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With that, Handel, I will turn it over to you and we will start the debate after that.

Handel Jones, Founder and CEO of International Business Strategies (IBS)

Today, we will talk about the underlying capabilities of AI, which is semiconductors and I will just give you some background about myself and the company. IBS has been business for nearly three years and we work with most of the major semiconductor companies, as well as national institutions, but also extensively with governments. We worked with the US government on their strategies for semiconductors and I have spent a lot of time in China working on semiconductors there. I have also interfaced with the French government and we had a high-level discussion with the French government last week, as well as Japan, Taiwan, and we are now also doing some work for India and potentially Vietnam. We work on a global basis and a key part of what we do is focusing on the growth and evolution of AI, and then focusing very heavily on the semiconductor support for AI. Of course, the key part of the essence of AI is data and in some ways data has similarities to oil. I am also going to cover why semiconductors have become so important in the last few years, and one of course, is that now the governments of many countries are involved as well as supply chain issues. The third factor is that of the emergence of generative AI, because it is going to change multiple industries. I will cover some of those points and focus very heavily on the semiconductor supply that is needed to support AI.

Today, we see AI in smartphones, the genre functionality in smartphones is based on AI and this is a beginning and we are going to see many, many new applications emerging. In the automobile industry we see semiconductor consumption in 2030 of around 2 500 per vehicle compared to USD 500 in 2020 and of course, a key part of that is the self-driving capabilities that will emerge. Nvidia has had very high visibility recently in terms of datacenters and we can think of datacenters in some ways as equivalent to oil refineries. A large amount of data goes in and it gets processed and then of course, the mutualization of data is very widespread. The key building block function of AI is the Nvidia GPU, which costs them about USD 3 000 to make it and they sell it for USD 50 000 and there are global shortages.

This is the beginning of what we call generative AI and the impact initially is in the datacenters but we will see widespread use in the Edge devices and applications in the future, which will produce major opportunities for countries in the Middle East, Europe, the US and other global regions. Governments are becoming increasingly active in semiconductors and supply chains were the initial driver. Cars could not be shifted because of lack of semiconductors, so we now see the joint venture between GlobalFoundries and STMicro, we see a FAB in Germany for TSMC and one for Intel, the US Chips Act is producing some money. Governments now are particularly involved in decision processes with semiconductors, which was not the case in the past and AI will increase their involvement.



The semiconductor market will be a trillion dollar market by 2030, which IBS and others predicted back in 2017. Of course, this is a huge industry with significant growth potential but it is very fragmented in terms of many different products.

A trade war has emerged in the semiconductor industry between the US and China and of course, part of it was supply chain issues. However, the US sees China becoming a major competitor in terms of semiconductors but the real interest of it right now is on Artificial Intelligence. The key building blocks for semiconductors in terms of the Artificial Intelligence is processors, and this is where there is a trade war right now between the US and China regarding the processor supply chain. AI is also increasingly important in military applications, drones rely very heavily on AI and software for military intelligence is a key factor in terms of the AI arena.

China is moving rapidly in building semiconductor capabilities and I came back a week ago from my third visit to China this year. I spent about six weeks in China this year and we see rapid progress in a number of areas and China has a large number of highly skilled engineers, and the Chinese government is providing large funding. The role of Taiwan is predictable, TSMC produces approximately 60% of the foundry market and 90% of advanced feature technologies and Apple, Qualcomm, Nvidia, all these companies depend on TSMC. What happens to TSMC in the future is a question for another discussion and we have significant visibility on what some of the potential options are.

Generative AI is effectively a new capability within the semiconductor industry. Generative AI is the ability to develop software that then allows tasks to be addressed very effectively. ChatGPT can create content, but the real value is software development that then allows new applications to emerge. We heard in the last presentation about digital health and that is going to be one of the biggest growth industries in 2030 to 2040 and generative AI and semiconductors are a key part of that. Sensors will also be a key part of that and of course, sensor capability and leadership is in Europe. In generative AI we think it will be important to have global collaboration which will be between countries with different skillsets, but also different requirements. This is a new era for the semiconductor industry and again, generative AI is a new capability that will revolutionize many applications.

As I said, generative AI is basically the ability to generate models and the initial activity is in datacenters. I mentioned Nvidia and their revenue from datacenters in 2014 was 199 million, this year it will be 40 billion. What IBS has done is to quantify the value of generative AI, looking at each product category and then at the value of AI and this is what we have in terms of the impact of AI in 2030. AI will represent USD 760 billion out of a total trillion dollars of semiconductors industry. This really has a huge impact in terms of semiconductor production and supply, but also now increasing government control over semiconductors. This is going to change the semiconductor industry supply chains and it is going to produce many new opportunities.

In summary, what we see in the semiconductor market is the market will decline this year but grow next year and then there will be fairly strong growth between now and 2030. However, the trade war between the US and China will become more contentious. We are seeing more restrictions being placed on China and it is hurting China. China is trying to do some mature technologies, which will be okay for a while, but there is going to be a point where China will push back and that will potentially create significant supply chain issues on a global basis. That may occur in 2025, 2026 or 2027, but it will happen. The trade war issues have some bases for national security but we question other areas. The end result is that China is making huge investments in semiconductors but, as I said, there will be significant escalation of the conflict in the future.



The growth of the semiconductor market right now is driven quite heavily by smartphones and datacenters, but we are going to see Edge devices being the key factor in terms of generative AI. What are the applications? As mentioned earlier, digital health is revolutionary and I have been exposed to some activities at Stanford and Harvard, and we will have major benefits in terms of a reduction or decrease in the importance of diseases, longer, more product lifetimes, etc. This is going to change society and it will take large resources and also collaboration. Food production is another area where there are going to be significant benefits from generative AI. The education system will have to change dramatically. What is being learned today will become obsolete with generative AI. What people will have will be what we call a virtual digital twin, which will have a higher IQ in terms of data analysis than the human brain. We will have autonomous transportation which will change logistics. We think that China will actually be the first market to adopt generative AI and L5 ADAS, maybe by 2035, but is it going to come. We are going to have major changes in society. We are concerned about the danger of AI but it is important to accept AI and try to accelerate the adoption because the benefits will far outweigh the limitation.

Thank you very much. That is my presentation, I wish I could have more time and could be there.

Paul Boudre

Thank you, Handel, stay with us if you can. What we are hearing from the previous panel and what Handel has shared with us is that we are entering a new era.