not often that as a civilisation, as a species, we change our primary mode of energy generation. You have firstly a few things driving, renewables, solar,

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wind are now at the price where they're below fossil fuels. And are continuing to decline. So, that economic sense of the transition should grow. You have the imperative of climate change, you were talking about some of the second order effects earlier, but I suspect energy security and energy independence, it's possible it gets more important over time.

So, there's lots of reasons that are pushing this. We've invested in a range of different companies beyond the electric vehicles of Tesla and NIO. Northvolt, which is producing the batteries that are necessary for this energy transition using cheap hydroelectric power in Northern Sweden. We've invested in Redwood Materials, which is founded by one of the cofounders of Tesla, JB Straubel, they're trying to build the cycling infrastructure for batteries to create a more closed loop and efficient system. We've also invested in ChargePoint, they're trying to build out the charging infrastructure.

We've invested even into electric plane vertical take-off planes, that are electrical flying taxis effectively, in Joby and Lilium. Where, first, it's a new mode of transport. But secondly, there is that possibility that it's one of the routes to decarbonising aviation in the long run. So, there's a range of opportunities and we continue to see, particularly in the private space, and that goes back to the importance of the broad canvas, an interesting opportunity said of companies that need capital and need patient capital to build physical infrastructure and physical business models that can help the world make this energy transition.

TS: And to pick up on that point, you can tie that back to this what is Scottish Mortgage particularly well placed to do? And it's one of those areas where we can use our scale. There are for a number of these decarbonisation companies, there is a significant buildout of physical assets to do. They need significant amounts of capital. And that allied with the time horizon that we have is an important combination. Tie it into what's the environment in private company investing and the supply of capital? There is a lot of money going after the type of opportunities that people understand well.

People know what a two-sided digital marketplace can do, what the economic model looks like, what a first party retail online business can do. And so, when you see those types of traits emerging, people pounce on it quickly, there's a ready supply of capital. For some of the types of businesses you talk about here, because it's relatively new, because it's relatively capital intensive, there isn't the same competition to supply capital into those opportunities.

LB: It's deeper than that. It's also the possibilities that a lot of the venture capital and some of the funds or the flows coming into that space you were mentioning earlier, they've built their success and been built up on suppling capital efficiently and successfully to digital business models. Where the minimum viable product in a digital space is different from a physical space. Where the time to product completion is different. And so, one of the areas that generally interests us is where we can see a combination of a large opportunity in growth, but also one where the playbook is more uncertain.

Because that indicates that there's some degree of uncertainty.

SH: Are you seeing different investors around the table with these types of businesses?

TS: Yes, is the short answer. It depends where in the world they are. And it depends what they're doing. But generally, it would tend to be larger capital pools and longer-term capital pools.

SH: That's great. We're just about exactly on 20 minutes left. So, we'd now like to see where we have questions from the audience. Now, we do have some mics, so if you could put your hand up if you have a question and just wait until one of the mics can come along so everyone can benefit from hearing from you. Are there any questions? There's one down there.

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Male Speaker (MS1): Hi. It might be a bit tricky, I'll hold one end. Perhaps if you could talk about the relationships in some of those that James had and how passing those over as being things like academics and the like. And also, whether they're the right relationships for the next decade or where you're looking in that area?

TS: Do you want to start?

LB: Yes, sure. So, first, it's a good question because for us some of those relationships are important. It's differentiated access. And it's insightful access where you get to understand what people's vision is and to spend that time being that dumbest person in the room and trying to understand and grapple with how they want to change things. SM's early meetings with Elon Musk outlining that he thought there was a small but growing chance Tesla could be the world's most valuable company seven or eight years ago was helpful in terms of trying to show the mentality of which they were approaching the problem and how they were thinking about it.

Both myself and Tom have been involved in a number of those relationships for many years, particularly on the European side. I mentioned Zalando earlier, A company I've known since before they were public. And so, there's a lot of those relationships that Tom and I already have. And then there's a few as well that James has done a spectacular job building up over time. And where we're in a path of trying to transition a couple of those over. So, one would be, for example, we've got a holding in a digital brand tech company, You & Mr Jones, which is now called Brandtech Group.

And the founder there, David Jones, is someone I've been getting to know over the last few months and years as part of that transition. And there would be a few other examples around that. What I would say is that going into those transitions, the amount of goodwill that's been built up is quite helpful and impressive. And that is a general asset that Scottish Mortgage really does have at this point. Which is, as Tom was alluding to earlier, that long history of being patient and supportive providers of capital.

And that does help and matter. And it particularly matters in terms of reinforcing it in times where markets are volatile and when times are difficult for companies, some of which are facing it now. It's a key way in which we can differentiate ourselves by being supportive of these companies, and that's the key to building these relationships in the long-term. You'd add around that?

TS: No.

SH: Are there any other questions? There's a couple up in the back.

Male Speaker (MS2): Thanks gentlemen, thanks very much for that, very helpful overview. Just to your point about patient providers of capital and partnership, would that be, how should I put it? A key tenant of your response, if you look at something like Moderna which went from $19 a share to $400 and plenty. Is that, when you think about your evaluation discipline, does that long-term partnership override that to an extent? How do you think about those two facets of looking at the portfolio?

TS: What I'll say on that is all investors fall somewhere on a spectrum. At one end you would say you size your positions by expected future return and that's all. And you would re-rate it every day on the basis of price movements. And at the other end you have the coffee can, buy the shares, put the certificates in a coffee can, bury in the ground, don't do anything for ten years. And everyone's somewhere on that spectrum. We're more towards the coffee can than the day trader, but low turnover is not the same as no turnover.

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And so, approaching that evaluation discipline question is not just what is the price today? And what's that as a multiple of earnings? But it's how is the addressable opportunity changed and how has the likelihood of success changed? So, if you do that on the specifics of Moderna, there's a couple of components to the evaluation. One piece is the COVID franchise. And the other piece is what that means for this pipeline of all these other opportunities.

And a lot of the volatility in the share price of Moderna has been driven by this assessment of what are the cash flows from the COVID franchise? And that seems to drive the ups and downs of the stock price in the short run. And our view has been more about the opportunity. So, the likelihood of success, we think this is a platform technology. So, having had success in this area meaningfully increases the odds of success in some of the other pieces. And then also the ability to do a lot more of that, a lot more quickly, because you have the cash flows coming in from the COVID franchise.

And so, the market has vacillated in its assessment of the COVID piece. We haven't tried to second guess that, I don't think we've got a strong view. I guess today we have a strong view that the COVID franchise is worth a lot more than the market is assessing. But the evaluation insight has been much more about this tail piece. Because the whole pharma industry is set up around saying you've got these three assets, this is our best estimate of the market, this is our best estimate of pricing, this is our best assessment of market share. That's the discounted value of these assets.

What that sector is finding difficult to deal with is right, we've got 50 assets, all at different stages. And it's how do you somehow do a risk weighted net present value? And that's the challenge that people are struggling with.

LB: Perhaps I could broaden it out, it's an important question. Firstly, relationships are valuable assets that we should and do take seriously. But also, we're looking for those outliers in companies that go up five- and ten-fold. So, we're less interested in spot multiples, I don't think they tell you much about that. But we're interested in does this company have the ability to be worth a multiple of its current value into the future? And there have been cases where companies where we have good relationships, where we still think that they're great companies, but we've started to struggle with that question.

And so, you'll have seen that in the reductions of Amazon, where at 1.6, 1.8 trillion we were going, what do we think the odds are of it being a $5 or $10 trillion company? We found that harder, despite all the admiration we have for the company, and particularly for Jeff Bezos. And you've also seen that with Tesla reductions. And so far, the lesson is that we might have been too quick with those Tesla reductions. But again, it was driven by us looking at can you make the returns that we want to make for Scottish Mortgage shareholders? And when the answer is that we start to struggle, you do at some point see the reductions reflect that.

Male Speaker (MS3): Thank you. Could you talk about your private companies? You mentioned 80 over the last ten years. Eight a year. You probably turned down hundreds, thousands. Can you tell us more about the research process? The [unclear] process? Given the multiple geographies, given the multiple sectors from pharma to electric vehicles. And perhaps a bit about the engagement with these private companies, once you've invested? Thank you.

TS: Yes, should I start on this? So, if you think about the evolution over the past ten years of the way we've approached this, this starting point was very much our heritage in public companies. And so, whether it was through the networks that we had in public company management teams that led us to potential opportunities, utilising some of that research capability in public markets. And so, for example, we invested in GRAIL which is the business that's looking to identify cancer through doing blood draws on patients.

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And the reason that we came to that is through our investment in Illumina. And the knowledge of the management team and that took us to that potential investment. And that remains an important piece, being able to look across both worlds. Because for most investors the world is strongly divided between private and public and there are relatively few people that move between the two. And then over the past decade, we, Baillie Gifford, have put significant resources into a dedicated private companies team. Who are both dealing with some of that inbound flow, but also a lot more going out and finding new ideas for themselves, building out that network of connections into the venture capital industry.

Which is an important source of ideas. Because like any industry there is a real spectrum from those that are seeking to shift assets at the highest possible price, to those who really care about the future of the businesses that they're investing in and are looking for those long-term partners. But the least scalable bit, and you hint at this in your question is actually managing those relationships. That private companies expect a lot more from you as an investor. So, there's a limit to how many one investor can manage with those relationships.

And that's where having the combination of private and public is valuable because some of the private companies team lead those relationships. Lawrence and I lead some of those relationships. Some of our other public market investors lead those relationships. So, you get that scalability without having to have the core team do everything there. But again, what are we trying to do with the private company investors? It's to find some of those exceptional large businesses of the future. So, you can filter out a lot of the inbound with just that heuristic.

It's companies like ByteDance, like Stripe, like SpaceX, where there's a clear understanding on that outset that the addressable market is large.

SH: Are there any other questions? Yes.

TS: There's two or three down here at the front.

Female Speaker (FS): What are you most concerned you might miss out on in the next decade by stripping things out in your filtering?

TS: That's a big question. Again, it comes back to this what are we trying to do? And it is find those companies that we think have the potential to be large. We're not small cap investors, we're not start up investors. So, it's the ones where you think actually, the trajectory is towards something that is ultimately a large market. And to do that you've got to be open minded that could come from all sorts of places. So, some of the best clues will come from being out in the world meeting people.

There's no point sitting behind a desk in Edinburgh thinking this stuff is all going to come to you. You've got to be out meeting companies. So, the world reopening is important from that point of view. But also, that those companies tend to come in clusters, whether that's geographic or because of the market etc that you're focusing on. So, it's making sure you have some of those connections. We touched on relationships. Some of those academic relationships that bring some of those things through as well.

So, it's not an answer on the specific what are we worried about, it's that you've got to be constantly open minded. It was Marc Andreessen of Andreessen Horowitz was talking about this recently. He was talking about the idea of the idea event horizon for investors. And so, the concept was yes, we all know that experience is important in this industry and the pattern recognition that goes with that. But he was talking about what point should you quit as an investor?

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And his argument was when new ideas start to seem outrageous to you. So, Bitcoin or Non-Fungible Tokens, well, that's ridiculous, that will never work. When you start to have that attitude to new ideas, that was his assessment of when the point had reached you should give up this game.

SH: We had another question down at the front. Maybe just shout.

Male Speaker (MS4): Sure.

SH: Here it comes.

MS4: I'm sure I read in the past a comment that we're going to have free energy one day, associated with Scottish Mortgage. My memory is faulty, but could you expand on all the ideas that you're looking at on the energy transition? And potentially different energy?

LB: I'll start. That goes back to what Tom was alluding to before, that one of the ways to make sure we don't miss certain things is to be open to the radical and the things that don't seem plausible. And part of that around the potential for energy to get to the point where it was free, it was a way of drawing out, look, if you follow some of the patterns of solar and wind where they're following an 85% decline in solar energy over the last ten years and it's continuing, where do you end up? And what does that mean for society? And that's what we're trying to get through with that and to push ourselves.

So, on the one hand you're investing in energy transition to help enable that. But on the other hand, you're also going, how does the world look if energy is a lot cheaper? What does that change? Because that leads to a different world. Energy has traditionally been a constraint on human activity. If it becomes abundant at some point in the future, what does that mean for companies where their [unclear] might be around energy efficiency? What does that mean for new things that you can do?

And that's part of, again, the challenge of making sure we don't miss out on things, is to push us and to think about where do some of these long-term trends take us? And work back from there. And that's the conversation we've had as well with some of our public companies of saying, look, if energy was free or near free, how would that affect your business? Just as a way to understand how these things and second order effects might ripple through. Is there anything you'd add around that?

TS: It's the long run argument. If you look at through history, strong periods of growth or periods where you've seen real economic progress, it's been around our ability to capture more energy and utilise more energy. And the mindset in recent decades has been more around efficiency and this idea that there isn't more energy for us to utilise. But as Lawrence says, the cost decline trajectory in some of these solar sources, and others, and also the nature of the cost structure, which is that it's all up-front CapEx and zero marginal cost.

Could it be the case that you just displace existing carbon energy with these new forms of energy, but effectively you get to the point of abundance with low incremental cost? And the ability to harness a much greater amount of energy? And the type of progress that that might enable? It's an extreme version of that, but the contentions behind it align with our thinking in these areas.

LB: And the other thing as well is that for that pursuit of outliers and to try and make sure we don't miss the next big thing which is always a risk is to make sure we're not just thinking about the most likely scenarios but the full spectrum. The right tails, even if it's a ten, 15% chance, we want to entertain it and try and explore it. Because if that ten, 15% chance is a ten-fold or 20-fold return, it still matters mathematically. And so, it's to make sure we concentrate more on the right tail cases than we do sometimes the base cases.

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SH: Another question in the middle here.

Male Speaker (MS5): Thank you. Are there any areas of the market where you think there's a rational exuberance perhaps investors are too early on the S-curve? I've read in the FT a few weeks ago that genomics might be one of those areas. But what do you think is the next 3D printing?

TS: That's difficult for a couple of reasons. One is that when you're investing in some of these areas where there is lots of potential and radical change, not all of them are going to work. And so, you've got to start with that premise that you're going to get some of these wrong. So, there might be enthusiasm there and it might be rightly placed or it might be wrongly placed. And you just can't know in advance. And so, it's being open to that is important. The second piece of it would be timing these things is almost impossible.

So, the idea you that can invest in just the knee of the S-curve. One of the things we found useful about investing in private companies is that you can build the position over time over subsequent funding grounds and find the companies that are really gaining traction. And invest behind that contention. So, you don't have to go all in at the start. And then the final piece on this would be that whilst there are themes that emerge in the portfolio, we're not thematic investors, we don't start with a contention we like electric cars, let's go invest in Tesla.

Instead, I would argue that it's because of Musk and Tesla that we're at the point that we are today with the growth of electric vehicles. And with genomics, the price of genomic sequencing would not be where it is today without Jay Flatley and the influence of Illumina. So, it's the ability of these influential companies to create the market that's most important. So, there are areas that get a lot of attention, but they're not necessarily particularly investable. Bitcoin and cryptocurrency would be an example of that.

Where there's an awful lot of media coverage, but in terms of large investable businesses, it's still relatively early. But, again, it probably is tied into the previous question about ideas, not being close minded to some of these potential opportunities or worrying that you might get there too soon.

LB: It's fair to say on the time horizon one it's both a luxury and an advantage. Because if you need to guess the year there's an inflection point, that is difficult. So, if you take electric vehicles, you don't know quite when the penetration's going to tick up towards an inflection point. But if you have the luxury of a long-term time horizon you can go, I don't know exactly when, but when it happens it will be meaningful. And looking at those long-term trends in battery costs you go the further out I look the more likely it becomes.

And so, there's an element of using time horizon to the advantage. It's much more difficult if you need something to come to fruition in the next 18 months. Because getting to that precision is hard.

TS: Picking up that one through a specific example, because it's interesting. So, we invest in a company called Zipline. And this is a drone delivery business. And we first invested in it as a private round three years ago, let's say. And then we increased it in a subsequent round last year. And this technology is coming down in cost. And increasing in reliability. So, it started out in medical applications, because the cost of a blood delivery in a blue light ambulance is expensive. And you can compete with that on day one, but you can't compete with the UPS driver of low value packages.

But you can see this trajectory of cost decline. You can see the regulatory process grinding forward. We haven't reached the point where any such company has got permission from the Federal Aviation authority to conduct autonomous out of line-of-sight flight. But you can see the pathway to that

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happening. So, as the cost comes down and the regulatory pathway ticks through, at some point, barring disasters, or societal backlash or whatever it is, you're going to see an inflection in the number of deliveries that come via drones.

Because it's cheaper, it's a much better service, you can schedule it down to the minute, not a 48-hour window. When will that come? I don't know. But if you look at the well-established trajectories, it's going to come at some point. So, you don't want to get there after the fact, but predicting when it is. We just don't know.

SH: That's great. Well, we are now over time, and I believe lunch is now ready. So, Tom, Lawrence, myself and Claire Shaw, our other investment specialist, will be there over lunch. If there are any more questions. So, all it leaves for me to say is thank you very much for coming along today, thank you.

Annual Past Performance To 31 December each year (net %)

	2017	2018	2019	2020	2021
Scottish Mortgage Investment Trust PLC	41.1	4.6	24.8	110.5	10.5

Source: Morningstar, share price, total return.

Past performance is not a guide to future returns.

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