

# Business, Energy and Industrial Strategy Committee

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

Tuesday 5 July 2022

Ordered by the House of Commons to be published on 5 July 2022.

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

Questions 119 - 133

## Witnesses

III: Rina Pal-Goetzen, Director of Global Policy, Semiconductor Industry Association; Trish Blomfield, UK Country Manager, Intel.



## Examination of witnesses

Witnesses: Rina Pal-Goetzen and Trish Blomfield.

**Chair:** We welcome, virtually on the screen, Rina Pal-Goetzen, the director of global policy at the Semiconductor Industry Association, and in the room Trish Blomfield, the UK country manager from Intel. Thank you for joining us this morning.

To kick us off from a trade body perspective, Rina, I do not know if you heard the last panels, but we are trying to understand where the UK fits within global supply chains and where there are strategic opportunities for us to do more, especially around resilience in those supply chains. How visible do you think the UK is within global supply chains? Do you agree, if you did hear the previous panels, that where we have expertise is in, for example, design and some of the cutting-edge technologies? Is there anything you wanted to add to that discussion?

**Rina Pal-Goetzen:** The UK does play a really important role on the semiconductor front in design activity. I apologise if this repeats the previous panels. I did not hear them.

**Chair:** That is no problem.

**Rina Pal-Goetzen:** With the increasing cost in this area, there is a potential for the UK to strengthen its support for the supply chain. There is a very interesting study from Georgetown, which I can also give to the Committee, which shows the role the UK plays in semiconductor IP and design development.

Q119 **Chair:** What is your experience of how the UK engages internationally in these discussions? Are we always around the table as part of the discussions or are we absent?

**Rina Pal-Goetzen:** The UK does focus more on the design side. While some of the other countries, such as India, Korea or Taiwan, are focusing on manufacturing in trade deals, the UK gets engaged quite heavily on the side of customers. With trade deals going forward, there is probably an opportunity for further engagement, though this is a challenge. It is difficult right now to carve out these trade deals from any country's perspective. There is a very significant opportunity for the UK.

Q120 **Chair:** From our perspective, we can see a very significant amount of money and activity in the United States, and maybe not an equivalent but a very large amount of money and activity in the European Union. From your perspective, are those activities being done coherently together in such a way that the UK and other countries will be able to fit in coherently, or are countries going off with their own things in a problematic way that might cause problems, risks, an increase in cost or competition for supply and talent?



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**Rina Pal-Goetzen:** You are asking me whether it is more competition versus being more collaborative with the UK.

**Chair:** Yes.

**Rina Pal-Goetzen:** That remains to be seen. The funding incentives are just beginning to be rolled out, and most countries have not laid out how they are going to do that. Whether that will include international partners, whether the funding will only be for certain kinds of technologies and whether it will be able to include international companies as well remains to be seen. The EU is trying to make that effort so there will be the opportunity for that.

Companies' decisions are being made right now, so it is very urgent for every country to consider whether it would like to be part of the supply chain. These companies look five or 10 years out when making decisions about where the manufacturing will go and the ecosystem that goes around that.

Q121 **Chair:** Presumably your industry members are asking Governments to collaborate, even if they are not already doing so at this stage.

**Rina Pal-Goetzen:** Yes, that is one of the main things on their minds right now. They want to make sure Governments can create an ecosystem that makes sense. Since making a chip goes through so many partners and so many countries that specialise in different areas, it is essential that there is co-operation within countries that can be relied on to make sure things work seamlessly.

Q122 **Chair:** Just lastly, where should that collaboration happen? I am not quite clear where that multilateral discussion happens with industry between countries. Is there a place where this should be happening? Does something new need to be created?

**Rina Pal-Goetzen:** There are a few things going on right now. Within the WTO there is a push for ITA3, which would include many products that are absolutely essential for semiconductor manufacturing and the supply chain. It is essential that countries do get together and agree to make this happen so that supplies can go in and out of countries and exports can be moved easily. Multilateralism would be one area to focus on.

Between countries as well there are trade zones being established so that things can be exported easily, tariffs can come down and there can be greater ease of trade. Incentive programmes can go further than just money, making things more secure from a ports perspective or encouraging green energy, for instance. All the things that are necessary for the manufacturing of these devices need to be part of the Government's efforts. This would really help collaboration and ensure that the specific areas where each part is made have the infrastructure and support that they need.



Q123 **Tonia Antoniazzi:** My question is to Trish. We have seen the announcements from Intel and TSMC about promising to boost manufacturing capabilities across the world with large investments, but there have been no similar commitments to funding in the UK. Why do you think this is?

**Trish Blomfield:** Maybe I can back up a little bit, because there was some discussion about why we have this situation now where there are some acute shortages in the industry. The long view is that semiconductors are going into everything. We talked about automotive earlier. The prediction is that by the end of this decade a premium vehicle we will have five times as much semiconductor content as today. That is the long trajectory.

At the same time, we have the pandemic. There was some discussion earlier about how manufacturers may have moved their allocations around. One of the key things was that, on top of this increase in demand, there were also supply chain disruptions; there were actual logistics disruptions as well. There were ripple effects from all of those.

We all saw what happens when you have a non-resilient supply chain. Some of the activities that we are engaging in around the world to expand manufacturing aim to address this. It is also about geographical distribution. From 1990 to now, the balance of manufacturing has changed. It was 80% European and US in 1990; it is now 80% in Asia. This is on the manufacturing side.

That served the industry very well. There has been huge growth in the digitisation of everything over that period and the supply chain worked. It is now at a point where it needs to be rebalanced. The investments that we are making as Intel are very directly linked to the Chips Acts in the US and in Europe. The UK is not part of those Chips Acts. We had a lot of support from EU member states. There were 70 bids from 10 different member states for our manufacturing.

It is not just the manufacturing we are investing in. We are investing, as we call it, from lab to fab. There will be labs as part of the investment; there will be fabrication. There will be a large mega-fab in Magdeburg in Germany, but there will also be other research and development around the region. That is what we are actually doing.

What I am really excited about for the UK is that we can take some of the IP and designs that are here in the UK. If you think about it, you now have the opportunity to manufacture on your doorstep, if you like. It is a new aspect. This reinvigorated European supply chain will be a new potential support for resiliency and potentially allow for a made in Europe and designed in Europe supply chain as well.

Q124 **Tonia Antoniazzi:** You have spoken about the bids you had from the EU, and the IP and design activity in the UK. Is it the current appeal for Intel to be operating in the UK on that level? What are your future expansion



plans? Will there be any more for the UK?

**Trish Blomfield:** We are about 700 people in the UK at the moment. We are across three different sites. What we are excited about and investing in on the design side, as somebody mentioned earlier, is creating infrastructure. We are investing hugely in creating that infrastructure, because it is in our interest. Having a vibrant design ecosystem is in our interest as well. We want to have more designs coming in, to get IP into the hands of chip designers and to get those designs being manufactured as quickly as possible.

What kind of investments are we making? We have started the ecosystem alliance partnership. That brings together leading chip design services, creates an opportunity for chip designers to access a full spectrum of services through the partnership and then gets their designs out to market more quickly. Just last week we announced a specific part of that, which is the cloud alliance. That might sound a bit specific, but it is actually very necessary. We are accelerating the ability of chip designers to use cloud scalability and to design chips in the cloud, which is not so easy to do today. We are putting emphasis on that kind of accelerator, which again helps chip design companies get their projects to market more quickly.

Q125 **Tonia Antoniazzi:** What can the UK Government do to attract the levels of investment needed?

**Trish Blomfield:** If you are talking about the levels of investment for mega-fabs, I will put some numbers around it. Somebody said “billions of dollars”. A fab that costs \$3 billion 10 years ago now costs between \$10 billion and \$15 billion. In terms of attracting those levels of investment as a single country, I am in agreement with some of the earliest speakers. I am not sure that is the right place for the UK to focus, given the strengths that are here.

In terms of investing and what the UK could be doing, I wanted to highlight that the UK has a really important seat at the table for international collaborations. That is a really important takeaway from what I have heard today. Whether it is the WTO, G7 or G20, Governments are creating these kinds of international agreements today. There is the EU-US TTC—the Trade and Technology Council. I know the UK has created a Singapore-UK digital economy agreement. These kinds of agreements are a really important part.

It is also happening in academia and the private sector. I would encourage international collaboration and agreements between academia and the private sector. These could be with countries such as Taiwan, which is already a major part of the manufacturing system today, but it could also be with the US, given the historical relationships there, or with the EU, given its closeness, and its commitment and intention to have this reinvigorated supply chain in close proximity.



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Q126 **Tonia Antoniazzi:** We heard from the other panel about the talent and diversity of the skill pool. Is there a pool of people in the UK to be able to advance Intel's plans in this country?

**Trish Blomfield:** Yes. I would also agree with what was said earlier: there is intense competition for talent. We do invest in bringing on new talent, and we also invest in career progression. We welcome the fact that a Digital Skills Council has been established. We do think it is worth doing a root-and-branch review of the skills that are coming through the system today and what is needed in the future.

Q127 **Tonia Antoniazzi:** Rina, the semiconductor industry is renowned for its boom-and-bust cycles. Will the current international policies stem the current bust or just put fuel on the fire for the next one?

**Rina Pal-Goetzen:** We have an interesting study on this as well, which I will give to the Committee. To answer that question briefly, the industry is not predicting that this shortage situation will continue for a number of years. When the boom and the bust will next happen remains to be seen. There is still a huge shortage in the legacy nodes. Investment in that is delayed. There are not many incentives for companies to focus on that right now for the long term. That remains a shortage issue. Right now we have such a situation of shortage that when the next cycle will happen is unknown.

Q128 **Tonia Antoniazzi:** There is a shortage issue. Are there opportunities that would take very little effort to improve the overall semiconductor supply chain?

**Rina Pal-Goetzen:** There are a few things that can be prioritised to make that happen. The UK should still prioritise retaining and growing intellectual property in this design area. Since it currently has a strong position in this, that is a very competitive area for the UK. It would not want to lose the strength it has there.

As was just discussed, the leading node chips are becoming so expensive. The 14 and 16 nanometre chip designs cost approximately £40 million to design while the three-nanometre chips are expected to cost nearly £300 million just on the design side. That is because of the increasing complexity. As such, the UK should consider incentives for the companies to keep working on this. That has probably been the message from all of the industry members today.

While the leading node designs are expensive, they are still less expensive than the capex costs for leading-edge foundries, so the UK could support the design chain at a lower overall cost than incentivising leading-edge foundries. That would also go very far to addressing the shortage issue.

Lastly, the UK Government could also encourage and support the work between design, EDA and the foundries to make it easier for the design companies to port work from one fab to another. This would make it



easier for design companies to find the necessary foundry capacity and would reduce the contract manufacturing cost for them as well. This is a specific area where the UK has a specialty and a competitive advantage over other locations.

Q129 **Tonia Antoniazzi:** Trish, do you have any comments on that question about the next bust?

**Trish Blomfield:** Rina's point on the legacy nodes is important. We are an advanced logic manufacturer, so we invest at the leading edge. We think that what we call the golden era of semiconductors is coming; we are at the beginning of that now. Demand is going up, but at the same time we are seeing a shift. The predicted shift is to have more of that demand landing on leading-edge nodes, partly because leading-edge nodes are where capacity investments can make a difference to alleviating shortages. It is much harder to invest new capacity on trailing nodes. The predictions are that there will be a structural shift towards some of the leading nodes.

Are there any quick fixes? I can talk about some. We have been doing quick fixes for as much and as many as we can. One of our assembly test factories is in Vietnam. The shortage was not in the chips; it was in the substrate. The silicon is landed on a substrate and then packaged with a heat sink. The shortage we were experiencing, which our downstream customers then experienced as a result, was in the substrate. We changed our process to take some of the processing in house in order to be able to do it ourselves and alleviate some of the load on the substrate supply.

We are able to do that because we do a lot of the design. We own the full chain. There are many, many complex interrelationships and ripple effects from particular acute shortages. As Rina said, those ripples will maybe extend into 2024, but the long-term trajectory is that the world is becoming more digital, and digital needs more semiconductors.

Q130 **Alexander Stafford:** Rina, we have been told that the semiconductor supply chain is an incredibly complicated apparatus and there are many options about the best way to advance it. In your view, what would a resilient semiconductor supply chain look like?

**Rina Pal-Goetzen:** A resilient supply chain has to look like countries co-operating. Right now the problem we have is that there is intense competition between countries that are not very co-operative. This is creating a national security issue for many places. We call it friend-shoring here, because no country can really develop all these things on its own.

Making sure there is co-operation between countries that are aligned and allied will strengthen the ecosystem, make security issues better and really help to make a counterweight to the countries we are not in line



with so we do not have a critical shortage, which would be disastrous to the economy, national security and defence across the board.

Q131 **Alexander Stafford:** Focusing on the domestic side of things—you mentioned the international side of it—what do nations like Britain need to do to increase the resilience of the domestic semiconductor industry? Is it just the international picture that they have to focus on?

**Rina Pal-Goetzen:** In this ecosystem, every country is playing its part. The UK is playing its part in semiconductor IP and design development. Focusing on your strengths, the Government incentivising that and incentivising countries investing there is going to go very far in strengthening the domestic industry there. There are so many places that are critical and need to play their part. Making sure they are part of that will strengthen them.

Q132 **Paul Howell:** Trish, we have heard throughout this about the strength of the UK in design, R&D and this end of the scale. We have talked a lot about the international supply chain and the whole resilience of that supply chain. Can you just talk a little bit about what the UK could do either domestically or internationally to better help the supply chain as a whole, and itself in the meantime, just to make more resilience? Are there parts of the chain that they should be pushing into, for example?

**Trish Blomfield:** I would probably need to reiterate what I am seeing happen at the moment. There has been this realisation, exacerbated by the pandemic, and companies are working with their suppliers to shore up their alliances and agreements, and looking at the resilience of their own supply chains. Governments are setting up international collaborations as well. The UK does have these areas of expertise and leverage. Compound semiconductors and quantum have come up today. Being part of those growing sectors of the semiconductor industry seems to be quite a natural step.

We are seeing the creation of these international collaborations and alliances, but to some extent the industries are also defining new alliances. For example, the automotive industry, seeing the challenges it had with this non-resilient supply chain, which took quite a few people by surprise, is now renegotiating, reassessing and re-establishing its alliances. Yes, there will be shocks, but they will be ones that can be recovered from more quickly. Being part of those is extremely important.

Q133 **Paul Howell:** Can I just get your opinion on the national security aspect of the supply chain? What are the Government's actions doing at the moment? What is the international community's view of the UK Government's perspective on this?

**Trish Blomfield:** Semiconductors are a matter of importance for both economic growth and national security. We fully understand that. What are Governments doing? We are the same as all other companies. We comply with whatever restrictions are placed upon us in terms of export controls, largely in the US, as was discussed earlier.



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**Rina Pal-Goetzen:** That covers what I would mention as well. The international co-operation part right now is a key theme at the WTO. We need to make sure that is still relevant and that countries are committed to multilateralism. The semiconductor industry is an absolute key example of why we need that kind of multilateralism to work. That would ensure the strength of this ecosystem.

**Chair:** Thank you very much. That brings the session to an end. Trish Blomfield and Rina Pal-Goetzen, thanks for your contributions to finish us off today.