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Q2 2019 Taiwan Semiconductor Manufacturing Co Ltd Earnings Call

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## PRESENTATION

**Elizabeth Sun** *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division*

(foreign language) Welcome to TSMC's Second Quarter 2019 Earnings Conference and Conference Call. This is Elizabeth Sun, TSMC's Senior Director of Corporate Communications and your host for today. Today's event is webcast live through TSMC's website at [www.tsmc.com](http://www.tsmc.com). If you are joining us through the conference call, your dialing lines are in listen-only mode. As this conference is being viewed by investors around the world, we will conduct this event in English only.

The format for today's event will be as follows. First, TSMC's Senior Vice President and CFO, Ms. Lora Ho, will summarize our operations in the second quarter 2019 followed by our guidance for the third quarter. Afterwards, Ms. Ho and TSMC's CEO, Dr. C.C. Wei, will jointly provide the company's key messages. Then TSMC's Chairman, Dr. Mark Liu, will host the Q&A session where all our executives on stage including TSMC's Deputy CFO, Mr. Wendell Huang, will entertain your questions.

For those participants on the call, if you do not yet have a copy of today's press release, you may download it from TSMC's website at [www.tsmc.com](http://www.tsmc.com). Please also download the summary slides in relation to today's conference presentation.

As usual, I would like to remind everyone that today's discussions may contain forward-looking statements, which are subject to significant risks and uncertainties which could cause actual results to differ materially from those contained in the forward-looking statements. Please refer to the safe harbor notice that appears on our press release.

And now I would like to turn the microphone to TSMC's CFO, Ms. Lora Ho, for the summary of operations and quarter -- current quarter guidance.

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**Lora Ho** *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales*

Thank you, Elizabeth. Good afternoon, everyone, and thank you for joining us this afternoon. My presentation will start with financial highlights for the second quarter and followed by the guidance of the third quarter.

Our second quarter revenue increased 10.2% quarter-over-quarter as we already passed the bottom of the cycle of our business and began to see demand increases. Gross margin increased by 1.7 percentage points sequentially to 43% mainly due to the absence of photoresist defect material incident and a slightly more favorable foreign exchange rate. Total operating expenses represented 11.2% of net revenue, lower than 11.9% in the first quarter. Operating margin increased by 2.3 percentage points sequentially to 31.7%. Overall, our second quarter's EPS was \$2.57, and ROE was 16.2%.

Now let's take a look at revenue by technology. 7-nanometer process technology accounted for 21% of wafer revenue in the second



quarter, 10-nanometer was 3%, and 16-nanometer was 23%. Advanced technologies, which are defined as 16-nanometer and below, accounted for 47% of wafer revenue, up from 42% in the first quarter.

Now let's talk about the revenue contribution by platform. Smartphone increased 5% quarter-over-quarter to accounting for 45% of our second quarter revenue. HPC increased 23% to accounting for 32%. IoT increased 15% to accounting for 8%. Automotive increased 3% to accounting for 5%. Digital consumer electronics and others went down slightly, accounting for [6%] and 4% (corrected by company after the call) of our wafer revenue.

Moving on to the balance sheet. We ended the second quarter with cash and marketable securities of TWD 765 billion, an increase of TWD 4 billion from the last quarter. On the liability side, current liabilities increased by 220 -- TWD 244 billion as we accrued about TWD 259 billion for 2018 and for first quarter 2019. 2018 cash dividend of TWD 8 per share will be paid today. And the first quarter 2019 dividend of TWD 2 per share will be paid out in October.

On financial ratios, accounts receivables turnover days decreased 7 days to 42 days. Days of inventory decreased 3 days to 76 days primarily due to lower days in work-in-progress inventory and finished goods, both of which resulting from higher shipments out of inventories built in first quarter '19.

Now let me make a few comments on cash flow and CapEx. During the second quarter, we generated about TWD 118 billion cash from operations and spent TWD 116 million in capital expenditure. As a result, we generated free cash flow of TWD 1.4 billion, and our overall cash balance increased TWD 4 billion to TWD 650 billion at the end of the quarter. In U.S. dollar terms, our second quarter capital expenditure was USD 3.75 billion.

I have finished my financial summary. Now let's turn to third quarter guidance. Based on the current business outlook, we expect third quarter revenue to be between USD 9.1 billion and USD 9.2 billion, which is an 18% sequential increase at the midpoint. Based on exchange rate assumption of USD 1 to TWD 31.0, gross margin is expected to be between 46% and 48%. Operating margin is expected to be between 35% and 37%.

This concludes my financial presentation. Let me follow by making a few comments about profitability, CapEx and the cash dividend.

First, about profitability. Let me make some comments on our second quarter and third quarter and our overall profitability outlook. Our second quarter '19 gross margin improved by 1.7 percentage points sequentially mainly due to the absence of the photoresist material incident from first quarter and a slightly more favorable foreign exchange rate. The reason second quarter revenue is slightly above the high end of our guidance but gross margin is at the low end is because the pace of cost improvement at N7 did not meet our plan in second quarter. But we expect costs to gradually improve towards the plan starting from the third quarter. We have just guided third quarter '19 gross margin to improve by 4 percentage points sequentially at the midpoint mainly as we expect a higher level of overall capacity utilization.

Our gross margin in first half '19 was primarily impacted by a low capacity utilization rate. But as our business and utilization rate improves in the second half of this year, we believe about 50% is still a good target for our gross margin going forward.

Now regarding 2019 CapEx planning. At the end -- at the beginning of this year, we have guided our 2019 CapEx budget to be between USD 10 billion and USD 11 billion. However, over the last 3 months, we have seen an acceleration in the worldwide 5G development. We believe this will lead to an increase in demand for our 5-nanometer and 7-nanometer technologies beyond the level we forecasted 3 months ago. We are, therefore, working closely with our customers on the most effective capacity planning for our N5 and N7. We expect our 2019 CapEx is likely to exceed the high end of our guidance range. We are currently evaluating our 2019 CapEx plan and expect to provide you a more detailed update during our October earnings conference.

The last comment is about the cash dividend distribution. We have communicated our dividend policy earlier this year. We will have sustainable cash dividend per share on both an annual and a quarterly basis. In addition, as our free cash flow increases, we will distribute about 70% of our free cash flow as cash dividend. TSMC's AGM in June approved the Board's approval of TWD 8 cash dividend



per share and full year -- for full year 2018 and the revision of the Article of Incorporation to adapt quarterly dividends. The Board then approved TWD 2 per share dividend for the first quarter 2019 which will be distributed in October 2019. Therefore, TSMC's shareholder will receive a total of TWD 10 cash dividend per share this year. That also means shareholder will receive at least TWD 10 per share cash dividend for 2020. Going forward, TSMC has set the payment months for the quarterly dividend as January, April, July and October of each year.

This concludes my remarks. Now I would like to turn to C.C. Wei for his comments.

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Thank you, Lora. Good afternoon, ladies and gentlemen.

Let me start with the near-term demand and inventory. We conclude our second quarter with revenue of TWD 241 billion or USD 7.75 billion, slightly above our guidance due to a higher demand from HPC and IoT applications as compared to the time when we gave guidance. Although our business continues to be impacted by the softer overall global economic condition, customer inventory management and high-end mobile product seasonality, we have also passed the bottom of the cycle of our business and began to see demand increases.

Moving into third quarter this year. TSMC's business will be driven by new product launches of premium smartphones, the acceleration of 5G development and the increasing adoption of our industry-leading 7-nanometer node by high-performance computing applications.

Now let's talk about the inventory. Our fabless customers' overall inventory is being gradually digested throughout second quarter. We expect it to reduce to several days above seasonal level exiting the second quarter, leading to an improved inventory environment for the second half of this year. Although a soft global economic condition and trade uncertainties remain, we expect our business to be much stronger in the second half as compared with the first half of this year due to the strong demand for our industry-leading 7-nanometer technology solutions.

The progress of our advanced technologies is well on track, and we are very confident in our technology leadership. Over the last 3 months, we have seen an acceleration in the worldwide 5G development. This would speed up the introduction and deployment of 5G network and smartphones in several major markets around the world. We expect this to lead to an increase in demand for our 5-nanometer and 7-nanometer technologies. And we are working closely with our customers to carefully plan out capacity to meet their demand, as our CFO just said.

Now I will talk about the N5 status and N3 development. Our N5 technology has already entered risk production in first quarter. Customer takeout activity are underway, and volume production is scheduled in first half of year 2020 with 80% logic density gain, 8-10 percent, and 15% speed compared with the 7-nanometer, we believe our N5 technology is the most advanced in the foundry industry with the best density, performance, power and transistor technology. Our 5-nanometer technology solution will be the foundry industry's most advanced solution until our 3-nanometer arrives. We are confident that our 5-nanometer will have a strong ramp and be a large and long-lasting node for TSMC.

On N3, the technology development progress is going well, and we are already engaging with the early customers on the technology definition. We expect our 3-nanometer technology to further extend our leadership position well into the future.

Now I will talk about the ramp-up of N7, N7+ and the progress of N6. We have seen very strong demand at N7 across a wide spectrum of products from mobile, HPC and IoT applications. Meanwhile, our N7+, which adapts EUV for a few critical layers, has already entered volume production. We expect our customers' end products using N7+ will be in the market in high volume this quarter. We expect strong demand to continue into next year.

N6 provide a clear migration path for second-wave N7 products as its design rules are 100% compatible with N7 while providing 18% logic density gain and performance-to-cost advantage. N6 will use more EUV layer than N7+. N6 risk production is scheduled to begin in first quarter year 2020 with customer product tapeouts in second half 2020. The volume production starts before the end of year 2020.



We reaffirm N7, N7+ will contribute more than 25% of our wafer revenue in this year. And we expect even higher percentage in next year on N7, N7+ and N6 because development of 5G accelerates and demand from HPC, mobile and other applications continue to grow.

Now let me talk about TSMC's competitiveness. The foundry business model has proven to be the most efficient model in the semiconductor industry. As a pure-play dedicated foundry, we collaborate and work closely together with our customers to unleash their innovation to the market and enable their success. We do not have any internal products, and we do not compete with customers.

Within foundry, TSMC competes on technology leadership, manufacturing excellence and customers' trust. Our trinity of strengths enables us to be everyone's foundry. We have the most useful and robust technology offering across both advanced and specialty technologies. We work diligently to protect our customers' technology, extend our leadership and accelerate our technology differentiation. We are the world's largest and trusted provider of logic capacity with an excellent manufacturing track record. We will continue to unleash innovations for all our customers for years to come.

Finally, I'll talk about our CFO transition. After serving very well as TSMC's CFO for the past 16 years, Lora Ho will take on new challenges ahead of Europe and Asian sales. Subject to the Board of Directors' approval, Wendell Huang will become TSMC's new CFO effective September 1. Wendell has been with TSMC for 20 years and has served as TSMC's Deputy CFO and Head of Finance Division. He brings a wealth of experience and knowledge of TSMC, and I am confident he will continue the strong tradition of TSMC's finance organization. I'm excited about both appointments and look forward to continue to work closely with both Lora and Wendell in their new roles.

Thank you for your attention.

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

This concludes our prepared statements. Before we begin the Q&A session, I would like to remind everybody to limit your questions to 2 at a time so that all the participants have an opportunity to ask their questions. Questions will be taken both from the floor and from the call. Should you wish to raise your questions in Chinese, I will translate it to English before our management answers your question. For those of you on the call, if you would like to ask some questions, (Operator Instructions).

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## QUESTIONS AND ANSWERS

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

We'll start the questions first from Crédit Suisse's Randy Abrams.

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**Randy Abrams Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department**

Maybe since it's Lora's last time and we also have 2 CFOs, so I'll start with the financial questions. On the gross margin, if you can elaborate just a bit more on what were the triggers for the slower progress on gross margin, as it seems uncharacteristic for TSMC at least recently to have a bit of impact on process ramp-up. And then looking forward on the 50%, if you still expect that target toward the end of this year and if looking into next year, as you ramp up 5 and normally have a 2- to 3-point impact, if you still expect 50% reasonable for next year?

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**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

When we ramp up any new technologies, we have a series of productivity, cost improvement activities on the plan. 7-nanometer is the same. 7-nanometer now is very, very busy. There's a lot of new tape-out. So in second quarter, we have set a goal, but we did not achieve the goal. That is why, as I've explained earlier, the margin fall into the low end of the guidance. As I said earlier, we have -- back on track to gradually improve productivity and with the volume continue to come in third and fourth quarter. And we are still confident we can achieve our cost reduction and productivity target. As to the 50% gross margin, I think for the whole year, I think the main reason is the lower utilization particularly in the first half of the year. As I've said, if we can maintain the high utilizations, which we believe we can, the 50% is still a good target going forward.



**Randy Abrams *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department***

Okay. And that implies also fourth quarter, fourth quarter of this year?

**Lora Ho *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales***

That is certainly my hope.

**Randy Abrams *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department***

Okay. Great. Okay. Second question, I actually wanted to ask a bit more on the sales growth outlook you've put out. And maybe the first starting point is you originally guided the full year would be growing back in April, and so I was wondering if you can update that expectation. And then to dig into the growth, if you could talk a bit about -- in that guidance for high-teens growth for the different segments, the HPC, auto, IoT, smartphones, how you're seeing each of those segments for second -- for third quarter and second half and if you're also seeing cryptocurrency come back.

**Mark Liu *Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board***

Well, for the first part, I think C.C. can answer, yes.

**C. C. Wei *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO***

Okay. What is the first part?

**Randy Abrams *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department***

Wrong question. First part was if you still think you can grow for this year?

**C. C. Wei *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO***

For the whole year?

**Randy Abrams *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department***

For the whole year.

**C. C. Wei *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO***

Let me give you some kind of a taste. Right now, the uncertainties really become in these days really hard to stay, so I cannot give you kind of, again, a very firm number of what kind of a growth we are going to get, but I can assure you that the fourth quarter would be better than the third quarter. That's all I can say. Okay. How much, I don't know yet, so you can calculate for that.

**Mark Liu *Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board***

So the key is fourth quarter we think will be better than third quarter. So I think the second part maybe, Lora, can you answer?

**Lora Ho *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales***

Randy, did you ask about the by-platform growth for third quarter?

**Randy Abrams *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department***

Yes. If -- actually, if you can just -- the third quarter and then an update on the full year for the platforms?

**Lora Ho *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales***

Okay. Third quarter, as I just guided, there's a sequential 18% growth, we are seeing very strong growth on smartphone. And also, actually, all platforms are going to grow in third quarter across the board with smartphone growing the most. And also, HPC is still growing very nicely. IoT is very strong although it's very small as a basis. And we also see automotive coming up to grow. It was kind of low in the first half of the year, okay? In terms of the whole year, we expect smartphone will grow single digit year-over-year. HPC, if exclude cryptocurrency, we will also see single-digit growth. But with the cryptocurrency, it's a declining number. IoT will grow more than double digit, very nicely. Automotive will be a down platform for the year, okay? So that is the segment analysis.

**Randy Abrams *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department***

Just the final clarification. For cryptocurrency, if you're seeing -- like how much of that activity is coming back? And do you expect to target that and then if you have the new capacity on 7 tied to that?

**Mark Liu *Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board***

On that one, C.C., will you answer that, yes?

**C. C. Wei *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO***

Yes. The cryptocurrency, recently, the pricing is up, and so we start to see the demand improving. We support the cryptocurrency by available capacities.

**Elizabeth Sun *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division***

Next question will be also coming from the floor from Morgan Stanley's Charlie Chan.

**Charlie Chan *Morgan Stanley, Research Division - Technology Analyst***

My first question is about your full year outlook. I think there's the uncertainty about the U.S.-China tension. Huawei's still in the entity list, right? So when you plan the full year or even fourth quarter, do you discount that risk? How much do you discount that risk from Huawei? And also, I think that there's a given intuition. I mean the biggest impact to the industry could be the 5G infrastructure from the U.S.-China tension. But you have seen that infrastructure demand is accelerating, right? So can you give us some sense of what you see differently about the infrastructure markets?

**C. C. Wei *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO***

All right. The effect of Huawei being the entity list and impact to TSMC, we do see some impact but not direct business between Huawei and TSMC -- actually HiSilicon and TSMC because we are -- we already announced that we continue our shipping practice. Because we follow the law, so we continue to ship. The infrastructure -- actually, the 5G's development actually accelerate, and we see a very strong demand from that. And as I said in my statement, in many countries, that they speed up the 5G deployment, and we see the increase of the demand at our leading-edge 7-nanometer.

**Charlie Chan *Morgan Stanley, Research Division - Technology Analyst***

Yes. So yes, it seems that, for example, being in the entity list, Huawei still has some restriction to update, for example, Google's mobile service. And that has impact their overseas smartphone demand. And according to your breakdown, the smartphone business still can see single-digit Y-o-Y growth, right? So I'm wondering, have you discount the potential downside risk if that entity list issue is going to last longer.

**C. C. Wei *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO***

Actually, I don't want to specifically pinpoint one customer only. All I can say is the second half, the new smartphone launches, especially the premium grade, has been the seasonality phenomena for us, always the second half. And the acceleration of the 5G actually enhance this kind of increase. That's all I can say.

**Mark Liu *Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board***

Let me add a little bit, too. Of course, the second half, there are still a lot of uncertainties, right, the geopolitical part, trade policy changes still go with the time. But I think the second half, the biggest growth momentum comes from the new smartphone launches. On Huawei's factors, yes, we think we did the discount. But Huawei -- since Huawei's been, many things happens, too. The downside is generally the smartphone market becoming uncertain in addition to Huawei themselves. So the whole Huawei -- whole smartphone market is suppressed, I think. And secondly is the trade barrier. Trade uncertainties still prevail in all sectors. So from all sectors, particularly the industrial and the consumer, I think that we will still see the momentum still coming -- not coming back. And -- but of course, the 5G momentum picking up, that is also new for the world globally, in U.S., in China, in Korea, in Japan and so forth. So those all factors combined, we think we try to make the best judgment and think that's the conclusion C.C. just delivered.

**Charlie Chan Morgan Stanley, Research Division - Technology Analyst**

Okay. That's very helpful. And my next question is to Lora. It's going to be a tough question before you transfer to another role. So a follow-up in this -- Randy's question, right? So compare your third quarter revenue scale versus the revenue scale in the first quarter 2018, that quarter you made 50% gross margin, right? So that means you have a higher scale, but the gross margin, I think, is 2 percentage point or 4 percentage points than that quarter, right? So I'm asking you whether there's any structural issue. And also, more specifically, your 7-nanometer is in the second year, right? So supposedly, it shouldn't cause the -- any margin dilution anymore, especially you are saying that 7-nanometer fab is quite busy, right? so can you explain why revenue scale is higher, fab is busy second year of the new nodes, but gross margin's low a few quarters ago.

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

Actually, utilization is still the main factor if you'll compare on year-over-year basis. Of course, there is still some dilution for N7, but this dilution will start to diminish as we have much strong demand in the second half, okay? Another thing is there's a little bit of a product mix issue. You do have -- we have portfolio of product mix. We have talked about this. There's certain technology is not -- surprisingly, is low. For example, 28-nanometer, that has some impact on our overall corporate margin. So those are the things I can think of that related to the margin changes, okay?

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

All right. We will go to the line now. Operator, please have the first caller on the line.

**Operator**

The first question comes from the line of Gokul Hariharan from JPMorgan.

**Gokul Hariharan JP Morgan**

First question, there's been a lot of discussion recently about more competitions from one of your foundry competitors. Could you, C.C., talk a little bit about a roadmap on 5-nanometer and especially your 3-nanometer? One of your competitors is looking to introduce a new transistor structure like gate-all-around. Is this going to stick with the FinFET and 3-nanometer as well? Or if it's also likely to move to a nanosheet or gate-all-around structure? That's my first question.

Secondly, could we talk a little bit about what is the activity level TSMC is seeing at 5-nanometer capacity? I think previously, you've mentioned that 5-nano is seeing -- you're building lesser 5-nanometer capacity for next year. And could we also talk a little bit about how our customers are thinking in terms of choosing for 6-nanometer versus 5-nanometer especially the customers who are on 7-nanometer today?

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

All right. Gokul, it seems -- I guess because you have a flu, so we didn't -- we can't really hear you quite well. But let me try to see if I understand your questions. First, your question is with regard to the competition within foundry. You asked whether we can compare our technology road map of 5-nanometer and 3-nanometer versus that of the competitors. And your second question is with respect to 5-nanometer where you asked that we seemed to be a little bit more conservative about 5-nanometer capacity build plan some time ago, and now we are a bit more aggressive. And so you are asking us if we have seen any difference we see in customers' demand for 5-nanometer.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

C.C., would you answer the first question?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Yes, yes, yes. The first question? First question is 5-nanometer and 3-nanometer. We think our 5-nanometer is very competitive and the first one in the industry in that geometry. And what is the risk production right now and the volume production in the first half in the next year, these continue to be the same situation. And about the 3-nanometer, let me clarify a little bit. We have evaluated all the possible options and come with a very good solution for our customer. We continue to work with our customer to define the spec, to define the approaches and to meet their requirement and I'll update you about our choices next time.



**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Let me add that, actually, our 5-nanometer is a full-node stride from our 7-nanometer. And our 3-nanometer is another full node stride from our 5-nanometer. This is very different than our competitors' road map. So if you compare their numerical, 3 is probably closer to the 5. Secondly, on the 5-nanometer capacity build -- the second question is 5-nanometer capacity.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Yes, what type do we see in customer demand.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Okay, it's C.C. now.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Okay. The 5-nanometer, in the last quarter when we communicated with you, we said that we are going to be a little bit conservative and to work with customer to plan the capacity that's necessary to support them. Now in these 3 months, because of a speed-up of 5G's development, we are working with the customer again. We have to up our -- probably we change our conservative attitude to become a little bit more aggressive and so to meet our customer's demand. Right now, this is a new development all because of 5G AI's progress.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

All right. Let's come back to the floor. Next question will be coming from Goldman Sachs' Bruce Lu.

**Bruce Lu Goldman Sachs Group Inc., Research Division - Research Analyst**

So the last couple of months has been pretty exciting in terms of the macro environment. So I think there are some changes in terms of customer behavior. Typically, we somehow synchronize their production together with their sales. So if they have some problem in terms of the sales through, they somehow change their production plan. There may be some time lag. But the last couple of months, we saw that customer is willing to be piling up more inventory, is willing to -- there are some disruption in terms of their sale through plan. But in terms of production plan, you don't really see a lot of meaningful changes at least for TSMC. So how do we forecast this kind of thing moving forward? It seems to me that the macro environment seems so dynamic, but we have -- as analyst, we have a lot of difficulties, right? We can't just follow the tweets. So can you help us how to do the -- how do you predict that kind of customer behavior in terms of the production planning moving forward?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

That's an interesting question. You ask us how we estimate or forecast the customers' inventory or how they plan out their component. Let me tell you that TSMC only receive the PO we put into production. Okay? And we did not see that strange customer's behavior and see that they are piling up of the product in expectation of something happen. Now we did not see that. That in our -- in our daily life, again, let me stress one point. We receive the PO, we do the production, and we did not see a very strange kind of phenomena.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

So don't follow the tweet. As the fabless inventory, I think Lora just reported is coming down.

**Bruce Lu Goldman Sachs Group Inc., Research Division - Research Analyst**

But one of the important customer, they don't provide the public information.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

That's right.

**Bruce Lu Goldman Sachs Group Inc., Research Division - Research Analyst**

That becomes a biggest swing factor, right?

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Most system companies, we have the inside look. But the company you mentioned, yes indeed, we do not know their inventories. But from their orders stream, we don't see any abnormal flow.

**Bruce Lu Goldman Sachs Group Inc., Research Division - Research Analyst**

I see. The second thing is the management kept on mentioning about our 5G's acceleration. Can you give us some like granularity of like what kind of revenue contribution coming from 5G in second half 2019 or 2020, either from smartphone side or from infrastructure side? What is the revenue exposure to TSMC at this moment?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Lora, do we have 5G specific pointed out?

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

We don't. It's difficult to kind of differentiate how much demand is coming from 5G. We track the demand on node basis, also on platform basis. 5G may be related to HPC, some of the smartphone as well. We do see those 2 segment are growing very strongly, if any.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Yes. Let me add some color to it. Actually, the networking processor, FPGA product, even some CPUs and also base stations, smartphone, that all are in 5G. And we see a very, very strong demand in the second half of this year.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

I think the question you're asking about, the exposure of 5G, can you elaborate what that means?

**Bruce Lu Goldman Sachs Group Inc., Research Division - Research Analyst**

Well, basically, it's now -- that is the strongest demand as management just mentioned, right? So basically, we try to get some granularity or we try to quantify how much growth we can expect moving forward, right? So yes, as I said, it can be any kind of product. So -- but the bigger revenue contribution still comes from the base station and the smartphone side, right? So that's the key area we are trying to focus on.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Yes. And the smartphone adopt -- implementation of 5G on the smartphone, we see actually stronger than when we were at 4G's ramp-up, okay? That's the information you get. And that is the opportunity for us as we consider here.

**Bruce Lu Goldman Sachs Group Inc., Research Division - Research Analyst**

Lastly, can I squeeze in, like can we still maintain that 5 years revenue CAGR's guidance?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Sure.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Okay. So that's the confirmation. Next question will be coming from Citigroup's Roland Shu.

**Roland Shu Citigroup Inc., Research Division - Director and Head of Regional Semiconductor Research**

With the 7-nanometer reach 25% of total revenue this year, and 7-nanometer will be the biggest node ever in revenue to TSMC this year. And next year, C.C., you expect 7-nanometer will be growing even more than 25% of total revenue next year? So it means that 7-nanometer will be even bigger. And then, C.C., you also said 5-nanometer going forward will be a big and long-lasting node and also will be growing bigger than 7-nanometer. So are you still maintaining this view with -- that the 7-nanometer is going to be very big next year?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

First, let me say again. It will be very big next year, all right? Why we are so upbeat on the 5-nanometer because we see that -- we forecast the ramp-up will be faster than, in terms of the revenue, faster than 7-nanometer. And we expect that our 5-nanometer as a solution to all the customers is very competitive. And the 5G AI, again, that will be a benefit to the 5-nanometers, of course, and the 7-nanometer.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

Yes. So for next year, first, you are going to ramp 5-nanometer very fastly. And then you still have a very big 7-nanometer. So for next year, so what is the overall growth outlook for you for next year?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Let's wait for next year, then I'll give you the answer. But all your statements are true.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

Okay. Second question actually is also related to this 7-nanometer and the 5-nanometer. So now your 7+ is entering mass production, so how is the EUV availability and the productivity for your 7+ so far? Has it reached the mass production need now?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

The EUV, we don't see any problem in production. So it's growing very well, on schedule, and we are very happy about it.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

How does the EUV productivity or availability compare to immersion in the same stage?

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Same stage.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Same stage, that's a long time ago. So far, it's -- on our schedule, everything's according to the plan. So that's all I can say.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

Okay. So just on outlook, do you -- so for next year, with your very fast 7-nanometer and the 5-nanometer ramp. So is this EUV going to be a big dilution to the gross margin next year?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Oh, that's a tough question. All I can say is that EUV will perform as we scheduled, all right? And EUV will be important in our cost-reduction path.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

All right. Let's go back to the line. Operator, please have the next caller on the line.

**Operator**

Next question comes from Mehdi Hosseini from SIG.

**Mehdi Hosseini Susquehanna Financial Group, LLLP, Research Division - Senior Analyst**

A couple of follow-ups. On the CapEx item, how should I think about the higher-than-expected CapEx in 2019? Is that more of the pull-in for 2020? Or your capital intensity is going to remain at a higher level looking forward?

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

We are still working on the CapEx number. We're going to report to you next quarter. I think in terms of the rushing, we are seeing more CapEx requirement both for 7-nanometer, also for 5-nanometer. For 5-nanometer, we need to pull in the tools to meet customers'



request, okay? So in terms of capital intensity, you'll probably see a -- in a short-term period, it will go higher than what I have guided, the 30% level. But in the longer term, we still believe the 30% level is still the right level of CapEx intensity.

**Mehdi Hosseini** *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst*

And just a quick follow-up on your view on Q4. I get a sense that there are still uncertain environment. What is the one end market that is the most variable when you think about the trend into Q4?

**C. C. Wei** *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO*

Could you please repeat the question?

**Elizabeth Sun** *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division*

Mehdi, you are asking what is the one end market that is most vulnerable or valuable? I didn't...

**Mehdi Hosseini** *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst*

If that makes it more challenging to you to forecasting Q4?

**Elizabeth Sun** *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division*

Most challenging, okay, for Q4.

**Mehdi Hosseini** *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst*

Yes.

**Mark Liu** *Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board*

Well, I think the most recent Japan and Korea dispute probably is the most uncertain one for the fourth quarter here.

**Mehdi Hosseini** *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst*

Sure. Sure. So how should I think about its impact by a specific end market? Is that more of a broad-based unknown factor? Is the unknown more of the broad-based macroeconomic trends? Or is that specific to one particular end market?

**Mark Liu** *Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board*

It is so uncertain that we don't -- cannot pin down specific products that are being impacted. People talk about smartphone itself could be impacted. But it's breaking down many supply chains. So it is including display or other electronic components. So that is difficult part for us to make estimation.

**Mehdi Hosseini** *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst*

Okay. Great. May I ask you one more question?

**Elizabeth Sun** *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division*

Okay. All right.

**Mehdi Hosseini** *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst*

Sure. Sure. I'll make it quick. I'll make it quick. But we -- I think there is no doubt that 5G opportunities are enormous. And -- but I just want to better understand how TSMC is planning. Carriers refer to a commercial end market or commercial after the 5G as more meaningful than consumer and handset. On the other hand, your customers semiconductor companies highlight the opportunities in the smartphone. So as you plan for your capacity -- leading-edge capacity plans, it's a very long lead time. How do you think about 5G and its impact on consumer, which is more of a handset or smartphone versus a commercial aspect, which could have an impact on your HPC or other segment?

**C. C. Wei** *Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO*

Well, actually, let me answer the question. Because 5G, what we expect is not only on the consumer products like a smartphone, per se, I do see the 5G will affect every area in our platform. For example, without 5G, the autonomous driving will not be possible. So it's very

important for automotive also. It's very important for the high-performance computing also because that's one of the networking processor where everything is connected.

It's also important for the IoT because that's where you connect all the data. And with the 5G's a multichannel with a very small latency with very high-speed and with the -- and all the data collection need to be analyzed. So I think in terms of 5G, the effect on the business and also on TSMC's capacity plan, it's enormous. So we are -- what TSMC is doing is right now working with all the customers to plan for their businesses and plan our own capacity. That's all I can say.

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**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Let me add some color for this. 5G, I think the -- if you look at next year, the biggest business influencer should be in the smartphone. And secondly, it will be the high-performance computing, which composed of the networking and other infrastructures. As far as the automotive and the IoT consumer, we have a high expectation for that. But I think it will take some time before the usage model get implemented in the market. That will come back -- come to us later.

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**Operator**

Your next question comes from the line of Bill Lu from UBS.

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**Bill Lu UBS Investment Bank, Research Division - MD and Asia Semiconductors Analyst**

First of all, I just want to say thank you to Lora for all the help over the years and patience in answering all of the questions. So thanks a lot and the best of luck.

My first question is again on 7-nanometers. If I go back and look at TSMC for 28-nanometers, that was TSMC's most successful node of all time, and that coincided with the big smartphone ramp. If I now look at 7, you've got the move from 4G to 5G, but you're also adding HPC. How do I think about the -- yes, if I look at capacity for 7, is it reasonable to assume that it could be bigger than 28?

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

7, at this same stage, is it bigger than 28? Are we...

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Yes.

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Okay. So my members say yes, but I think I don't think so.

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**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

I think revenue-wise, 7-nanometer would definitely be much bigger than 28-nanometer but not necessarily the capacity.

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Yes. Not the capacity.

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**Bill Lu UBS Investment Bank, Research Division - MD and Asia Semiconductors Analyst**

Okay. Can you give me a sense for ultimately how big 7 capacity could be relative to 28?

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

It's not more but it's close at the same stage.

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**Bill Lu UBS Investment Bank, Research Division - MD and Asia Semiconductors Analyst**

Okay. Great. Maybe I could ask that a different way. Well, just if you look at 7-nanometer demand, let's say, a year from now, what do you think is the split between HPC, smartphones and maybe the other platforms?

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Bill is asking, a year from today, if we look back and look at the 7-nanometer revenue, what will be the split between HPC, smartphone and other platforms.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

We don't have the specific number. But if you look at today's HPC and smartphone percentage ratio, I think it will be probably similar, although a fraction of the smartphone may not be the leading-edge. But for those 2 sectors, most of -- both sectors are closer to the leading-edge. So both of the factors -- both of those segments will go to 7-nanometer. So probably, smartphone will still be bigger than HPC. It's similar ratio, I think. That's the business we have today.

**Bill Lu UBS Investment Bank, Research Division - MD and Asia Semiconductors Analyst**

Great. My second question is on 5-nanometers. So a quarter ago, I asked Dr. Wei about the cost per transistor at 5-nanometers. And I heard some of the feedback from customers is that maybe it's not coming down as fast as expected. And I think Dr. Wei's answer was that TSMC is working at it -- is working on it. I'm just wondering, can you give me an update on that? Whether costs have seen improvement? Or what's the status there?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Excuse me, you're asking the device improvement? Or is it demand improvement?

**Bill Lu UBS Investment Bank, Research Division - MD and Asia Semiconductors Analyst**

No, sorry. I think if you look at cost per transistor for 5-nanometers, it's not coming down as fast as previous nodes. I'm wondering if you have an update there.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

No, I don't have any update except that right now we see a much more stronger demand.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Thank you, Bill. Let's come back to the floor. Next question will be coming from Daiwa's Rick Hsu.

**Rick Hsu Daiwa Securities Co. Ltd., Research Division - Head of Regional Technology & Head of Taiwan Research**

Just one question from me. I think, Lora, just talking about your -- this year's revenue growth by different platforms. So like smartphone, up a single digit; high performance, single digit up; and IoT, up double digit. So if I recall my memory, this set of guidance looks the same as that you've provided early this year. So can I fairly assume by your total revenue that you guys still keep the same guidance of the revenue for the whole year? Will be up slightly year-on-year?

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

There is still uncertainty on fourth quarter. What I can say now is fourth quarter revenue will be higher than third quarter.

**Rick Hsu Daiwa Securities Co. Ltd., Research Division - Head of Regional Technology & Head of Taiwan Research**

Okay. Fair enough. Just one quick follow-up. Can also you update us this year's Global Semi outlook and also global foundry's?

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Next -- you mean 2020?

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

No, no, no, this year. Yes.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

This year.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

This year's. This year, our foundry actually is a little bit negative.

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

Semi, excluding memory, negative 3%. Foundry, negative 1% this year.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

So we have been implicitly answered your question. All right. Next question will be coming from Crédit Suisse's Randy.

**Randy Abrams Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department**

I just wanted to -- there's been a lot of press and maybe it's noise about customers evaluating other foundries. So you all came out of strong in 5G, HPC. Are you -- I'm just curious if you're factoring in any offsets. Like in the past, you've had couple major customers like go back and forth between foundries. So as you look at the next couple of years, do you see that much -- like how do you see your market share? And do you see any offsets to that strength over the next couple of years?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Well, we did see the strong competition. But let me assure you that our technologies and leadership and also that our manufacturing excellent. With our customer's trust, I believe we are going to maintain our market share and increase the market share. Did I answer your question?

**Randy Abrams Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department**

Yes. Well, within that because we know about some projects like customers like AMD that have shut down or switched from GLOBALFOUNDRIES. So it's more of if you also see any offsetting drags that we should factor in just so we don't get too far ahead of ourselves, if there's anything that we saw a few years ago. We had a mobile customer shift foundries. Like if you see any offsets -- or from a market share, it still looks like -- I think in the past you've said you have pretty much all the customers. But if you still view that on the [present]?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Yes. We factor what the possible competitors' sales approach. We factor it in, yes.

**Randy Abrams Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department**

Okay. And then if I could ask on the nodes. Actually, 2 of them. One on -- as the 7 matures over the next couple of years, how you now see the variation of 7+ and 6 because I think in the past, you saw that as becoming mainstream. If you still think that 7 evolves that way or most of the customers move to the EUV version, 7+ or 6. And then for 5, for next year, how concentrated do you see that both in terms of customers? And then also if it's concentrated smartphone or you see a lot of HPC.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Let me answer that. I believe you asked about the 7+ or 6, right, will the 2 continue the 7-nanometers node. Actually, we would believe that most of the customers, especially the second wave customer, will to adopt 6, okay? Because it's 100% compatible with the 7, that reduce their burden of redesign or the IPs. So the 6 will be a very sweet spot for them to continue with the 7 route. That's one, okay. 7+, this year actually is -- we provide a better performance and better density for some of the customers that have been adopted. And it will continue to grow. The majority, as I said, will be going to 6. As for 5, 5 would be adopted by a lot of platform, that's including the smartphone, the mobile, including the high performance computing. And let me see, what else? IoT, no, no. We do not see IoT yet. At the beginning, it will be mobile and HPC.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Next question will be coming from CL Securities' Sebastian Hou.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

My first question is a little bit of follow-up on Randy's questions. So if you narrow down Randy's questions to a very leading-edge technology, the market share. Let's say, sub 10-nanometers market share in the next 3 years. What's TSMC's expectation on that? Are we going to maintain or further increase market share here?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

I'll believe we'll maintain well. We have a very high market share. Very high.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

So the -- but in terms of the very high, like, 95 is high. 90 is high. So from 95 to 90, there are...

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

You want to nail down the number?

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

I want to know the direction.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

I think direction, probably, our 16 is higher than our 28. And our 7 will be higher than our 16 and on, yes.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

All right. And then what's your expectation of 5 versus 7?

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

5, it's too early to say. But we target to be higher than 7.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Okay. My second question is can TSMC talk about the possibility of building the fab or acquiring a fab company in the United States? And would this is -- would this be out of the pure geopolitical concerns? Or any other consideration?

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

Of course, geopolitical concern is everybody's concerns. However, if you want to answer how can we solve the concern, it's not that simple. It's not building a fab outside Taiwan or any other country can solve that problem. However, we are always open to build a fab in overseas, provided we can provide the same cost structure to our customers and to our investors. So far, in the U.S, we have talked to the industry and to see whether that is a viable approach, is a good approach to our customers, given the cost differences and if given by the -- in addition to the local subsidies. But still, it's -- current supply from Taiwan is still the best solution for our customers. So we are open to that, but we are not in a hurry to make a decision. Of course, we also see some unproductive facility overseas. We don't want to increase the excess capacity for the industry. Therefore, the possible -- in addition, the approach of building a greenfield fab, acquisition is probably better for the industry. That's our current consideration. But we don't have a definitive plan today that we are going to have that in the U.S. at this point.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Great. Can I just conclude that -- so TSMC's preference is to -- if you're going to do this, your option will -- your preferred option will be buy rather than build.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

At this point, yes.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Okay. I understand. Can I add more -- one more question?



**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Follow up later.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Okay. I'll come in later.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Yes. Next will be coming from Citigroup's Roland Shu.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

I would like to switch gears to 8-inch. So you load your 8-inch at the utilization. I think it's probably below corporate average in first half. So how do you see your 8-inch demand or utilization in second half?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

The second half will be better. Actually it's because of smartphone's seasonality. So the 8-inch's utilization rate will be much higher than the first half.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

How do you compare with your corporate average?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Let me give you some taste that some of the segment actually is fully loaded.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

Okay. So this is the demand across the board. So it's not just for certain customers' rush orders.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Oh, it's demand across the board. I'm talking about the product segment.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

Okay. And second question, how about your Nanjing fab? So can you give us a color or update for your Nanjing fab?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Nanjing fab's progress went well. The loading is very healthy, and we continue our plan. We will build 20,000 wafers per month capacity over there.

**Roland Shu Citigroup Inc, Research Division - Director and Head of Regional Semiconductor Research**

Any plan to -- above this 20,000?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Right now 20,000 is our plan.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Now let's go back to the line. Operator, please have the caller on the line, the next one.

**Operator**

Next question comes from the line of Xiuxi Zhu from Standard & Poor's.

**Xiuxi Zhu Standard&Poor'S Global**

Just have very 2 brief questions. The first one is about your drop -- year-over-year drop of your net income. Could you please give us the specific reasons for the drop, the 7.6% drop in the net income? And the second question is about your outlook on the mobile sales in year

2. So you said it will be the main driver of your revenue growth. I was wondering will that be overall increase of the shipment of the mobile that you're thinking about? Or is there any other reason such as the technology upgrades over there? That's all.

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

First question, of course, to explain what the reason behind the year-over-year drop of our net income in this year, I guess, for our second quarter. The second question is the outlook for mobile, the growth that we indicated, was it because it was driven by a quantity increase? Or is it because of technology migration, so leading to a revenue increase?

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**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

Let me answer the first question. On year-over-year basis, if we look at the second quarter this year and the second quarter last year, the margin difference is mainly -- there's about 5 percentage points margin difference mainly from the lower utilization this year. This -- first half of this year has been very weak, including the second quarter. So utilization is the main reason and a little bit of product mix as well, okay?

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

What is the second question?

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**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

The second question is smartphone revenue increase.

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Yes. Smartphone revenue increase, whether it's quantity or technology migration.

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

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The second half's revenue increase due to the smartphone firstly because of seasonality, of course. So that's -- as compared with the first half, second half the smartphone is much better. Although we say that the whole year in the smartphone unit, we forecast a drop. But TSMC's revenues still grow because of, one, it's because of a silicon content increase. Second one is because we gain the market share through our customer. So we still forecast the whole year, the smartphone will increase in revenue. Especially, the second half would be much stronger than the first half. Did that answer the question?

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**Xiuxi Zhu Standard&Poor'S Global**

Yes. Great.

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**Operator**

Next question is from Yubao Hua from Tianfeng Securities.

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**Yubao Hua Tianfeng Securities Co., Ltd.**

Hello? can you hear me?

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

Yes. Yes we can.

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**Yubao Hua Tianfeng Securities Co., Ltd.**

Hello?

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

We can hear you.

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**Yubao Hua *Tianfeng Securities Co., Ltd.***

Okay. Can I speak Chinese, please?

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**Elizabeth Sun *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division***

Yes, you can speak Chinese.

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**Yubao Hua *Tianfeng Securities Co., Ltd.***

Okay. (foreign language)

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**Elizabeth Sun *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division***

Let me translate to English first. Yubao had observed our June revenue, which is a strong growth, and he wants us to comment on the second half business outlook.

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**Lora Ho *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales***

(foreign language)

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**Elizabeth Sun *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division***

Lora, can you speak in English too, for the record?

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**Lora Ho *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales***

All right. I just gave the guidance for the third quarter, where our revenue in third quarter will be USD 9.1 billion to USD 9.2 billion. That is 18% sequential growth. As to the fourth quarter, we have said we believe our fourth quarter revenue will be higher than third quarter although there are still some uncertainties. We did not provide a clear guidance on the fourth quarter yet.

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**Yubao Hua *Tianfeng Securities Co., Ltd.***

Okay. (foreign language)

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**Elizabeth Sun *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division***

(foreign language)

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**Yubao Hua *Tianfeng Securities Co., Ltd.***

(foreign language)

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**Elizabeth Sun *Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division***

Okay. So your first question is -- he likes to know the breakdown among our smartphones, HPC and IoT among our growth platforms, the revenue breakdown.

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**Lora Ho *Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales***

(foreign language) I will now provide a revenue breakdown by platform for the whole year. But I have just said, our smartphone will grow single digit. It still accounts for the biggest part of our revenue for the whole year followed by HPC. And then the rest of them are much smaller, like IoT, automotive and DCE and others.

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**Operator**

We have another question from Mehdi Hosseini from SIG.

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**Mehdi Hosseini *Susquehanna Financial Group, LLLP, Research Division - Senior Analyst***

Just one quick follow-up. But before I just -- I also want to express my gratitude to Lora Ho and wish her the best of luck in her new endeavor.

Going back to a question that came up last earnings conference call. It had to do with the SOI. And I just wanted to revisit the topic and

better understand how you're planning for some of the challenges that 5G brings, such as a lower, I think, you said power consumption and whether SOI is going to be included in your road map.

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Well, we did develop some of the technology for the RF circuit or RF technology using the SOI wafers. But we don't do the logic technology on FD-SOI. So let me make sure that everybody understands what I'm going to deliver. We don't do FD-SOI for logic -- for conventional logic technology, but we do use SOI wafer to develop RF technologies. For RF Front End, for example, that we are doing. Did I answer the questions?

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**Mehdi Hosseini Susquehanna Financial Group, LLLP, Research Division - Senior Analyst**

Got it. Yes.

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**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

All right. Let's come back to the floor. Next question will be coming from Morgan Stanley's Charlie Chan.

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**Charlie Chan Morgan Stanley, Research Division - Technology Analyst**

I have 2 follow-up questions, and if I may, I may have my industry cross-checks. So first of all, it's about the smartphone semi content increase. Can you give us some color how much is that for this year? And also when 5G comes next year, because your remark was just very bullish about the 5G smartphone contribution next year. How would the 5G smartphone to help your semi content growth in the smartphones?

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Okay. That's a good question, but it's very hard to identify what is the percentage of the silicon content increase. But let me give you some color of it, all right? The first one is -- look at your smartphone today. It's 3-camera or 2-camera or even 4-camera. Look at that. And look at the pixel size, right? You might hear some of the pixel is a 48-megapixel. Those kind of things come with silicon with it. So that's the silicon content, the first one. Actually, just some other minor things, so for example, power management IC. Now the power consumption is very important. So now every major component inside need the power management IC to come with it. One is screen driver. You need power management. The application process, you need power management. Just a lot of things.

And furthermore, let me give you in terms of 5G. You have a lot of different channels. So now even the RF transceiver or RF Front End, the die size is bigger. That's why I say -- that's why silicon content is increasing. Did I answer your question?

But how many percentage, actually, I cannot identify it.

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**Charlie Chan Morgan Stanley, Research Division - Technology Analyst**

But how significant for those modern chip or application processor? Because that's related to your businesses the most. Can you give us some percentage of increase? Like 10%, 20% increase?

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Definitely cannot. I cannot because we are working on it and we know all the minor details. So I cannot give that -- some of the information.

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**Charlie Chan Morgan Stanley, Research Division - Technology Analyst**

Okay. That's fine. So next question, switching gears back to the gross margin, right? So we -- so my question is that for your leading-edge investment, do you feel like the payback period of those leading-edge investments are getting longer or shorter, right? Because I still want to find out some explanation why gross margin kind of declined year-over-year. So it could be the leading-edge investments getting heavier, or there's a true price competition from your competitors. So I just want to get some thoughts from you on this topic.

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**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Lora, can give an idea on the payback years?

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

Okay. I looked -- actually, personally, I don't a payback year means much. If you look at the various technologies -- actually, I checked this question. They look very much the same. We all know the payback year are very much the same. However, I think the ramp profile is very different and the sensitivity of utilization to margin is different. The more leading-edge is more sensitive to margin. So leading edge needs to have very high utilization to secure the margin. That's the key, and we are working on it, okay?

**Charlie Chan Morgan Stanley, Research Division - Technology Analyst**

Okay. And to -- since I wanted to cross-check, if I may. First of all, you mentioned that you're pulling some 5-nanometer CapEx to this year, right? So next year, do you think the CapEx level would be at the range of your kind of annual guidance? And secondly, about the raw wafer price, do you think you can get a good bargain on the raw wafer price for next year?

**Lora Ho Taiwan Semiconductor Manufacturing Company Limited - CFO and Senior VP of Finance & Europe & Asia Sales**

I think next year's CapEx will have to depend on a lot of things: depend on overall market conditions, the customers' requirements and so forth. So it's probably too early to say whether it's going back to this old range or target. As we get more clear, we will communicate with you, okay? The raw wafer price, I think we have done a good job to lock in the price, and that is also a continued effort.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

I think to make sure you understand, Lora just mentioned it will exceed the top range, what we gave you today.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

All right. Follow-up question will be coming from CL Securities' Sebastian Hou.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

I have 2 follow-ups. The first one is, for the past several earnings call, I always felt like TSMC's 5-nanometer tape out activity or interest level from clients isn't as large as 7-nanometer at the same stage, if I -- well, if I'm right. Now you mention stronger 5-nanometer demand. And is it driven -- more driven by the accelerating 5G deployment or also driven by the EUV costs or EUV economy improvements?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

It's actually driven by the 5G's accelerations.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Okay. And internally, if I look at 5G acceleration, do you see them more from HPC or smartphone?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Both actually. Because our 5G infrastructure is in the HPC area. On the smartphone, almost all the premium phone is with TSMC.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Okay. If I understand that correctly, I think so far, in most of the infrastructure baseband, 5G baseband is still on 12- or 16-nanometers in mainstream right now. And so you see the accelerated 5-nanometer demand. So basically, we will assume that the next uptick will be 7 and I also see 5?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Oh, I see. I see. You are talking about that. Some of the networking processor will probably go into the 5-nanometer, but some of it stay in 7 and some of them -- but basically and actually, both of the base station is now going to the most leading-edge technology.

**Mark Liu Taiwan Semiconductor Manufacturing Company Limited - Chairman of the Board**

I think it is -- of course, in terms of revenue, smartphone is bigger than the base station, okay? And in the 5-nanometer, the big players get into 5G smartphone very aggressively. And it doesn't take many tape-outs, just a few tape-outs. They demand much bigger capacity than any other products.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Second follow-up is I'd like to hear TSMC's views on the next-generation architecture of transistor. So how do you see the FinFET and the gate-all-around or to compare that to see the pros and cons of these 2 architectures in 5-nanometer and 3-nanometer? Because it seems that one of your competitors is -- promote GAA aggressively.

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Yes, we noticed that. And actually we also have evaluated all the options, right, just as what I said. And we look at the pros and cons. And we work with our customer, and we choose the most competitive in terms of performance and cost-wise. So we choose the most competitive approaches. So we work with our customers, actually.

**Sebastian Hou CL Securities Taiwan Company Limited, Research Division - Research Analyst**

Okay. But would it make sense to assume that -- because so far, on the, say, 16 nanometer to 10, to 7, the industry standard has been FinFET. So customers will be easier to dual-source if they want to or if they can. But going -- if going forward, if there is going to be different routes, one doing GAA, one doing FinFET, would it be -- make customers' dual sourcing more difficult?

**C. C. Wei Taiwan Semiconductor Manufacturing Company Limited - Vice Chairman & CEO**

Actually, let me say that even the FinFET structure, it's very hard to switch the foundry. It's very hard because of the design rules, the architecture, the design flow are all different. At the 5-nanometer geometry, TSMC still see the FinFET as the best one, although we have evaluated all other options. But so far, we still -- in 5-nanometer geometry, please notice that, 5-nanometer geometries, FinFET is still the most efficient one, the most competitive one. For the full node transition to the next one, 3-nanometer, we are evaluating everything. We talked with our customer when we define what is the approaches that we are using.

**Elizabeth Sun Taiwan Semiconductor Manufacturing Company Limited - Senior Director of Corporate Communication Division**

So I think we can conclude our Q&A session now knowing that we had evaluated all available options and picked the optimal one.

Okay. Before we end today's conference, please be advised that the replay of the conference will be accessible within 4 hours from now. Transcript will be available 24 hours from now. Both of which will be available through our website at [www.tsmc.com](http://www.tsmc.com).

Thank you for joining us today. We hope you will join us again next quarter. Goodbye, and have a good day.

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