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Q1 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) In English, the earthquake that just took place at 1:10 this afternoon has no impact to TSMC's fabs or the back-end packaging fab. So there's no impact. Thank you.

Welcome to TSMC's First 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. If you are joining us through the conference call, your dial-in lines are in listen-only mode. As this conference is being viewed by investors around the world, we will conduct the event in English only.

The format of today's event will be as follows. First, TSMC's Senior Vice President and CFO, Ms. Lora Ho, will summarize our operations in the first quarter 2019, followed by the guidance of the second quarter. Afterwards, Ms. Ho and TSMC's CEO, Dr. C.C. Wei, will jointly provide company's key messages. Then we will open both the floor and the line for the Q&A.

For those participants on the call, if you do not yet have a copy of the press release, you may download it now from our website at www.tsmc.com. Please also download the summary slides in relation to today's conference presentations.

As usual, I would like to remind everyone that today's discussions may contain forward-looking statements that are subject to significant risks and uncertainties, which could cause actual results to differ materially from those contained in the forward-looking statement. So 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 current quarter guidance.

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

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

First quarter revenue decreased 24.5% quarter-over-quarter as our business was impacted by the overall global economic conditions, which dampened the end market demand, also customers' inventory corrections and high-end smartphone seasonality and the photoresist defect material incident.

Due to lower level of capacity utilization and the negative impact from a photoresist defect material incident, gross margin decreased 6.4 percentage points sequentially to 41.3%. Total operating expenses decreased by about TWD 4.8 billion and they represented 11.9% of total net revenue in the first quarter. So operating margin decreased by 7.6 percentage points sequentially to 29.4%. Overall, our first

quarter EPS was $2.37 and ROE for the first quarter was 14.4%.

Now let's take a look at revenue by technology. 7-nanometer technology accounted for 22% of wafer revenue in the first quarter, 10-nanometer was 4% and 16-nanometer was 16%. Advanced technologies, which we now define as 16-nanometer and below, accounted for 42% of wafer revenue.

Now let's take a look at revenue contribution by application. During the first quarter, Communication, Computer, Consumer and Industrial/Standard decreased 27%, 31%, 10% and 16%, respectively.

Now this is the last time we provide a revenue breakdown by application. From this quarter on, we will report revenue breakdown by platform as we believe this change will better represent the company's results.

Now let me explain how to read the table. The table shows the -- between the 4 application and 6 platforms how do they relate to each other. In general, within computer application, almost all revenue is from HPC. Within Communication, about 2/3 is from smartphone. HPC is about 1/5, and other platforms are single digit each. Consumer is mainly distributed between HPC and the digital consumer electronics, whereas Industrial/Standard spread across all platforms, with smartphone and HPC each representing about 30%.

Now let's take a look at revenue contribution by platform for the first quarter. Smartphone decreased 33% to accounted for 47% of our first quarter revenue. HPC decreased 26% to accounted for 29%, while IoT, automotive, digital, consumer electronics and others accounted for 5% to 7% each.

Now I would like to move on to the balance sheet. We ended the first quarter with cash and marketable securities of TWD 760 billion, an increase of TWD 65 billion from the last quarter. On the liabilities side, current liabilities increased by TWD 38 billion. On financial ratios, accounts receivable turnover days increased 8 days to 49 days, as sales decreased faster than average accounts receivable. Days of inventory increased 12 days to 79 days, reflecting 7-nanometer wafer prebuild and an increase in raw wafers.

Now let me make a few comments on cash flow and CapEx. During the first quarter, we generated about TWD 153 billion cash from operations and spent TWD 76 billion in capital expenditures. As a result, we generated free cash flow of TWD 77 billion and our overall cash balance increased TWD 88 billion to reach TWD 646 billion at the end of the quarter. In U.S. dollar terms, our first quarter capital expenditure was $2.46 billion.

I have finished my financial summary. Now let me provide the second quarter guidance. Based on the current business outlook, we expect second quarter revenue to be between USD 7.55 billion and USD 7.65 billion, which is a 7.1% sequential increase at the midpoint. Based on exchange rate assumption of USD 1 to TWD 30.85, our first quarter gross margin is expected to be between 43% and 45%. Our first quarter operating margin is expected to be between 31% and 33%.

Also, in the second quarter, we will again need to accrue the 10% retained -- 10% tax on undistributed retained earnings. As a result, our second quarter tax rate will be about 18%. The tax rate will then fall back to 10% level in the third and fourth quarter and the full year tax rate will be about 12%.

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

First, let me talk about the profitability in the first and second quarter. Our first quarter gross margin declined by 6.4 percentage points sequentially as our 7-nanometer saw a substantial cutback in utilization in first quarter due to high-end smartphone seasonality, which impacted our gross margin by close to 4 percentage points. In addition, the photo material -- photoresist material incident impacted our gross margin by about 2.6 percentage points as we indicated in our press release in February.

I have just guided the second quarter gross margin to improve by 2.7 percentage points sequentially at the midpoint. Since most of the wafer scrapped in first quarter due to the photoresist incident will be made up in second quarter, gross margin can improve by about 1.5 percentage points in this quarter. In addition, the 7-nanometer dilution in second quarter, as compared to fourth quarter '18, will be close

to 3 percentage points, which is about 1 percentage point improvement from the first quarter in terms of dilution. And we also expect a slight improvement in other nodes' utilization rate.

Our gross margin in first and second quarter are primarily impacted by a lower capacity utilization rate. As our business and utilization rate improves in the second half of this year, we believe about 50% is still a target for our gross margin going forward.

Now I will talk about the CapEx outlook. We reiterate our 2019 CapEx to be between USD 10 billion to USD 11 billion. About 80% of the CapEx budget will be allocated for advanced process technologies, including 7-nanometer, 5-nanometer and 3-nanometer. About 10% will be spent for advanced packaging and mask making, and about 10% will be spent for specialty technologies. As I have stated before, we see our CapEx forecast between USD 10 billion and USD 12 billion to support our average growth rate of 5% to 10% per annum in the next few years.

My last comment is about the cash dividend distribution. In the future, TSMC intend to return about 70% of free cash flow to shareholder every year by distributing quarterly dividends. TSMC also remains committed to sustainable cash dividends on both an annual and quarterly basis.

In June, TSMC will hold the annual shareholder meeting to approve the Board's proposed TWD 8 cash dividend per share for the full year of 2018. And the shareholder meeting will also approve the revision of the articles of incorporation to adopt quarterly dividends. Subject to the approval by the annual shareholder meeting, the Board plans to approve TWD 2 cash dividend per share for the first quarter 2019 and to be paid in the fourth quarter of 2019. Therefore, TSMC's shareholders will receive a total of TWD 10 per share cash dividend in 2019. That also means, in 2020, shareholders will receive at least TWD 10 per share cash dividend for the whole year.

That concludes my remark. Let me turn the podium to C.C.

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

Thank you, Lora. Good afternoon, ladies and gentlemen. Let me start with our near-term demand and inventory. We concluded our first quarter with revenue of TWD 280.7 billion or USD 7.1 billion, in line with our revised guidance. Our business in the first quarter was impacted by 3 factors: first, the overall global economic condition, which dampened the end market demand; second, customers are ongoing inventory adjustment; and third, the high-end mobile product seasonality. Meanwhile, the net effect from the photoresist defect material incident also impacted our first quarter revenue by about 3.5%.

Moving into second quarter this year. While the economical factor and mobile product seasonality still linger, we believe we may have passed the bottom of the cycle of our business as we are seeing customers' demand stabilizing.

Based upon customer indications for their business and wafer loading in second quarter, we also expect our customers' overall inventory to be substantially reduced and approach the seasonal level around the middle of this year.

In the second half of this year, TSMC's business will be supported by this healthier inventory base as well as strong demand from our industry-leading 7-nanometer technology, which supports high-end smartphone new product launches, initial 5G deployment and HPC-related applications. For the whole year of 2019, we forecast the overall semiconductor market excluding memory as well as foundry growth to both be flattish. For TSMC, we reiterate that we expect to grow slightly in 2019.

Now let me update the photoresist material incident. On February 15, in order to ensure quality of wafer delivery, TSMC announced it will scrap a large number of wafers as a result of a batch of bad photoresist material from a chemical supplier. This batch of photoresist contained a foreign polymer that created a desirable -- undesirable effect and resulted in yield deviation on 12- and 16-nanometer wafers at Fab 14B.

We have since taken corrective actions to enhance our defenses and minimize future risk. Our actions including the following: improve TSMC's own in-house incoming material, conforming test and controls; upgrade control and methodology with all suppliers for incoming material quality certification; establish robust in-line and off-line monitoring process to prevent defect escape.

Now I will talk about our N5 status. Our N5 technology development is well on track. N5 has entered risk production in first quarter, and we expect customer tape-outs starting this quarter and volume production ramp in first half of 2020. With 1.8X logic density and 15% speed gain and an ARM A72 core compared with 7-nanometer, we believe our N5 technology is the most competitive in the industry. With the best density, performance, power and the best transistor technology, we expect most of our customers who are using 7-nanometer today will adopt 5-nanometer. With N5, we are expanding our customer product portfolio and increasing our addressable market. Thus, we are confident that 5-nanometer will also be a large and long-lasting node for TSMC.

Now I'll talk about the ramp up of N7 and N7+ and introduction of N6. We are seeing strong tape-out activities at N7, which include HPC, IoT and automotive. Meanwhile, our N7+, which adopts EUV for a few critical layers, has already started volume production now. The yield rate is comparable to N7. We reaffirm N7 and N7+ will contribute more than 25% of our wafer revenue in year 2019.

As we continue to improve our 7-nanometer technology and by leveraging the EUV learning from N7+, we now introduce N6 process. N6 has 3 major advantages. First, N6 have 100% compatible design rules with N7, which allow customer to directly migrate from N7-based design, which substantially shortened time-to-market. Second, N6 can deliver 18% higher logical density as compared to N7 and provide customer with a highly competitive performance-to-cost advantage. Third, N6 will offer shortened cycle time and better defect density. Risk production of N6 is scheduled to begin in first quarter year 2020 with volume production starting before the end of 2020.

Now let me talk about our advanced packaging technology. TSMC's advanced packaging strategy focuses on providing advanced wafer level system integration technologies to meet customers' product needs. Currently, we have offered InFO and CoWoS for several generation and recently introduced SoIC. We believe heterogeneous integration on a packaging level has become a clear trend for many applications. All our advanced packaging platforms enable efficient system level integration, and will continue to do so.

Our fourth generation InFO solutions provide finer interconnected line width and spacing to enable both mobile and HPC products.

CoWoS continue to see good growth momentum in demand from HPC and the AI applications as we continue to expand beyond the reticle size. We are also working with a few leading customer on SoIC, which is an industry-leading 3D-IC packaging solution. We target to start production in 2021 time frame.

The traction of our advanced packaging solution has been strong in mobile and HPC segment and we have seen inquiry from automotive segment as well. We therefore believe our advanced packaging solutions will contribute to our business growth for years to come.

Finally, I will talk about the HPC as our most important growth driver in the next 5 years. CPU, AI accelerator and networking will be the main growth area for our HPC platform. With the successful ramp of N7, N7+ and the upcoming N6 and N5, we are able to expand our customer product portfolio and increase our addressable market to support applications, such as data center, PC and tablets. Meanwhile, we also see networking growing thanks to 5G infrastructure deployment over the next few years. We are truly excited about our growth opportunities in HPC.

Thank you for your attention.

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

All right. This concludes our prepared statements. (Operator Instructions)

QUESTIONS AND ANSWERS

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

First question will be coming from Citigroup's Roland Shu.

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

First question. As C.C. said, you maintain your view for the whole year revenue to grow slightly. So that means according to your first quarter revenue, second quarter guidance means that second half is going to grow very fast. So can you just let us know what kind of applications are driving so strong second half to TSMC this year?

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

The strong demand I just mentioned from 7-nanometer actually including the mobile platform, HPC platform and IoT, with a little bit flattish over automotive, but that's all that what we rely on. Actually, we will say that seasonality of the mobile phone, the new product launch that makes the major contribution.

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

Yes. And I just through this calculation. I think for second half, your revenue actually is going to grow year by year in, maybe, mid-single digit year-on-year. So I think, except for this seasonality, do you gain share or do you have more new applications in second half?

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

We actually gained some shares because of 7-nanometer. And for the new product portfolio, that will be probably you will see the effect in 2020, not much in this year.

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

Okay. Yes, and also for the second half gross margin, Lora said with this higher utilization and also with the less dilution from 7-nanometer. So is that your long-term gross margin will be -- target will be 50%. So is this means that for second half or just for the long term?

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

Both.

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

Okay. My second question is, C.C., last quarter, you said that now we are at the market with the widest addressable market driven by HPC and CPU. And C.C. also said that HPC is going to be our most important growth driver. So can you quantify how big foundry addressable market will be driven by HPC and CPU, respectively?

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

I don't think I have enough data to tell you that how much we can quantify the percentage. But I believe the HPC platform will grow double digit excluding the cryptocurrency, of course.

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

How about the CPU?

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

Too specific.

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

Okay. And I think, lastly.

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

Roland, you have more than 2.

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

This is a follow-up for the second question. Yes. So do you have any competition on this CPU foundry also?

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

Again, I don't want to be too more specific on the CPU area, all right, Roland?

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

Next. The question will be coming from JPMorgan's Gokul.

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

So my first question is on 5-nanometer. I think in the last conference call, C.C., you mentioned that TSMC will be initially building a few percentage points or some lower capacity on 5-nanometer in 2020 compared to 7-nanometer. Now that you have more visibility into your customers' plans, could you let us know what does that mean? Is that 30% lower, 10% lower? What does it mean? And why is that? Is it because customer is a little bit hesitant to go to 5-nanometer and has other options? Or you just believe that, like you previously mentioned, the only reason is that high-end smartphone demand expectation, you're taking a more cautious view on that? That's my first question.

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

Actually, Gokul, I like your last sentence, you say that's more cautiously. Let me repeat again that we say N5's initial ramp, it might be slower than the N7. First, we learned a lesson from the N7's wafer loading. Look at this year, so first quarter and second quarter right now, it's actually very low so we learned a lesson. So we are working with the customer to be more cautiously and effectively manage the capacity ramping, so that's what I said that it will be a little bit slow. But that being said, the N5's business, I want to reassure everybody that N5 as a business will grow bigger than N7 because our expanding the product portfolio, and you know what I mean. In the HPC, we have very good opportunities and on the smartphone we are gaining market share. So I will believe that N5 initial ramp probably a little bit more cautiously slower than the N7, but it will pick up quickly.

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

Okay. Got it. My second question is on the technology leadership. I think TSMC clearly now seems to be ahead of even IDMs in terms of technology leadership. How should we think about how that translates in a financial basis? What we've seen in semiconductor industry in the last several years is when one player becomes the dominant player, typically, margins go up. How should we think about this? What is TSMC's philosophy in terms of utilizing this technology leadership? Are we looking for higher than market revenue growth or we should expect structurally higher margins in the future years now that we are kind of getting through the smartphone saturation period and getting into HPC?

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

As you pointed out, we have technology leadership and supposed -- and we are working on it also. Actually, we want to grow the market share. We want to do a bigger business with a higher profitability. I don't have enough data in my hand to give you order analysis in the future years, but we are working on it. And that the goal we are working on, actually, higher profitability and gain market share.

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

So just one sub question there. I think if we observe the last couple of years, TSMC -- foundry industry has not outgrown semis, ex memory. And TSMC also has not grown much faster than the foundry industry, which was not the case in the past. In the past foundry was growing much faster than semis, and TSMC was growing much faster than semis -- foundries. So when do we expect that gap to open up between TSMC's growth and foundry growth and potentially foundry growth and semis growth itself?

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

You are asking more and more specific on the schedule. I would -- I would expect that starting from the second half of this year and extended to the next few years, we will start to widen the gap. Did that answer your question?

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

That's specific enough.

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

Next question will be coming from UBS, Bill Lu.

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

So in the last couple of months, I've had a chance to visit a few fabless customers and I feel like the feedback that I'm getting is that, maybe previously, there was more concerns about EUV feasibility. That is now mostly going away or maybe it's less. But on the flip side, I hear maybe a bit more concerned about cost per transistor for 5-nanometers. I'm wondering if you agree with that and what can be done about that.

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

Well, that's a good question. We did some calculation by ourselves. We still think that cost per transistor is still decreasing, but not as fast as it used to be. That's one thing. As you mentioned about the EUV, today, we put the EUV into mass production already, and we learned some kind of experience so that we can introduce N6. But is EUV productivity very good already? Not yet. We expect it to continue to improve every year, just as we did for the immersion photolithography. So we expect in the future that EUV will offer a best tool in terms of cost, in terms of technologies moving forward, but not today yet. There's still a lot of process complexity, so we're using the EUV to replace some of the very critical layers and the cost probably are equal today. And in the future, we hope it will improve. Once it improves, the cost per transistor will decrease faster.

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

Is there a timing for that?

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

No. But as fast as possible.

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

Sorry. Second question is just a clarification. I think, previously, Dr. Wei said that HPC ex crypto grows double digits. Is that for this year or is that longer term?

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

For this year, it's close. For longer term, that's what I mean, for longer term.

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

Yes. Really appreciate the breakout by platform. Can you help me with this year's growth, maybe just for smartphone versus HPC?

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

Both are probably in the mid-single digit, somewhere around that.

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

Okay. So HPC is close to that (inaudible).

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

Yes.

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

Without crypto, mid-single digit including crypto?

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

No. HPC without the cryptocurrency, it will be somewhere mid-single digit. With the cryptocurrency, it's dragged down.

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

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

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

First of all, just want to follow up that HPC segment. Because just compare the notes, last quarter, we said HPC excluding crypto upsizing right? Including crypto, down more than 10%. So it seems like the number seems to be a little bit better. Is that the right comment about HPC market doing better than expected?

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

Yes. It's doing better because of one of the factors or one of the components in HPC is networking. And you know that 5G's deployment, so that helped the growth of the networking quickly.

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

Okay. Yes, so I think this is related to my second question, right? I think a lot of shareholders are saying that some big customers in smartphone and the base station segment is building up inventory for whatever reason, share gain or semiconductor strategic inventory. But you mentioned -- you also said that you believe the inventory level will be back to normal around the midyear. So my question is do you worry about this kind of overbuild of inventory and how are you going to manage that kind of risk?

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

We don't specifically comment on one customer's particular business behavior, but then we share with you why we say that the inventory will be greatly reduced and be close to the seasonal level around the middle of this year. We actually looked at our history in the second quarter, the customers' growth rate, and we're using that number and look at the customers' demand number given to us in the second quarter. And we do some calculation and we come to a conclusion that they are digesting their inventory quickly. So that's how we say that in the second quarter, they are not building the inventory. They are actually -- they are reducing the inventory quickly. And that's why we come to the conclusion that in the second half, we will have a healthier inventory base.

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

Okay. Yes, maybe a quick question to Lora on cash dividend. So you -- so this year, I think the quarterly run rate is like $2 per quarter, right, but the annual dividend payout is actually $10 in total, right. So for next year, what will be the kind of minimum dividend payout? To use $2 run rate so we get like $8 for full year for 2020, is that the guidance?

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

This year, actually, is a transition year, so we issue twice of cash dividend. First, $8, followed by the $2 on quarterly basis. Starting from first quarter next year, we will only have quarterly dividends, and we want to have a sustainable on quarterly dividend and on annual both. So we will likely see more stable dividend on quarterly basis as well. So since I said, the dividend will be no less than $10, and we want to be stable on quarterly basis. So you can assume or expect we will issue $2.50 on quarterly basis at least.

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

All right. Next question will be coming from Credit Suisse, Randy Abrams.

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

I want to ask a follow-up. It was a good disclosure moving to the new platform segmentation. Could you talk about sequential pickup? How you see the different 4 platforms? How they're sequentially improving from this low level. And then for full year, since we've got the first pieces also the IoT and automotive, what your views on the other segments for the full year?

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

I will first comment on the second quarter on a sequential basis by platform and followed by the full year picture. Is that what you're asking, Randy? Okay. For second quarter, we are expecting smartphone to grow single digit. HPC grow double digit, and IoT, automotive and others will grow single-digit, and the digital consumer electronic will slightly decline. That's for second quarter. For the whole year, we expect smartphone will grow high-single digit. HPC excluding crypto will grow high-single digit as well. And IoT will grow double

digit, automotive will decline single digit, and digital still cameras and others will decline single digit. That's the overall picture for this year.

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

Okay. Great. Appreciate that. And then follow-up on the migration for these derivatives, 7-plus and 6 nanometer. It seems to date, the adoption has been rather slow for this year. If you could talk maybe about factors why a lot of customers are staying on 7 for now. And as the node matures, if you could talk about the pace? How you see customer see a percent of the node or how meaningful next 1 or 2 years for those derivative process?

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

As I said, we have a very high tape-out activity for N7 for this year. Actually, a lot of customer from the four platforms, and mostly is from the HPC area, they are all designing their product with N7. A few of them adopted N7+. But then that's why we introduced our N6 that can be 100% compatible to the N7. So I'll give you a taste of that probably starting year 2020. Most of the customers in the N7 will move to N6. And from that day on probably, the N6 will pick up all the momentum and pick up all the volume production.

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

Okay. Great. If I can ask a follow-up to, given the strength on these derivatives, 6-nanometer, 5 and optimism, do you have any different view on 28 about -- if any of this equipment could be migrated to these advanced nodes? Or do you think it will be all new capacity?

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

From node to node, we have about 90% of the common tool or bigger than 90% of the percentage of the common tool being used for the next node. So you bet that some of the tools from 28-nanometer can be used for 7 or for 5, okay? But of course, it's less and less. But to -- for the overcapacity in the 28-nanometer because of some of the non-market-driven capacity increase, our strategy is to develop some of derivative technology like a 22-nanometer and so that we can ensure that we still have a very healthy loading in the future.

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

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***

(foreign language) This is Rick from Daiwa. So I think the first question is about the follow-up on the N6. My question is would you worry whether the N6 will cannibalize N5 development because this node looks pretty close.

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

The number N6 and N5 looks pretty close, but actually the performance are -- they still have a big gap. N5 compared with N7, actually, the logic density increased by 80%, 8-0. N6 compared with N7 is only 18. So you can see there's a big difference in that logic density and transistor performance also. And so as a result, the total power consumption in the chip is lower in the N5. And also that -- there's a lot of benefit if you move into N5. But nevertheless, N5 is one of the node, full node, and it takes time for the customer to design their new products. The beauty of the N6 is if they already design in N7, they spend a very minimal effort. They can move into the N6 and gain some benefit. And so some of the customers, depending on their product's characteristics and their market, they will decide which one go to N6, which one go to N5.

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

Can I have one quick follow-up to the first question before I ask the second one? Just a quick follow-up. Can you share the number of critical layers that will be built by EUV for -- I know for 7+, you -- I think last year, you mentioned just a few layers, critical layer for EUV. What about N6 and N5?

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

Okay. N6 has few critical layers plus 1. Okay. That gives you a hint. N5 plus many, so...

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

Okay. That's very clear. And my second question is you look at your end first quarter inventory days, 79. If I don't remember wrong, I think this is probably kind of an all-time high in the history. Majority of this inventory were finished wafers or can you share some idea -- and also, can you elaborate a little bit more what's the rationale behind that 79 days?

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

Yes. Okay. Rick, 79 is really high, but there's a good reason for that. Because we anticipated 7-nanometer capacity will be very tight in the second half. Well, it's not so tight. It's very empty in the first half. So we're trying to prebuild some of the inventory for our customer in work in process. So they will not be constrained by our second half capacity. So by doing so, that work in in process value will certainly go up, right? So when we move in the second half, when we digest those inventory and demand start to pick up, our days of inventory will come down in the second half.

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

Next question will be coming from Bruce Lu, who is now with Goldman Sachs.

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

My first question is still going back to the smartphone. Management mentioned that the smartphone growth is going to be high single digit. This is substantially stronger than the smartphone shipment growth. And management also guided previously that the next couple of years, smartphone growth will be mid-single digit. Again, it's also higher than the smartphone shipment growth in our view. So where is the growth coming from? Is it mainly driven by the content growth or share gain either by your customer or yourselves share gain? And can we somehow quantify that a little bit?

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

Quantify, I probably cannot. But the answer to your question is both. We gain the market share and the content increase quite a lot.

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

Can we know like which one is stronger?

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

You got me. I want both of them to be as high as possible, but I don't have a calculation. Because of the market share gain, we have to be very careful into doing the calculation. And also the content increase. Let me say that content increase in the 5G area or in the AI area, every customer are different. So they put a different functionality inside. And we don't have a very good detail or detail insight to give you exactly a number to quantify what is the percentage per se.

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

I see. The reason I tried to dig down a bit further is that if the content growth which means that, that will be at expense of the smartphone cost structure. So you have higher content growth, which means that semi content in terms of cost structure is higher, which at the end of the day will dampen the smartphone shipment as price elastic. So how do you -- we've foreseen very, very strong content growth, which means that the cost structure for your customer will be much higher at the end of the day. So there will be certain trade-off at the end of the day.

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

There will be certain trade-off of the high-end smartphones pricing and their cost, of course. But for TSMC, our job is to fully support customers' need. When they need this functionality, they need this kind of speed, we support it. Whether that will increase their pricing or the smartphones end market strategy, that's not really our concern. We support it all the way.

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

Okay. My second question is more for Lora. So can you somehow help us to quantify the margin impact in 2020 as we can expect like very high -- very quick ramp-up for the 5-nanometer, which naturally, in the first year, there will be the negative margin impact. And we will come into the third year of 7-nanometer, so the margin negative impact should be less, but you have new margin negative on 5. So how do we -- can we get some color on it?

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

The margin impact actually has 2 front. Number one, introduction of new technology as you just mentioned. Usually, in the first year, there's a dilution to corporate gross margin. The other factor is utilization on each technology node, particularly the advanced technology node is more sensitive to utilization. So if we look at the corporate margin, we have to take consideration of both. But if we just talk about the leading-edge introductions, N5 will be like N7. It will have some dilution next year. And so we have indicated before, it takes 7 or 8 quarters to reach to corporate level. We believe N5 will follow the same pattern.

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

But can we assume that the first 2 quarters of N5 in the second half next year when you ramp-up the negative impact for the margin is likely 2% or 3% like what we had in 7?

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

No. We need to look at what's the ramping speed as well. Because if you ramp faster, eventually, you can get through the learning curve quicker. So if you ramp slower, you'll take long time. So it's -- many factors will affect that.

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

I see. Because most of the investors' concern is that with EUV potential higher CapEx, blah, blah, blah, so that might have higher negative impact in terms of gross margin when we ramp up 5. So we just want to get some color to clear the concern.

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

I think the N5 impact will not have difference than our previous leading nodes.

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

I think this is about time that we should go to the line for the questions. Operator, could you please have the next caller on the line?

Operator

Sure. Next question is from the line of Brett Simpson of Arete Research.

Brett Simpson ***Arete Research Services LLP - Senior Analyst***

I have plenty of questions for C.C. First on FD-SOI. It seems to be getting more traction in 5G than we first thought both on the -- on RF-SOI and on the modem side for handsets. So I'm just keen to understand if TSMC might consider supporting FD-SOI or RF-SOI. And if not, how you plan to defend against it?

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

Okay. The question is FD-SOI has some good momentum in 5G area. And does TSMC consider to develop the FD-SOI? The answer is no. Actually, we also offer very good technology, 22 nanometer technology that today's performance is very comparable to FD-SOI, if not better. And we're talking to the customer right now and a lot of customers start to adopt the TSMC's approach. So no, we are not going to develop FD-SOI technology.

Brett Simpson ***Arete Research Services LLP - Senior Analyst***

Okay. And just a follow-up, C.C. Can you give us your perspective on TSMC's strategy for compound semiconductor materials like gallium nitride or silicon carbide? It seems to be still very small market, but the potential long term seems to be quite significant. So how does TSMC plan to deploy these in its variance?

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

Okay. The question is about III-V compound or compound semiconductors. TSMC actually is developing the gallium nitride technology to support the power management IC or the high-voltage, high-current power management. And others like gallium oxynitride high frequency or those kind of thing, no, we are not doing it. We -- actually, we are doing the gallium nitride project to support our customers' need. That, today, we are doing. Silicon carbide, no. We are not doing it also.

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

Operator, can you have the caller on -- the next caller on the line, please?

Operator

Sure. We have Mehdi Hosseini of SIG.

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

Two questions. First one, is your guide on the smartphone revenue growth of high single digit this year impacted by one of the leading semiconductor company exiting the baseband business. And I'm just trying to better understand how you view going to capitalize this opportunity, and I have a follow-up.

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

Mehdi's question is that whether or not this year our high single-digit growth in the smartphone platform is affected by 1 very large company's exit from the baseband market.

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

Well, again, we don't comment on specific customer's business situation, but I will say this year that we have a high single-digit smartphones, of course. It's because, one, we gained market share. Two, again, that silicon content is higher. So that's why we say we have a high single-digit growth.

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

Okay. Great. And then turning onto the 6-nanometer. I'm just trying to better understand the applications that would utilize 6-nanometer. And if I heard you correctly, 6 is going to be ramping later than 5. And if you could elaborate on the current applications that would use that would be good at understanding that particular node?

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

Right. The question is about N6. It looks like N6 is behind N5 in terms of schedule. So what is the application? Well, again, I want to reiterate that N6 is coming from the N7, N7+ experience and learning. And so the N6, if you -- a lot of customers are already entering N7 with a lot of tapeouts. So N6 provides them a very good path that they can easily port their current products into N6. So gain the benefit of either the performance, the die area and also the shortened cycle time. N5 is a totally new node. So we're entering into a very new area. If you start to design the N5 today as compared with you want to enter the N6 with N7 already in your pocket, I think N6 will be much easier. I cannot say that N5 is difficult, but TSMC will help you to move into N5, of course. But you look at the effort that you build the ecosystem. Ecosystem is the one that's very important for all the product companies want to design their new products. N7's ecosystem has been very complete. We even offer to the automotive grade, okay? And not to mention about mobile, HPC, everything. The ecosystem are ready, and equally mature will be the N6. Because we're 100% compatible. Of course, you still have to do some modification. If you want to shrink your die, you have to rerun your timing, closure, those kinds of things. But still much easier from N7 go to N6 rather than N7 go to N5. And that's the beauty of these 2 technologies. Did I answer the question?

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

Yes.

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

Follow-up question from Citi's Roland.

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

So it looks like 2020 will be a very busy year to you. You are ramping up N7 plus, N6 and N5 together in the same year. So what kind of revenue growth projection underlying these 3 key technology ramps next year?

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

Roland, we don't forecast next year. And please attend the first quarter next year.

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

Okay. Then you have so many new technologies ramp up next year. So how about 2021? So any new technology? What kind of new technology you are going to launch in 2021?

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

Please attend next year's...

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

My next question is for Lora. So I looked at your 20-F. I think now your total accumulated legal capital reserves have exceeded paid-in capital in 2018. But still, Board of Directors on mid-teen in February have approved to continue appropriating 10% of 2018 net income to legal reserve. So why don't you just pay this 10% to investors in order to improve your ROE?

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

We are increasing the dividend, and it's all come from retained earnings pool that includes the capital surplus, which we accrue every year. So we can choose not to, but we choose to because we want to be more conservative. And if we needed, we can issue dividend from that pool as well. So there's no impact to shareholders.

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

Okay. Understood. So it means that from next year, going forward, you will still appropriate at least 10% legal reserve?

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

Currently, that's how we're thinking. Yes. We will decide each year, okay? We have a very big retained earnings pool. You know that, okay?

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 can you give us the numbers of the fabless DOI existing 1Q '19? And what's your expectation by the end of this quarter? How many days above?

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

Probably at the end of 1Q '19, probably around 10 days, roughly, okay? This is based on our own calculation, by the way. And in the middle of this year, probably reduce down to very low single-digit. That's why we say it's close to the seasonal level.

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

I need to add a little clarification here. The so-called fabless DOI is according to TSMC's own top 32 fabless customers' DOI. It is not the entire fabless industry. Thank you.

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

Okay. So for -- just also one follow-up on that is the definition of your fabless, does that include some system company? No, it's just only the fabless, the pure semiconductor companies?

Okay. So I had an impression that earlier the company mentioned that the days of -- fabless days of inventory may continue to stay a few days above seasonal level throughout second half this year. So is that still the case based on the current outlook?

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

Very close to seasonal, so we did not comment a few days above. No. Okay?

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

Okay. But -- close to seasonal, but maybe not like really at a seasonal level?

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

Well, I would like to say that probably below seasonal level, but we -- it's too early for us. We don't have enough data to do all the analysis and too early for us to forecast accurately, say, how many days or below or above, all right? But we make our own judgment from the wafer loading and the past history's data. So we make our own calculation, so we observe that their inventory is greatly reduced in the second quarter. We are confident actually that in the middle of this year, we will be very close to the seasonal level.

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

My second question is on the smartphone growth outlook for this year. Remember last quarter, the company guided smartphone to grow slightly this year. And now it's like high single-digit. So it seems like about like 5 percentage point higher based on our own calculation. And I think last time you mentioned about also market share gain, content increase. This time, also the same reason. So I just wonder which of these 2 factors have surprised on the upside in the past 3 months?

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

Well, we gain market share. That's -- and actually, our customers gain market share, let me say that. And that is kind of good news to TSMC, although we did not forecast that at the beginning of this year.

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

Great. That was actually my follow-up question. So in terms of the market share gain and what's a surprise on the upside in the past 3 months, how much of that is your own share gain in the AP or baseband or semiconductor chip? Or how much of that is your customers gain share, so you benefit? Which one is more important?

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

How can we separate that one out because of all the high-end smartphones, APs are all in TSMC. So you want me to separate all these customers' gain or TSMC's gain, I cannot separate out. It's all in TSMC.

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

Right. Right. But are you -- would you be worried about potential like -- maybe some of your high-end smartphone customers gain share right now, but that might cannibalize some of the -- your other high-end smartphone customers in second half this year?

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

Well, so long as -- so long the high-end smartphone continue to grow or so long TSMC has a very high market share. We just do our job to support them.

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

Okay. Dr. Sun, can I just have 1 more follow-up?

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

Do you object? There's no objection, so you may continue.

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

So on the HPC side, also it seems like growth is better than last quarter guidance. I remember it was slight growth without crypto. Now it is high single digit, so also about 5 percent point higher. I think that C.C. earlier mentioned about is major due to the networking on the 5G deployment. So is it mainly driven by 1 or 2 few customers or several customers across the board?

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

In the 5G area, there are many players. And all of them are now very optimistic. And so the 5G deployment is faster than we initially planned, okay? That's a trend right now. So we are forecasting higher growth than 3 months ago.

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

Okay. So it's very widespread rather than 1 or 2 chip customers?

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

You are right.

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

JPMorgan's Gokul has a follow-up question.

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

My first question, I just wanted to clarify. I think last time, we mentioned N7+ could be about $1 billion or slightly higher than that of revenue in 2019. Are we still seeing that or customers are still staying on N7 for this year?

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

We are ramping up N7+ right now, but the revenue for this year is still a little bit less than $1 billion. And as I just mentioned, next year is that one we try to look at it. I will believe most of the customers will adopt the N6 because that's much easier for them to move into. And the benefit is almost the same as N7+. So I will say N7+ this year, a little bit below $1 billion. Next year, it probably won't grow, but N6 will start to pick up.

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

Okay. That's very clear. My second question, Dr. Wei, could you explain a little bit more on what you encompass when you talk about heterogeneous integration? I think some of your customers have talked about packaging multiple process technologies in the same package. I think some of the customers' forward-running researchers even talked about multiple process in the same wafer. Could you talk a little bit about what is TSMC's vision when we -- when it comes to heterogeneous integration maybe in the next couple of years since you're starting to showcase the technology and potentially going to production?

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

That is a very complex question to be answered. Actually, we're working with the customers and -- different customers has different needs, but the trend on the heterogeneous integration is what we believe that in the future a lot of customers will adopt. But because of the benefit that when the circuit at some speed now is limited by the connection from the chip to chip, connection chip to chip's communication. So that has to be shortened and -- to gain the benefit of your single chip's high performance. So you want to put them together. You better to reserve your signal's integrity. You better has a very minimal capacitance, minimal inductance, minimal loss in the resistance. So we -- that's what I say heterogeneous integration become important because we are using the InFO. We are using the CoWoS to help our customer to integrate all of them together with the most efficient way to connect all the chip together and also extending if you need high bandwidth module that will one of the benefits that using TSMC's CoWoS or InFO and -- so if you ask me what is the application in the future, HPC will be the one that will adopt this kind of process. That's the first one to go into. But of course, today, mobile smartphone already adopted the InFO technology as you knew already. And more and more of the high-end smartphone and more and more of the HPC's customer will adopt TSMC's advanced packaging method, including heterogeneous integration.

Gokul Hariharan ***JP Morgan Chase & Co, Research Division - Head of Taiwan Equity Research and Senior Tech Analyst***

So then we shouldn't expect that advanced packaging just keeps rising as a percentage of your revenue in a pretty steady manner for the next few years?

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

You're right.

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

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

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

So first of all, that revenue breakdown by application was very helpful. Just -- can you give us some clarification. For example, the consumer application on smartphone platform. Can you give us some illustration for this kind of semiconductors? What is the consumer application by applying the smartphone platform? Or you can just ignore those kind of minor contribution?

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

Probably -- I -- do you have any good answer to that one, the consumer inside a smartphone?

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

I don't know. You mean the consumer inside smartphone?

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

Yes. Well, if you are using the smartphone to do the gaming, can I say it's a consumer function inside a smartphone?

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

Yes. I think your definition, for example, for GPU in gaming or for AI or for PC, I think that was clear, right, but you -- now you provide a more breakdown, we really appreciate. I just wanted to make sure we don't get it wrong.

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

Video games is a consumer application now is in HPC and set-top box, digital TV, cordless phone, these are consumer applications now in the digital consumer electronics.

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

Okay. Okay. So also my next question is about your supply chain management, right, related to your kind of high inventory level, right? So now how is the raw wafer inventory at the foundry. And do you plan to reduce some shipment from those raw wafer vendors? And also regarding that previous chemical issue, would you get any compensation from your chemical vendors?

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

I will answer first part of the question. Our DOI actually included an increase of raw wafer inventory. So on a Q-o-Q basis, it does increase a few days of our own DOI because we have very low first and second quarter and we have a contract with those wafer companies. But moving to a second half as our demand pick up, those DOI on raw wafer, we'll gradually digest it to a normal level. This is the first part of your question.

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

What is the second question?

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

The chemical issue caused some damage, right? So will you get any reimbursements or compensation from your -- or TSMC will book it as kind of expense?

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

So what is our...

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

Chemical quality...

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

The photoresist event, yes, and what we do?

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

Yes. In terms of financial.

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

Do we ask for financial compensation?

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

Yes.

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

I have no comment on that one.

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

Okay. No problem. And also, C.C., regarding your comments about 5-nanometer will have a bigger, larger scale and 7-nanometer because kind of wider applications. So my question is that besides exceeding 7-nanometer customers and applications, what will be the new customer or application for 5-nanometer?

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

We are -- actually, we are engaging with the new big customers and they are expanding their product portfolio into HPC area and that's what we rely on. Okay. So that's why we say that 5-nanometer's business probably will be bigger than the 7-nanometer.

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

Yes. Yes. And lastly, I guess on M&A, right, because your subsidiary Vanguard acquired GlobalFoundries' 8" fab early this year, right? So would you consider to do any M&A from those kind of overseas fab at some point?

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

We don't have a plan right now. Of course, if there's a good opportunity or everything that meet our strategy, we will consider, but we don't have any plan of M&A right now.

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

Okay. Yes. And follow-up question to Gokul's question regarding the profitability, right? So I guess last year one big event is that GlobalFoundries exited the leading-edge, right? But if you look at first half gross margin, I think it was much below previous cycle's margin. So do you think that your bargain power really improved after this industry consolidation? And how do you think about Samsung's EUV technology compared to your 5- or 6-nanometer?

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

You're talking about margin or profitability. Let me say that I think that the first quarter, second quarter's, most of the dip is caused by the 7-nanometer loading. The loading is so low that affect our margin by 4 points in the first quarter, by 3 points in the second quarter. So the loading is actually the dominant one. It's not because of others. You're talking about the EUV status compared with my competitor. All I can say is we are very confident that we can ramp-up the EUV right now. And we believe our -- the maturity or the readiness of the EUV technology, TSMC definitely is better than others.

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

Follow-up question from Crédit Suisse, Randy Abrams.

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

I just have 2 quick follow-ups. One for Lora on the dividend. Since you're moving to quarterly in first quarter approving for fourth quarter this year, next quarter would you declare for first quarter of 2020? And is it the view for 2020 you'll declare quarterly or will get a set amount for the full year next year?

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

After the shareholder meeting, we'll declare the $2, which is the first quarter dividend, will be paid in fourth quarter this year. And so every quarter from then, we will declare cash dividend and will be paid within 6 months. So first quarter next year, you will get a dividend from our board approval in third quarter this year. So that will continue going on. Did I make myself clear?

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

Yes. That part is clear. And then so every quarter we'll declare, but is there a goal...

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

Yes. Every quarter, we will declare dividend.

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

Okay. And so your goal then for each year to still be stable or can it rise through...

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

Yes. That's right. Stable.

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

Okay. Good. Okay. And then one follow-up to just Charlie on the margins. Just relative to the revision you made, sales actually came in a little bit better, but the gross margin came in toward the lower end of the range. I guess just relative if there were some factors that you saw in the last month that might have affected near term because it looks like by medium term, you have margin getting back toward 50.

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

Actually, when we gave the guidance on February, it's a range, right? So we are still within the range. So there are a few factors may have swing the gross margin, photoresist definitely one. Actually, the actual number was slightly deviated from what we have said in February, but still within the range, okay? Going forward, as I said in my remarks, we are thinking the 50% gross margin is still a good target for us. I really mean if we can achieve better utilization, we can go back to 50, but it will be depending on each quarter's demand profile. I'm not ready to give you third quarter and fourth quarter separately, but what I can say is our gross margin will improve in third quarter and we will further improve in fourth quarter.

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

Now with this very positive note on the margins and also as our CEO said, we have passed the bottom of the cycle for our business and we are launching the industry's competitive leading-edge technologies, With volume production already taken place using EUV. I think let's end our conference today with such a high note. Thank you for coming to our event today, and we hope to see you next quarter. Thank you.
