

Business, Energy and Industrial Strategy Committee

Oral evidence: The semiconductor industry in the UK, HC 291

Tuesday 5 July 2022

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Members present: Darren Jones (Chair); Tonia Antoniazzi; Richard Fuller; Paul Howell; Mark Pawsey; Alexander Stafford.

Questions 46 - 98

Witnesses

I: Toni Versluijs, General Manager, BG MOS Discretes, and Country Manager, Nexperia UK; Americo Lemos, Chief Executive Officer, IQE plc; Simon Thomas, Chief Executive Officer, Paragraf; Professor Ken Young, Technology Director, Manufacturing Technology Centre.



Examination of witnesses

Witnesses: Toni Versluijs, Americo Lemos, Simon Thomas and Professor Ken Young.

Q46 **Chair:** Welcome to this morning's session of the Business, Energy and Industrial Strategy Committee for the latest hearing in our semiconductor inquiry. We have a busy morning with three panels of witnesses. That does mean we will not be asking each of you to answer every single question. If you have a burning additional thing to say, as opposed to a repetitive thing to say, and the question is not directed at you, please wave at me and I will make sure we can try to fit you in.

In panel one we are delighted to welcome four witnesses: Toni Versluijs, the general manager at Nexperia; America Lemos, the CEO of IQE; Dr Simon Thomas, the CEO of Paragraf; and Professor Ken Young, technology director at the Manufacturing Technology Centre. Good morning to each of you.

To set the scene, just explain to the Committee where you sit in the semiconductor supply chain and what it is that your organisation does, so we have that on the record.

Toni Versluijs: Nexperia is producing, developing and selling semiconductors. We produce semiconductor wafers, silicon wafers, in Hamburg in Germany. We do that in Manchester here in the UK and since recently also in Newport. Those wafers are being shipped predominantly from the UK to the Philippines. They are sawn into small pieces and a black box with metal contacts is put around them, and then they are ready to be shipped to our customers.

Our customers range from electronic module makers in the car industry to companies that make smartphones and companies that make household equipment. The companies that make the electronic modules for the car industry then supply those modules, for instance, to Jaguar Land Rover.

Americo Lemos: Good morning. At IQE we design and manufacture complex compound semiconductor wafers using a process called epitaxy. It is quite different from the silicon industry. We design those wafers for many different markets, ranging from 5G handset infrastructure and autonomous driving that needs sensors and powered electronics to satellites and the defence industry. We believe that the future of innovation will depend on compound semiconductor products, which is what we are doing at IQE.

Simon Thomas: I am going to go to the further future. Paragraf is a new company developing what I called advanced semiconductors. This is the first one everybody knows: graphene. We are a manufacturer in the UK of the world's first graphene-based chips. We are not necessarily plugging directly into the supply chain today, but we are enabling new technologies, whether that is in the world of EV or quantum computing.



We are beyond silicon, beyond compound. We are what is coming next. Today we manufacture these things in the UK. We are the first in the world to do it. We are proud that we are doing it in the UK, and we hope we can continue to do it in the UK.

Professor Young: The Manufacturing Technology Centre is a research and technology organisation. It is part of the High Value Manufacturing Catapult. Our role is to help companies adopt technology specifically into their manufacturing processes. We are very much around the process rather than the product. One of the areas we work in is electronics manufacture. It is mainly for companies doing high-end products, so things like controllers for aircraft engines and defence and security-type applications. It is very much around the assembly of the parts into the boards that then go into the product.

Q47 **Mark Pawsey:** My questions continue to Ken. It is great to see MTC represented here today. How well able is the UK to use these semiconductors? Where do we stand in the industry? Are we a big player or are we at the edge of it?

Professor Young: Globally we are quite a big player, in that we are ranked about sixth. Compared to the first-placed player, we are tiny. Our ranking is high, but our size is smaller. We are very good at doing it in certain applications. It is specifically around those high-value—

Q48 **Mark Pawsey:** Where are we strong? What are the applications we are good at?

Professor Young: It is around aircraft engine controllers and defence/security-type applications.

Q49 **Mark Pawsey:** Are there markets that we should be more effective in, which we should have a bigger play in, but have not managed to do that so far?

Professor Young: I would like to think there are. One of the challenges with the supply chain uncertainties we have at the moment is that almost every high-value product we produce nowadays has an electronic element to it. Without that electronic element, you cannot ship the product. A great example of that is Jaguar Land Rover. For a while during the pandemic, it could not ship cars because it could not get the electronics components to go into them.

Increasingly, every product that we produce has more and more electronics in it. As we go towards net zero, we are going to have to get better and better control of those products to make them more efficient. That is going to require more—

Q50 **Mark Pawsey:** You have just hit on one of the reasons why we are doing this inquiry, which is the challenge in supply. Can you just tell us a little more about the obstacles in the supply of finished products occasioned by the shortages? Perhaps tell us a little about why the shortages exist.



Professor Young: In my understanding, the shortages are down to the pandemic causing certain manufacturers to move more towards home computers and communications, and to stop producing the parts that the automotive people needed. Automotive dropped its volume; it was not producing, so it stopped putting in the orders to its suppliers. Its suppliers found new customers, and then when it wanted it back the capacity was not there.

Q51 **Mark Pawsey:** How long does it take for new capacity to be developed? If there is more demand, why can't the industry just produce more?

Professor Young: It is quite a large job to put in a new factory of that sort of level and to get it up to speed and producing. Part of the challenge is that no one knows whether the market will still be there by the time you have done it. It is a risk.

Q52 **Mark Pawsey:** The consequences, you have explained, are delays in supply. We know that some automotive manufacturers are quoting a 12-month lead time. Where are there particular problems? What are the products that are particularly affected? What sort of times are customers who want to buy having to wait?

Professor Young: I am not sure I would know the specifics. The problem is that you are getting down to chips that are in almost anything. It hits across a wide range of products; it is not just specific.

Americo Lemos: I came from the silicon industry. I joined IQE seven months ago. Prior to that I was at GlobalFoundries, where I was managing the Asia business. We were in the middle of this chip shortage. What the professor said is right. At the beginning of the pandemic, some sectors discontinued their demand, because, rightfully, no one was expecting car sales to continue to happen. Then consumer electronics came in and took the capacity that was available. When the demand came back from the automotive sector, for instance, there was no way for us to work around that.

Some of those products that were required are what we in the semiconductor business call legacy nodes. There were not many investments being made in those capacities, because the business rationale did not make sense. There was a surge in demand and then neither enough capacity nor enough investment going in. To your question earlier, it takes three to four years to get a silicon fab up and running, and the investment is in the billions of dollars.

Q53 **Mark Pawsey:** The investment signals are there now, but it cannot happen quickly enough.

Americo Lemos: It cannot happen quickly enough.

Q54 **Richard Fuller:** Dr Thomas, in your opening you said about your business that you were proud to do this in the UK. You said, "We hope we can continue to do it in the UK". Are you tempted to go overseas?



Simon Thomas: That is a really big question.

Richard Fuller: What are your thoughts?

Simon Thomas: The easy answer to it is an example that we had from last week. Our company attended an event in the US called SelectUSA. It is quite well known. It is all about the US trying to pull businesses into the country—into the different states. It comes under each of the different states and also under the federal jurisdiction to try to pull these companies in.

SelectUSA approached us about four weeks ago and said, “Is there anything you need in order to grow your business?” We said, “We need talent, we need infrastructure and potentially we need capital. Capital is not a big concern for us, but talent and infrastructure are big ones.” They said, “Okay.” Two weeks later, they came back with a heatmap of the whole US, which showed us where all the talent was located. Then they said, “Here is an extra heatmap of where your supply chain partners are.”

They had gone out and done all of this work themselves. They went, “By the way, if you move to this state or this state, we will give you the infrastructure; we will also give you a tax rebate for the first five years.”

Richard Fuller: Gosh, sign me up right now.

Simon Thomas: Exactly, but there are those types of challenge for a new business like ours. How do I justify saying to our investors, “No, we want to stay in the UK”? Of course, I do. One of my big drives is to grow a UK-based business, but they are the challenges we have.

The second example is that we were approached by the DIT a few weeks ago. “Why don’t you outsource your OSAT business”—outsourced assembly and testing—“to a company in Malaysia?” “I am sorry. We want to be in the UK”. UK DIT is telling us, “No, go and do it in Malaysia”. There are so many mixed signals about what we can and cannot do in the UK. I had to dig through so much just to get to the core of how I am going to do this here in Great Britain, when I have other offers coming, even from the UK Government, to help me do it elsewhere.

Q55 **Richard Fuller:** I was interested. You talked about how you were being wooed by SelectUSA. They gave you heatmaps and financial incentives; they could cohere infrastructure to support you. Obviously, you are a British-based business. Are you aware of a similar effort by the Government here to attract inward investment in your sector to anything like that degree?

Simon Thomas: No. I have contact with all the different agencies, whether it is DCMS, BEIS or the British Business Bank. In fact, we are invested in by BPC. We were one of the first investments by the breakthrough fund. I am very grateful for that; there is no doubt about it, but there is no joined-up thinking in the same way that SelectUSA has.



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You have to put a lot of effort in as a company or as a CEO to dig out all those individual potential parts.

Q56 **Richard Fuller:** Would it be helpful if the Government were a little more coherent around those things?

Simon Thomas: Yes, undoubtedly.

Q57 **Richard Fuller:** Finally on this, you did mention your series B. Congratulations on closing. I hope it was an up round—\$60 million investment.

Simon Thomas: Thank you. It was a very big up round.

Richard Fuller: That is even better. British Patient Capital invested as part of the British Business Bank. Are there any strings attached to that investment? You talked about your desire to be British and stay in the United Kingdom. You talked about the incentives to go elsewhere. Are there any extra ties that come with that investment?

Simon Thomas: Yes, there are. How do I put this politely? The investment approach of the British Business Bank with respect to the breakthrough fund, i.e. scaling companies in the UK, does have some clauses in that other VCs do not like. There has to be a lot of negotiation to get there.

One of those clauses is how many people you can locate elsewhere in the world. I want to be UK-headquartered, but I have to have people in other locations around the world in order to do international trade. I know the breakthrough fund is a particularly new fund, so it is funding its feet. I understand that there are going to be some hurdles there, but that could really do with being addressed.

Richard Fuller: Just because I mentioned the series B, I should mention that I am an adviser to a technology investment fund, but we are not invested anywhere in this area.

Q58 **Paul Howell:** Dr Thomas, developing the same point in a slightly different way, you said in your comments there that you did not have a capital problem. For a number of businesses that are trying to expand, that is exactly the primary problem that exists. Could you just tell us your view as to whether there are other institutions out there that are going to provide patient capital? Do we need some Government intervention in that space?

Simon Thomas: I am not sure Government intervention is required. Government support is required. Let me just explain what I mean by that. There is definitely capital out there to invest in deep tech, hard tech and materials tech in the UK. There are lots of private investors; there are lots of people who are interested in doing it. The problem is when you come to that infrastructure part. If you ask a VC or if you ask private equity to invest in large infrastructure, then they say immediately, "I am going to tie up all my capital straight into this capital expenditure".



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That is where I believe the Government can help. It is about allowing that infrastructure to grow in the UK. Whether that is through a type of grant funding, whether it is just through tax breaks or whatever, does not really matter. There needs to be some kind of incentive that allows businesses to site here, because for the underlying technology, whether it is our graphene stuff, AI or quantum, which is big in the UK at the moment, the money is there privately.

To just follow up on that, a fund has just been launched by the Bessemer Society, which you may or may not know about, called the semiconductor advanced electronics infrastructure fund. "Infrastructure" is in the name. They are trying to raise capital right now to enable private investment, as it would be, into infrastructure in the UK, enabling that supply chain to be grown. They are asking for Government help. They are pitching to the British Business Bank; they are talking to BPC.

If you can offer that support, it can be magnified by the private capital world. That is a really important thing to think about. In my opinion, there is great innovation in this country, but the problem comes when you have to turn that innovation into a real-world profit. That chasm exists and, for companies like ours, it is usually the infrastructure spend that is the issue. It is a big one. As was just pointed out, it can be in the billions.

That is why having infrastructure available for early stage and then growth is really important, which we do not have. As I mentioned, we are a manufacturing company. That is not because we want to be but because we have been forced to be. We really wanted to be a little less hands-on, with a little more innovative design—not fabless but semi-fabless. That option does not exist for us in the UK. We have taken on funding and we have grown our own manufacturing capability, which adds a lot of stress.

Q59 Paul Howell: As somebody who spent their life in the manufacturing industry, I will endorse that. I just wanted to take a little step back in terms of where the private sector investment was available. Is that UK finance or is it overseas finance?

Simon Thomas: Over the time we have had Paragraf in the UK, the amount of money that is going into deep tech and hard tech from a VC and PE perspective has grown massively. It has been really strong. Some of the fundraising we did this round would not have been supported as strongly by UK finance as it would have been four years ago.

There is still one hurdle to get over: the commitment to leading a round of investment in the UK is still quite risk averse. For example, a fund of \$30 million to \$35 million will be fine, but if you go beyond that you need an American lead to come in and have that vision: "Yes, we are going to carry this forward".



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The VC community is tackling that on its own. That is what has happened over the past four years. Some confidence from Government that there will be support for these companies growing in the UK would go a long way to helping them feel more comfortable putting more money into those businesses.

You are probably also aware that we have a lot of US-based VCs now moving to London. You have Generation Investment Management and even Sequoia Capital coming to London, which is showing that there is real innovation here. There is real product and technology here. The big boys are moving offices here in order to invest in that, which is a great story.

Q60 Paul Howell: Yes. I certainly was not aware of that. In terms of the successful financing of semiconductor SMEs, do you have any examples you could give us?

Simon Thomas: Rockley Photonics, which you are going to be speaking to later on, has done really well with its investment. I know there is a question to be asked about manufacturing on that. It has done really well. There is also Bay Photonics down south. Plessey Semiconductors is doing quite well at the moment. It has been a long journey. All of those things have been long journeys. That should explain to you the time it takes to get there.

Most of the successful financing of semiconductor companies is not done in the UK. If you look at the companies that have been grown in the US over the past 10 years, there are tens, twenties, if not hundreds of companies growing in the US. That has to do with the underlying approach from the state governments and federal Government in growing that technology in the country. I cannot think of one massive standout UK investment in the past 10 years that has gone stellar. Maybe Graphcore is about to. We will see.

Paul Howell: I am sure I could probe a bit further, Chair, but I am conscious of time.

Q61 Mark Pawsey: Mr Versluijs, in your introductory remarks you said that you produce silicon wafers in Manchester, you ship them to the Philippines for an additional process, and then they go to customers. Why can you not do what you do in the Philippines in the UK?

Toni Versluijs: If you look at the global supply chain for semiconductors, it is extremely dispersed. It is fragmented and there are a lot of mutual dependencies. For instance, the assembly, which we are talking about, is done in the Philippines. It is traditionally very labour intensive. For a number of decades, the competence to assemble semiconductor products has been established over there.

Q62 Mark Pawsey: Is that an issue about the cost of labour or the ability of labour?



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Toni Versluijs: It is a combination of both. It is also the competence that has been established. There are many companies in the Philippines, for instance, that are doing this type of assembly. There is also a critical mass for this specific competence. That is extremely important in the semiconductor world. Wherever you do something, it needs to be somewhere where there is critical mass so you can attract talent and further enhance competences.

Q63 **Mark Pawsey:** Are we doing enough in the UK to develop the talent in order to have an aspiration to do those things in the UK? Is it so specialist that is not even worth our while to try?

Toni Versluijs: When it comes specifically to this assembly example, based on my experience, I would not advocate developing that competence here in the UK.

In general, I see quite a number of initiatives around me in the UK, for instance to grow the number of young people who choose a STEM-related education. That can always be increased further. Nexperia is also participating in some of those programmes. In general I do see the initiatives, but this can be further expanded.

Q64 **Mark Pawsey:** You said there are good labour skills in the Philippines. This committee looked at automation in the manufacturing process in an inquiry a couple of years ago. Why can't what happens in the Philippines be done through automation?

Toni Versluijs: If that were to be done, it would be a process of many, many years. It would first require fundamental research and investment in the UK around that. We are talking about processes that do not exist yet. We know that, from inventing and developing something like that to implementing into volume, it can easily take decades.

Q65 **Mark Pawsey:** If I can come back to Ken Young, we have heard from Simon Thomas that we have great innovation in the UK, but we sometimes do not manage to turn that into a productive process. Bridging that valley of death is what the MTC has set out to do. Are we going to get to a stage where the processes that Mr Versluijs is talking about could conceivably be done in the UK? Are you seeing bright and clever enough people coming through your organisation to be able to do that in the years to come?

Professor Young: We certainly have bright and clever people coming through. Do we have enough of them? No, definitely not. If I look at some of the societal challenges we have around net zero and sustainability, that is going to be solved by engineers. We have to make sure our education system is producing more engineers and not producing people in quite the same quantities to go into some of the other industries that are not what we need to solve those issues.

If we look specifically at semiconductors, though it is probably true in all industries, we've not just got to be able to make the end product. What



we need to do is make the machines that make the end product. That is where the real IP around the manufacturing process—

Q66 **Mark Pawsey:** That was essentially my question. That is a process for which there are great skills in the Philippines right now. Could we automate that and do it here without that level of skill?

Professor Young: Part of the challenge is that, for an awful lot of how we go about putting factories together, we go and buy the equipment from somewhere else. You are only ever going to be as good as they are at doing it, if you are buying the equipment off them. We have to get to the point where we create the next generation of equipment in the UK. That is not an area where we are investing enough money at the moment. That is something that, as MTC and the High Value Manufacturing Catapult, we are trying to drive.

Q67 **Mark Pawsey:** Mr Lemos, what is your assessment of skills availability in the UK? Do we have enough skills for your business? Would you grow more quickly here if you could find more capable engineers?

Americo Lemos: We do have skills. I come from the other part of the Atlantic, in Silicon Valley, where we have fostered a process of developing skills. We have a good relationship with Cardiff University, for instance, in order to develop not only skills at PhD level but a curriculum adapted to what we do.

What matters is to pick an ecosystem and develop it. The industry is very wide. When you look at what places like Taiwan did, they picked an ecosystem. TSMC is not alone. Taiwan is able to do pretty much everything in one ecosystem. In this country, there is an opportunity to create the same thing not in silicon but in compound semiconductors. The UK is really leading. That is why I am here from California.

I see a huge opportunity moving forward for mainly three reasons. First, the geopolitical tensions have created two ecosystems. We know it is going to continue. Up to now it was frankly cheaper to do things in Asia, particularly in China. Now Malaysia and other places are doing this. Having two ecosystems means we have to get our act together and start getting things moving.

Secondly, most of what we call the megatrends in innovation will require compound semiconductors, more so in volume than the traditional semiconductor products that we see.

It is true for net zero. There is no net zero without compound. You have to realise that. There is no autonomous driving without compound electronics. There is no telecom 5G without compound electronics.

Q68 **Mark Pawsey:** You are saying it is fundamental to achieve net zero.

Americo Lemos: It is a fundamental building block to the future of this industry. The UK has a leadership position. You may not realise it, but a



company like IQE is the only company that is globally positioned to do what we do in this world.

Q69 **Mark Pawsey:** Can I ask you about keeping talent? We have huge demand in this sector. Are engineers and skilled people being enticed from one company to another? Are we growing enough for the sector to develop?

Americo Lemos: We would like to grow more quickly. That goes back to the investment issue we were talking about. The most critical element in the industry today comes down to manufacturing. We all know design is important; IP is important. All of that is granted, but those chips will see the light of day only if they are manufactured somehow.

It is a very concentrated environment. When we look at the silicon industry, there are only two companies that know how to do advanced chips. We need to continue to invest. Public-private partnerships would be very much welcome.

Q70 **Mark Pawsey:** I am really focused on skills. Your view is that it is not skills that is holding back growth; it is getting the investment in.

Americo Lemos: That is right.

Q71 **Richard Fuller:** What you were saying about compound semiconductors sounded rather encouraging, Mr Lemos. Is that a very specialist niche of the semiconductor market or is it large currently?

Americo Lemos: It is large; it is becoming larger.

Q72 **Richard Fuller:** Is it 20% of the global semiconductor market?

Americo Lemos: It is growing two times more quickly than the traditional semiconductor market.

Q73 **Richard Fuller:** Is that from a very small base? I am just trying to scale compound semis versus the semiconductor market as a whole. If the semiconductor market size is, say, 100, what is it for compound semis?

Americo Lemos: It is hard to say.

Q74 **Richard Fuller:** Okay, but you are encouraged by the UK's positioning.

Americo Lemos: Yes, very much.

Q75 **Richard Fuller:** People say it costs a lot of money. You said it costs billions to set up a semiconductor fab business. Is there that money around in this country?

Americo Lemos: There is money around, I am sure. The question is what priorities we put around it and how we make sure we utilise the existing funds in the right way.

Q76 **Richard Fuller:** When you say that there is money around, do you mean private money or do you mean that there have to be some breadcrumbs



from the taxpayer to support your business segment?

Americo Lemos: When I look at what happens in other parts of the world where I have lived and worked, there have always been more and more Government initiatives to support the sector. China has led the way; we know that.

Q77 **Richard Fuller:** That is a communist country. You would expect the Government to do most things, since they own everything.

Americo Lemos: The US has realised that there need to be some partnerships. At the state level, as you said, it is very much ongoing. The federal level is trying to move forward with the Chips Act. We have worked on that in the past. The EU is helping as well. We need to look at how we can partner with Government agencies.

Q78 **Richard Fuller:** From the point of Nexperia, is it also your view that it is going to cost a lot of money and we need the Government to help support it?

Toni Versluijs: When it comes to regular investment, over the past 15 months Nexperia has invested £160 million in the UK equally between the Newport site and the Manchester site. That is what we have invested out of our own pocket. That is Dutch money, so to speak. When it comes to landing completely new initiatives in the UK, typically, my colleagues in Germany would like to land it in Germany and my colleagues in Malaysia would like to land it in Malaysia. Those are the moments when support from Government is required to make sure those activities will be landed over here.

Q79 **Richard Fuller:** Why should the British taxpayer get in a bidding war to throw money at your business against other countries whose taxpayers are being forced to throw money at your business? When will I be able to tell my taxpayers that there is a return for the money you are asking us to throw at you to persuade you to come here?

Toni Versluijs: It is also a matter of choice for the UK to see whether it would want to have certain activities on its ground. Several colleagues just referred to the enormous investments that are required there.

Q80 **Richard Fuller:** You did not answer my question. You said that it is up to the Government if they want to have it here, but I asked you, "What is the benefit to my taxpayers if we do that?" What is the benefit to my taxpayers from having Nexperia here in the UK rather than just buying it cheaply from Malaysia?

Toni Versluijs: The benefit for the taxpayer to having Nexperia here and having a healthy semiconductor industry here is that it provides a lot of good jobs; it provides spin-offs in the cluster; it provides co-operation with academia; and, with that, it places the seeds for further spin-offs. I would see that there is quite a benefit to having a healthy semiconductor industry in the UK.



- Q81 **Richard Fuller:** Forgive me, I will maybe come back to Mr Lemos. Are there not many examples of businesses that create well-paid jobs and new opportunities that do not require the Government to put up the investment? There must be something special here, because you are all very smart people and you probably broadly agree, from the point of view of the overall industry, that there is a need for some intervention from the Government.

Is it because the scale of investment is so large? Is it because of the geopolitical points that you mentioned, Mr Lemos? What is the critical factor right now that should be galvanising the Government's attention to say, "It is worthwhile for taxpayers to put some money in this sector or behind this particular business"?

Professor Young: Just about every industry we have has the electronics industry as a supplier at the bottom end. The challenge is that, unless you have that supply of the electronics components to it, all of your industry is in danger. That is particularly true—

- Q82 **Richard Fuller:** We heard this argument last week about the steel industry. We had Kwasi Kwarteng here. That is another cap in hand industry that just says, "Let the taxpayers pay some money to keep the steel industry, because, gosh, we can't have cars unless we have steel." The oil and gas industry comes here and says, "My goodness, if we don't invest—" When are you going to rely on your own investors and stop asking taxpayers to subsidise your investment plans, Professor Young?

Professor Young: An awful lot of industries will do that, but they will not necessarily do it in the UK. If it is not in the UK, it is possible, particularly when we get global disruption, that UK supply chains will be cut and we will have problems. It is simply a question of how resilient we want UK supply chains to be. That is where the true question is.

One of the things that would be worth doing is taking a detailed look at what all the UK supply chains are and then seeing where that resilience is needed and where we are prepared to invest. You cannot invest in all of them. You absolutely cannot. If you look just at the semiconductor bit, the investment in Taiwan and in China is massive. We cannot compete with that. We have to make sure we do the bits that really matter to us.

- Q83 **Richard Fuller:** Are you doing that in this sector right now or are you planning to?

Professor Young: No, we do not have the level of funding that would allow us to map that supply chain. It is so complex.

- Q84 **Alexander Stafford:** I have a question mainly to Toni about Newport Wafer Fab. Can you give us an outline of why members of the community are clearly upset with the takeover of Newport Wafer Fab by Nexperia? I would be interested in your views.

Toni Versluijs: I would need to speculate as to why people do that. One thing I know is that the semiconductor world, as we also found here, is



quite complex and the situation around Newport is quite complex. I have also seen in the media that there is only partial knowledge or sometimes no knowledge around this.

If you look at the facts around it, Nexperia saved Newport Wafer Fab from bankruptcy. I mentioned already the £160 million investment. By the way, there were no strings attached for any additional Government support on that. We have secured the jobs over there. We also enabled the needs of the local cluster by providing an option to the previous owner to continue the aspirations of doing activities in compound semiconductors.

If I start from the partial knowledge, I might have a bit of an understanding. If I look at the facts, they say something different.

Q85 Alexander Stafford: Was it more the form of the takeover or the fact that the plans for potential compound semiconductor volume were taken away? Was that why people were angry with you guys?

Toni Versluijs: Yes, that is also a very good point to mention. The illusion has been raised that there was a compound semiconductor open access fab. Such a fab did not exist and does not exist. There were plans; there were ambitions. The possibility to realise those plans and those ambitions still exists, among others through the option that we have given to the previous owner of Newport Wafer Fab to establish such an activity.

Q86 Alexander Stafford: Looking at future ambitions, apparently there is space for expansion at Newport Wafer Fab. Is it possible to start a spin-off company dedicated to generating compound semiconductors at your site? Is that something you would support?

Toni Versluijs: Actually, we have provided such an option to use a currently unused building on the site of Newport Wafer Fab to start exactly such an activity. What it would require is funding, a viable business case and a viable business plan. This option, to be quite honest, is outstanding for almost a year.

Q87 Alexander Stafford: At the moment, is there a sizable customer base to support your current size? We have heard rumours that Newport Wafer Fab may potentially shut and move operations abroad. Can you comment on that?

Toni Versluijs: To the last point that you mentioned on the rumours of being shut, that is due to a wrong interpretation of Sir Geoffrey Owen's report. Sir Geoffrey explicitly asked me to take the opportunity today to put a couple of things straight on that. Sir Geoffrey asked me—I am quoting here—to make it clear that the Policy Exchange paper was in no way predicting the closure of Newport. It was merely reporting what some opponents of the acquisition have been saying. For the record, that has been straightened out.



Q88 **Alexander Stafford:** It has not been straightened out. That is a quote. Are you planning to shut and move operations abroad in the next six to 12 months?

Toni Versluijs: We are not planning to shut any operations. We have been in the UK on the site in Stockport for more than 50 years; we have been in Hamburg for more than 50 years. We invested big time in Manchester; we invested big time in Newport. We created the jobs. We are here to stay. We want to work in the local ecosystem and enable the local ecosystem and the UK semiconductor industry to be successful.

Q89 **Alexander Stafford:** You are currently being investigated under the National Security and Investment Act. What signals do you think that sends out to the rest of the business, the industry and international investors?

Toni Versluijs: The National Security and Investment Act, in an international context, is not uncommon. We also see other countries having such an Act. Of course, matters of national security need to be investigated in a good and diligent way.

Q90 **Alexander Stafford:** You do not see any issue with being under investigation.

Toni Versluijs: At the same time, this investigation also needs to be done swiftly. We see that our customers are becoming impatient for clarity, along with some of our employees. Last week, on Friday, a young lady in Newport stepped into the office of our general manager and she said, "I just bought a new house. After this review, will I still have a job?" It is in everybody's interest to give clarification, if not for Nexperia then for people like the young lady.

Q91 **Alexander Stafford:** To the rest of the panel, given what we have seen going on down in Newport, what signals has the investigation sent to you and the rest of the community?

Americo Lemos: I am still new here, so I am learning about the landscape. As Toni was saying, we have seen this in different parts of the world. We just need to work with you guys on the process.

Simon Thomas: I do not see a problem. We are talking about investment coming from the Government, overseas or inward investment, or whatever. We have to accept that we live in a global environment. In order to thrive, particularly in the UK, we need to take that investment. I appreciate the national security implications of what is going on, but that is pretty much separate from being able to create the jobs for this young lady.

We need to have a really defined strategy about what we can accept and what we cannot. Overseas investment is something we should be accepting, particularly when we get a statement like, "We are here for the long stay." That is pretty good.



I would just add one final point. Having the open access part, which has just been alluded to, would also be very good for the UK. It is accelerating the ability for innovation to be moved forward. I know that is a separate conversation. Where the funding for that comes from is something away from this conversation, but that would be a great step forward for the ecosystem here.

Q92 Alexander Stafford: Should mergers and acquisitions in the sector be subject to investigations as routine?

Simon Thomas: I agree with Toni. It is about speed. As a start-up or now as an SME leader, the reason we have got to the front of the game is speed. That happens across the whole industry, particularly in the semiconductor industry where things move so quickly. If things can be done at speed, yes, everything should have some type of gated process to go through, because then you have a really strong case for what we are doing in the UK.

If it is going to take years to happen, you have to understand the damage that happens in that time by delaying the businesses. Yes, of course we need to protect national security, but I would add that caveat: as long as there is a good process to control it.

Professor Young: It is a difficult one. What do we need in terms of capability in the UK? When things like a pandemic happen or we end up in a war, suddenly you want to be able to pivot your industry to producing whatever it is you are going to need in that situation. It is really hard to predict what that is.

One thing we are certainly seeing in the Ukraine war is an awful lot of semiconductors in communications and drones. That is where they have gone. Unless we have the ability to do that for ourselves, we could easily find ourselves in a difficult situation where we cannot get what we need in future.

Q93 Alexander Stafford: On the investigation side, does the panel agree that all mergers should be investigated? I will take that silence as probably yes. Simon mentioned time. How long is a realistic time that investigations should go on for? How long are the current times for investigations? I am happy to take anyone's answer on that. What is a realistic timeframe for an investigation to happen in? How long is it currently taking?

Toni Versluijs: I believe there are international benchmarks for how it is done in other countries. I would suggest to benchmark. That will provide the answer.

Q94 Paul Howell: I want to ask you guys a couple of questions about the semiconductor industry and its coherence, but I was very encouraged by what you said, Mr Lemos, about the potential for compound semiconductors. I just wanted to move across to Dr Thomas to talk a little bit about that.



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You said that your business is based on graphene. I assume that compound semiconductors can have other products in them. What other products are in there? We all know that silica is very available. Are the products that would be necessary for compound semiconductors available? Are there likely to be restrictions in growth because of product availability? Does that make sense?

Simon Thomas: I think I get it. Americo said before that compound is going to go through everything. I worked in gallium nitride for 15 years. It is only now really becoming the big thing, but now it is a big thing. It is in high-power devices; it is in all types of new technologies.

Paul Howell: I hear about products like diamond being involved as well.

Simon Thomas: Yes, looking at the advanced side where I am sitting, silicon carbide, graphene and diamond are coming through as new materials. These are all bleeding edge, if you like. We talked about the amount of money that needs to go into, for example, the silicon industry to catch up or the compound industry, if we are not careful and we have to catch up. Right now, advanced materials do not need that much money. I say that biting my lip. They are still tens of millions of dollars required.

Paul Howell: Define "that much".

Simon Thomas: That is compared to the rest of the semiconductor industry. There are new products coming along with these advanced materials that we could take control of right now. The reason I said we did not really need capital is that the amount of VC funding we get is enough to snowball our industry. If we wait too long, it will not be; we will be in the same boat as everything else. We will have to invest heavily just to catch up again.

To put a measure on that, China put \$8 billion into graphene last year. They are nowhere near where we are, but they are going to catch us; there is no doubt about it. Graphene is waking up in the US as well and in Europe. The advanced technologies that we have in this country were innovations. The Nobel Prize for graphene was in Manchester. We put lots of money into the National Graphene Institute and into the GEIC. Let us get that extra little step, and we will be there. It is the same with silicon carbide and diamond going forward. There are a lot of great news stories here for new technologies for the future. We just have to make sure we support them.

Q95 **Paul Howell:** Thanks for that. I had better not digress too much. I had better get back to the point I was going to come to, which is about collaboration within the UK semiconductor industry. I will start again with you, Dr Thomas. Is there a vibrant ecosystem that is able to function fully in order to provide the goods needed and supply the wider electronics market?



Simon Thomas: In the UK semiconductor ecosystem, we all know each other. We all do different things. The chain just does not quite join together properly. We have lost a few elements of that chain over the past few years.

For example, I talked about outsourced assembly and testing. A large capability to do that in the UK does not really exist. Advanced packaging does not really exist, although the Compound Semiconductor Applications Catapult is addressing that right now. We need to have the businesses that can plug into that chain. The chain is there and there is good collaboration, but it is very fragile.

Q96 **Paul Howell:** I just want to pick up on the answers that came about why we should invest in the UK and about the resilience of supply chains. In our recent world life, if you like, the resilience of supply chains has moved dramatically. What might have seemed secure three years ago is now no longer secure.

I was just wondering about the creation of a resilient supply chain. How much of that needs to be in the UK? How much of that can be with friendly partners? Do we need facilities like Imec in Belgium or Fraunhofer in Germany? Is that a partnership part of our supply chain? What do we need to do to have the resilience that we could refer to when we are talking about the UK?

Simon Thomas: We are straying into foreign policy now, but I agree. There are many, many friendly countries. The world is more expensive than it was 20 years ago in terms of trying to do something. Having those friendly partnerships is fundamental as well.

I talked about having to go to Malaysia to do our outsource testing. It is great that we have a relationship that means we can go and do that at the moment. If we did not have the relationship, we would be stuck. It is a mix of the two. It comes back to that question about what it is the UK wants to secure. Which piece and which part do we want to secure? Which piece and which part can our friendly partners provide for us?

Q97 **Paul Howell:** It is about making sure that within the friendly zone all of the pieces of the jigsaw can be put together. I could keep talking about this, but I had better move on.

I would like to talk to Toni and Americo. The industry is particularly fast moving and dynamic; it has complex supply chains. Do you feel confident that you understand what the Government's current strategy is? Is that strategy providing you with the confidence you need to invest? Are there things we should be encouraging them to do differently?

Americo Lemos: There have been conversations with the Government about their strategy on semiconductors. It is not yet clear where we should focus and what resources we are going to put in place to get the best outcome. That is also what Simon was talking about. The sector is



very, very complex. We spent literally decades building the global system, but now we need to deal with some shortcomings.

It is not yet clear at least in my mind. Maybe I am still ramping up in the system here; I am more used to the other side. We need to get to some concrete actions at some point in order to put plans in place.

Q98 Paul Howell: In your answer, Toni, could you comment on whether there are effective mechanisms for engaging with the Government?

Toni Versluijs: Those mechanisms could be enhanced. We could think, for instance, about a taskforce or a champion within the Government who looks after semiconductors. From a company point of view, we would always like to have one point of access or one point of address, as it will facilitate the speed that we talked about earlier. I see great initiatives going on. We also contributed to the semiconductor industry finding through DCMS. When that comes out, some enhancements can be made.

Americo Lemos: I have one more comment on that point. I have proposed that we put in place what we could call an SIA—a semiconductor industry association. That exists in the US. IQE is part of that, because we have operations in the US. The EU has one; Korea has one, as do Japan, China, Taiwan et cetera. That would allow us to discuss partnerships, as you pointed out earlier, among the industry players and develop policies, recommendations and processes to be able to work more effectively together.

Chair: Thank you to all four of you for your contributions this morning. We are grateful.