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EDITED TRANSCRIPT

ADI - Analog Devices Inc at Citi Global Technology Conference

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PRESENTATION

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Thanks for coming, everybody. Next up is Analog Devices, one of the best companies in semis, I think the second highest operating margins in the space these days and also one of the boldest in terms of buying Linear last year. We all know about the high-quality business model of high-end analog. And they also reported the quarter last week, so great update on what's going on in the space.

Here today, we have Ali Husain, who's the Treasurer and Head of Investor Relations. We also have Mike Lucarelli, who's VP of Investor Relations. So guys, since you just reported last week, if you could maybe start with a little bit of a recap of the quarter and the outlook and what you're seeing there, and we'll take it from there.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Okay, sure. Thanks, Chris, for having us.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Thanks for coming.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Pleasure. Thank you, everybody, for joining us. So yes, we just reported results about a week ago. Revenue came in -- and I think $1.46 billion, which was above the high end of the guidance range that we provided investors with. And really, I'd point to 2 areas of strength that really got us above the high end of the range. One was the industrial market. We've guided for low to mid-single-digit growth on a sequential basis, and it came in at around 7%. So we saw a lot of strength in the industrial space. And in addition, we saw strength in the automotive sector, particularly in the powertrain space in China. There have been a bit of inventory correction in that space, and we saw a recovery there.

Gross margins came in at 70.5%, again above the high end of the guidance we provided. And that was really on strength in the industrial space, which tends to drive pretty good gross margins. And we did move pretty early to capture cost synergies as well related to the acquisition. So that got us to a pretty good gross margin number. Operating margins expanded, again, above the high end of the range at 40.5%, and we delivered earnings per share of $1.26, which was $0.05 above the range.

And then in terms of the guidance that we've provided investors with, we think we could grow revenues in the fourth quarter that, on a sequential basis, would be up at the midpoint somewhere in kind of the 2.5% to 3% range with strength in automotive and consumer. And then from a gross margin perspective, we think we could keep gross margins pretty stable because even though the mix in the fourth quarter is probably a little dilutive to the gross margin number, we are again moving pretty aggressively to capture more of the cost synergies. So we think we can keep gross margins pretty stable in the fourth quarter.

In terms of OpEx, I think we'll have our first sub-30% OpEx quarter probably in the history of the company, and that's something that we're striving for. It certainly is the implication. We've given a 5-year kind of model in terms of how we think we can run the business. And certainly, the end state there is to be able to run this company at a sub-30% OpEx ratio. And so in any event, next quarter then, we think we can expand gross -- our operating margins to about 42%, which we think would be a very strong result. And then at the midpoint of the guidance, earnings per share should be around $1.36.

So I think generally, my takeaway is that we're in a strong business environment and we're happy to discuss what we think is driving that. But I think generally speaking, it's a pretty strong business environment. And the supply chain as well -- as far as we can tell, the supply chain looks to be pretty well managed. So I think we feel okay about the environment. Of course, we're in the semiconductor space. And so as a management team, we always look at this kind of growth rates and always have to kind of picture ourselves a little bit. All we're doing and all we can do is make sure we're keeping up high levels of service for our customers and that we're continuing to remain very cautious in terms of how we run on our own business.

QUESTIONS AND ANSWERS

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. So I guess let's start with the industry first and then we can dig into ADI's specific drivers. But as far as the industry goes, pretty good year. We're at 19% revenue growth for semis this year. What do you think has been kind of driving the demand in semis this year? What makes this year so special?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Well I mean, I can't speak for the industry. I can certainly speak for what we're seeing. And from our perspective, it's really been a very strong industrial environment, and I think we're just inherently in a better CapEx cycle at this stage. And I think you're seeing that borne out in some of the macroeconomic data points, like PMI and GDP, for example. The other thing I'd point out is in terms of the comparison to last year -- certainly my own memory tends to be little fleeting when it comes to these things, but we were dealing with some massive macro issues around this time last year. If you recall, China was looking to be slowing down. Oil and gas was very weak. And so I think as we get -- as we kind of got into early 2017 here, we started to see a bit of a recovery. I think at least from a stability perspective, if nothing else, I think having the election behind us and at least having a president that's talking about growth policies, I hope he delivers on those. And tax reform, I hope he delivers on those things. But at least from a narrative perspective, I think that's been pretty helpful. And certainly, we talk to our industrial customers as well. And the sense we're getting from them is ever since the Great Recession, there's been a fair amount of CapEx that's been withheld as folks tried to extend the useful life of their existing equipment. And I think they've reached a point now that they do need to make some upgrades. And I don't think it's a wholesale, greenfield expansion. I think what we're seeing is more of a brownfield upgrade cycle where they're taking existing machinery and adding semiconductors to make it more efficient, more connected, more intelligent. So that's what we're seeing from that perspective. And the other thing I'd point out is in China, there is this very real initiative called China 2025, and it's all about indigenizing factory automation and making their equipment there connected, intelligent, efficient. And we are starting to see that effect. So for example, in the area of robotics, for us, for ADI, our dollar content opportunity doubles in existing robotics simply by the addition of the things that ADI does around sensing, measuring, interpreting, connecting, power delivery. That doubles our available opportunity in existing robotics. In addition, when you think about -- the kind of the next wave of these robots is around collaborative robots. You probably heard about cobots. And our dollar content opportunity there is about $500 per collaborative robot. So I think there's things that we can point to today that are driving our business. And certainly, the macro has been, I think, much stronger this year relative to last, and that certainly helped with the rising tide. But I think there's things that we have going on that are secular drivers of growth as well that have helped our business. Aerospace and defense is another great example where we're adding additional dollar content, and the world certainly continues to become a more uncertain place. And so the demand for the kinds of things that we provide into that space has gone up. In addition, there is a real move to taking existing mechanical radar systems that historically have been single-transmit, single-receive systems. And our total dollar content opportunity in those systems has historically been -- or the opportunity has been up to $50,000 per system. Although systems are moving to digitized radar, these phased array radar systems where you could beam steers -- steer the beam of the radar. And our dollar content opportunity in those systems is approximately $2 million. So there is these real secular drivers that we can point to. Of course, I always take a step back and say, "Boy, these are very strong growth rates." And so I think as a company, as a management team, as a business, all we can do is respond to the demand that we're seeing in a way that we keep customer service levels high and, at the same time, manage our expenses in a way that, I think, is the responsible way of running a business. And that's what we're going to try and do.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. Two questions, one shorter and one longer term. Can you talk about your order bookings linearity during the previous quarter? And then also, have you basically seen your industrial business strengthen every quarter since the bottom from last year?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes. So we have seen a strengthening industrial environment, no doubt, for several quarters. And frankly, I was asked this question, I think, last time at your dinner, Chris. So you said, "You guys keep coming in above the high end of the guidance range. What's going on?"

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

That means business is good.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Well, business is good, but it's also business has strengthened is the point. So generally speaking, when we're giving guidance, we only have about 4 weeks of orders that we can look at. And so in every quarter, in the last few quarters, business has strengthened throughout the quarter. And that has helped us get to kind of the high end of the guidance range, in some cases above the high end of the guidance range. So in terms of the order linearity, I'd say orders increased in every month of the quarter. And what was a little bit surprising is that we have the July month in our quarter, and that tends to be a weaker month for industrial and automotive because we had North America -- primarily North America and Europe focused business that tend to be more holidays in the month of July. But this time around, July ended up actually being the strongest month of the quarter. So we saw very, very good strength, the orders increasing every month of the quarter. I'd say August was down from July, but that -- there's a seasonal aspect to that, so nothing too concerning from that perspective. And the other thing I'd point out is the book-to-bill in the quarter for the B2B markets was 1, and that supports the stable guide, which is what we did for the B2B markets. And then overall, it was above 1, and that supports the kind of the modest sequential growth that we expect.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Okay. And then did you see any more upside from the ADI or the Linear upside? Or was it both? Or was one kind of leading the way more than the other?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, I know, I'd say there's -- both stand-alones kind of outperformed. I'd say on the Linear side, it was largely driven by the recovery in the automotive space or in the powertrain sector in China. And on the ADI side, it was largely driven by, obviously, a better macro, but it was also driven by aerospace and defense and the automated test equipment markets, which were particularly strong for us.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

And with this continued strengthening throughout the year, have you seen any increase in lead times, any issues with wafer availability? Have your own boundary lead times from the foundry increased at all?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, I think -- no, look, there is no doubt that this is a pretty strong business environment. But I what I would tell you is for the things that we can see, right, the things that are under our control, things are pretty stable. We are delivering and continue to deliver the vast majority of our products within our stated lead times of 4 to 6 weeks. And we have internal metrics that we obviously look at, and those metrics really haven't changed that much from a lead time perspective. So I don't know. It's one of those things, Chris, that we look at these growth rates. And this was 10 or 15 years ago, these were all -- these were the classic signs that investors look at and, certainly, we look at as well. But at least from a supply chain perspective, it's pretty benign.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

So no real change in lead times then.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

No.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

And have you seen -- because some of your competitors talk about their lead times lengthening, have you seen that? Is that an advantage for ADI that competitors might have some issues getting folks product and (inaudible) opportunity for you to gain market share?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Well, I think one of the beauties of playing in the analog space is that the inventory doesn't tend to go bad, and so we are firmly committed to providing our customers the products when they need them. And so we tend to keep a fair amount of safety stock on hand at all times. I think our prior CFO had a good saying. He said ADI's chips are like fine wine. They're not bananas, and so they tend not to go bad. Chris, you would know all about fine wine.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Yes. And bananas, too, unfortunately.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Me, too. I have little kids. So -- yes, so I'd say we've been pretty conservative. That's kind of the model. We tend to keep pretty high levels of inventory. And so we have 3.5 months' worth of inventory on our own balance sheet. We have 7 weeks of inventory distribution. And so we can...

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

That's flat, right?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

That's been flat quarter-to-quarter. Although on a dollars basis, it was certainly up to support the demand. But again, like I said, it's been very stable.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Okay. And then maybe switch gears a little bit to the automotive end market. You talked about Linear's correction was over -- maybe just take a step back. When did the correction start? How bad was it? And are things pretty much back to normal now?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, that's a good question. So I think the automotive market itself has been pretty seasonal for ADI, to be perfectly candid with you. We obviously pay attention to all the SAR numbers. We do our own analysis and due diligence. We talk to customers as well. But we've been in a pretty seasonal environment thus far, not to say that, that can't change but that's what we've seen thus far. Specific to the powertrain sector -- and again, Linear's automotive business was much more geared towards that particular market. And I think going back to the end of calendar '16, I think there was a pretty major buildup of inventory as there were some tax incentives around the purchase of these vehicles, and so suppliers built up a fair amount of inventory. And so I think we started to see a correction in the earlier part of our -- towards the middle of our fiscal year, and it was a very severe inventory correction. And so at this point in time, we saw a recovery in the third quarter in the automotive space in this particular sector, and I think we expect to see that continue.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Okay. And then when do you think the auto business would start to pick up and look more like the industrial business? Any guess?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Well, I think you've got to look at normalized growth rates probably to best answer that question. But I think our sense is today, our dollar content opportunity in a car is about $250 a car. And we think over the next 8 years, we can drive that to a $600 content opportunity per vehicle. And there's really 2 main mega trends that we're banking on to get us to that. Again, that's the dollar content opportunity, not to say that we'll get all of that but that's the opportunity. And there's really 2 mega trends that we think can help us more than double that dollar content opportunity. One is around the electrification of the powertrain. So more and more electric vehicles, more and more hybrid electric vehicles, that is a very good place for us to be because we believe we've got differentiated technology in that space that really, at the end of the day, ends up making a real value. It's a real value contributor for the automotive OEMs. It also helps them squeeze more and more charge out of each vehicle, thereby extending the range on the battery. So that's a good driver. The other driver is really around making cars more autonomous, semi-autonomous. And so obviously, there's levels to autonomy. We're probably level 1 or 2 maybe, the best case right now. But as we progress along that spectrum, we've got a really good opportunity to drive additional dollar content. So we have a safety business that has kind of like your traditional MEMS accelerometers, MEMS gyroscopes. But in addition, we've got a radar business that is doing very well at the current time at 24 gigahertz. And we think we can drive really solid revenue growth because we think we have a very differentiated solution at the higher frequencies at 77 gigahertz, 79 gigahertz. The spatial accuracy that we can achieve with our radar system is 8x better than the competition. The form factor that we have in our radar, in the 77 gigahertz radar, is 3x smaller than the competition's. And it's -- we do it in RF CMOS. So it's highly integrated. It allows a lot of integration for the OEMs. So we think we've got a very good solution there to win in the marketplace. In addition, LIDAR today is in its infancy, but we acquired a small LIDAR start-up a couple of years ago, and we're making very good progress there. In fact, at CES this year, we plan to show a demo. And so if folks are interested in joining us at our booth at CES this year, you're welcome to come along and have a look at our LIDAR solution as well. It's a solid-state LIDAR. It has no blind spots. It is -- it has no sensitivity to vibration. And we think we can get it down to a price point that will be very appealing to the automotive guys. So that's the overall, I guess, answer on that.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

And then one other area of upside during the quarter, I believe, was the consumer end market, a little stronger than expected if I'm not mistaken. Can you just talk about what drove that? And then we all know that there is a certain part of that that's going to wind down. Maybe talk about the wind down and impact, if any.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Do I have to?

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Well, if I don't ask, I think somebody in the audience will.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Okay. So consumer -- okay, so on consumer, yes, I'd say the high end of the guidance range did incorporate a stronger consumer market, and that's what we ended up getting. I'd say the challenge with forecasting that market, Chris, is that the volumes are pretty high. So one week of order shipping around can certainly influence the quarter. And so I'd say at the midpoint of guidance, we tend to take a pretty conservative stance. So we think consumer can do so. I think -- I mean, it's kind of a flippant answer but we just saw better demand. So that's where we ended up. I think if you look at the fourth quarter guidance, we're guiding for consumer to be up sequentially in the fourth quarter at kind of the rates that we saw in the third quarter, but that would imply that consumer will be down over the prior year. And I'd expect that weakness -- that year-over-year weakness to continue into 2018. And I think we've been pretty transparent in terms of talking about the impact of that business to ADI for next year. And at the Analyst Day, we were asked back at the end of June, and I think some of the analysts have it in their models for that -- for our consumer business to be down 20% to 30% next year. And I made the comment last week on the earnings call but my sense was down 30% for the overall consumer business is likely a worst-case scenario.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Yes, okay, great. And then last end market is comm. Some of it was good, and some of it was not so good. But what are the thoughts there?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes. So I'd say there is 2 pieces of the communications infrastructure business for ADI. So comms is about 18% or 20% of our total revenue. About half of that business is wireless infrastructure. So think about all the radios that go on base stations. It could be a macro base station, a small cell base station. And then the other half of our comps business is on the wireline side, primarily in the optical and the control of the laser. And it's been a bit of a tale of 2 businesses over the last year. So the wireless side has been weaker. And I think we saw a really good bounce in that business when 4G was deploying, but at this stage, 4G is on kind of a refresh rate. And so I'd expect that market to be pretty stable until we get to 5G, which we think we'll start seeing the benefits of in 2019. But until then, my sense is that's probably going to be a pretty stable piece of the market. Wireline, however, has actually been a pretty strong grower for us. And so in the quarter, I think it was up in the kind of the mid-single digit sequentially. It's up over the prior year. And I think data centers are going in, and people want more and more broadband and more and more connectivity. And we're seeing the benefit of that. And I think we're in a position there that is -- actually, we lead the market in that particular space. We tend to get the first call. So again, that's a very good market for us and, I think, will continue to be a good mid single-digit grower.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. So let's talk some Linear. It sounds like the synergies are moving right along, dare I say, a little better than expected. Maybe talk about...

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

You may. You may say that.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Maybe talk about where the better-than-expected synergies have come from.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, so -- okay, so just for the audience, just some context. We talked about -- when we combined these 2 companies, we said we can get $150 million of cost synergies. That represented, I think, 5% of the combined company cost base, so not a huge amount of synergies. But our M&A strategy is really focused on buying or acquiring really good companies and to hopefully let them scale and make them better over time. And so of course, when you combine 2 companies, you're going to have natural efficiencies. And so we talked about this $150 million synergy number that we thought we could achieve within the first 18 months post-transaction close. We have been realizing the synergies faster than we had pointed to in the past. I think part of it is just when you combine 2 companies, you're going to have some surprises that come up and potentially go the other way. So I think you have to be a little cautious when you give out these targets. I think the reality is that we haven't really seen anything negative. And so we're just seeing the synergies faster as a result of that. The one other thing I'd point out is even though the $150 million is in the first 18 months, we do see a path to an additional $100 million of cost synergies in the 3- to 5-year time frame. And so I think at $250 million, we're talking about 8% of the combined company cost base. But really, I mean the reason to do this transaction is about the revenue synergies. And I know -- look, I totally get it. You've got to prove that you've got the revenue synergies before you really start talking about them, but we think there's up to $1 billion revenue synergy opportunity. That's an annualized number. That is up to a 300 basis point adder to the stand-alone growth rate. So I think there's real opportunities there. We are very, very complementary from a product perspective. We're very complementary from an application and market perspective. We're very complementary in a go-to-market perspective. ADI was largely focused on large customers. Linear was largely focused at small and midsize customers. So there's a great cross-pollination of synergies, I think, that we can get from the combined customer base. And then the last thing I'd point out is our mantra at ADI has always been about long-term profitable growth. It's been about optimizing free cash flow, and I think we're going to take that model and bring Linear into the fold into that kind of thinking as well. So I think that will be a good adder to the revenue story over time.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Okay. Maybe talk about, will there be any changes in manufacturing at Linear as well? Is that part of the synergies?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

No, I mean, look, we've -- we haven't gone into a great deal of detail about where the 3- to 5-year cost synergy numbers are going to come from. But I think naturally, when you put 2 companies together, you're going to get some efficiencies. Some of them happen earlier. Some of them happen later. So I'd just point out that once we have a plan around the $100 million incremental synergy number that we've talked about, once we have a real detailed plan, we'll be happy to communicate it to The Street.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Sure. And what would be the milestones that we can look for in terms of the next $50 million to $100 million in savings? Is it something on the revenue side? Is something closing? Is there -- you guys going to switch fonts in your presentation (inaudible) correct fonts or what the...

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, we'll cut down the number of slides that we present. No -- so I think...

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

(inaudible) big cost saving.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Of course, every little bit counts, Chris. No, I think we've been pretty public. I mean, I think on the earnings call as well, we said, "Look, on the $150 million of synergies, $85 million will be realized by the fourth quarter," which is next quarter. And displayed on that $85 million is 2/3 on the OpEx line, 1/3 on the cost of sales line. And there's an incremental $65 million to come, which we'll start recognizing in the first quarter of '18. And the split on that will be more towards the cost of sales side, the OpEx side. I think again, you combine 2 companies, you're going to get natural efficiencies around buying power. You're also going to get efficiencies around just what people do. And so actually, in advance of closing the deal, we took an action on the ADI side and we offered folks an early retirement offer because we got -- take 2 companies. You put them together. You're going to get natural synergies or natural efficiencies. And so we try to clear the decks as much as possible before we close the acquisition. And so a lot of the actions that needed to be taken to realize those synergies have already been taken. So I think from -- at least from a shareholder or Wall Street investor perspective, it's more about the passage of time now to see those things kick in. For example, on the distribution side, we move to one distributor. There's savings from that. There are synergies from that. And we haven't even seen those synergies kick in.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. Can you just refresh everybody on where your operating margins are now and what is the long-term model, long-term goal -- in your gross margins, (inaudible) we have a few minutes.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Well, yes, I sure do. I have 12 minutes and 19 seconds but -- okay. So I think I'll answer that by saying we're clearly in a very good business environment at the time. So we've -- we just had 40.5% operating margins this quarter, 70.5% gross margins this quarter. We're guiding to similar gross margins again and 42% operating margins. And again, the caveat is we are in a strong business environment. Our fabs are pretty well utilized. We're getting synergy captures. So these are very good gross margins at the current time, very strong operating margins as well. So what I would say is the operating margin model is to run the company at 39% to 45%. And the real, I guess, takeaway is really around free cash flow margins because the free cash flow margins have a ways to go. And I think we do have a plan to really get them humming. And so at the current time, we're at 34% of sales on the free cash flow margin line. The model is to run anywhere from 34% to 42%. So at the current time, we're actually at the lower end of that, and the plan is to grow that over the next 2 to 3 years.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

And maybe talk about your -- sort of your R&D and the R&D synergies. And do you think that -- what will be your eventual R&D goal for the combined company?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

That's actually a good question. I think overall, if you kind of back into the financial model that we've given The Street, I think this company, over the next 3 to 5 years, should be able to run sub-30% OpEx. And then the split of the R&D versus SG&A, look, we are an innovation-driven company. So my sense is that R&D will always outrank SG&A. If I have to venture a guess, if we're running, let's say, at 30% OpEx, it's probably 17% or so R&D and 13% SG&A. But again, the long-term goal is to run this company at sub-30%.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. Anything on Linear retention of employees? I always get that question.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

No issues. The attrition rates at both companies are very low, and we haven't seen really any market change since the acquisition. In fact, what I would tell you is in the engineering community, it's -- there's a lot of excitement at both ADI and Linear because if you think about it, these were 2 companies that were at the leading edge of analog but doing 2 very different things. Linear was primarily power and amps. We were mostly signal chain data converters and digital. Linear didn't have a lot of digital. We have a lot of digital capabilities at the company. And so there's a tremendous degree of excitement to be able to get access to each other's toolkits. I'll give you an example. There is this trend right now in data centers to move to 48-volt battery systems and power delivery systems. Well, the challenge there is how do you take -- it's great, let's move up to 48 volts. You could deliver a whole lot of power. How do you convert that power to 1 volt so you could deliver it to the source? It's a tremendous challenge, okay. Now the Linear guys had figured out a way to actually do it. That's a great data center opportunity for ADI now, but they didn't have the data -- they didn't have the digital capabilities. They were looking for a controller for that particular system. That would have taken them 1 to 2 years to design and get to market and integrating their system. Well, as it turns out, ADI already has something that works perfectly well. So I'm just -- I guess what all I wanted to give you, Chris, is an example of that. There's a great deal of complementarity between these 2 companies, and there's a great deal of excitement in the engineering community at both companies around the possibilities that lie ahead frankly.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. By the way, I know you have new boss.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

I met him for breakfast this morning.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

There you go. But what's his mandate? What are going to be his objectives besides moving here?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

So he's currently in Belgium. He's moving to the U.S. He will start at ADI at the end of the month.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

And what can you tell us about him?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Well, he's a very nice guy, okay. So Prashanth is a great guy. Like I said, I met him this morning for breakfast as well. He's -- I think what he's going to bring to ADI is a level of operational discipline that I think will be very good. I think what ends up happening in a lot of analog -- by the way, we've done a great job, right. ADI has done a very good job, raising our margins, raising our standards, but I think there tends to be -- in these analog companies, because the margin structures are so good and the free cash flow margins are so good, I think you can have areas of value in the company that can get trapped in times. And I think Prashanth is going to do a great job at unlocking those areas of value for the company. Now of course, he's got to do all the other CFO stuff, too, right, and I'll make sure he meets you as well, Chris. But he's got to do all those things, no doubt. I'm sure he'll do a great job. But I think the areas -- there are areas in any company where you can have value that tends to get trapped. And I'd say in some of these analog companies in particular, there's areas that get -- they get overlooked at times. And I think he'll do a great job at, I guess, unlocking those areas of value.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

All right. Before I continue, I'd like to open up to the audience. If anybody has any questions here in the front row.

Unidentified Analyst

A question on your industrial business. Is the majority of the applications from PLC, DCS, PAS type?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Sorry, what's PLC?

Unidentified Analyst

Programmable logic controller, distributed control systems.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, so that's a good question. So the industrial business is about 50% of our overall revenue. The area -- and I'll just answer kind of just broadly. The areas of factory automation, industrial instrumentation, and aerospace and defense are about 2/3 of that business. So if I have to venture a guess, the area of factory automation specifically is about 20%, 25% of the industrial business for ADI.

Unidentified Analyst

So mostly be sort of the PLC-type factory (inaudible) .

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

That's correct, yes, which is why we're actually pretty bullish on this whole automation upgrade cycle.

Unidentified Analyst

You've given some estimates as to the content growth you can have in automotive, $200 to $600 over the next couple of years. Can you give us a similar metric, if possible, on the industrial side? I know it's more diverse and more difficult, but to give a sense of the secular opportunity. And does the TAM triple over the next 6 years? Or how do you think about that metric?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Now that's a good question. I think you're right in the sense that the greatest opportunity for -- and I hate to use this moniker. The greatest opportunity for IoT or industrial IoT is in the area of industrial, no doubt, because you can actually create a lot of value there. And I think we're in the very early stages of realizing that value. And you're going to require a whole lot of semiconductors to be able to do that. And what we did as a company, which was -- which caused short-term pain at the time but, I think, set us up very nicely here for over the long term as we pivoted our resources. 8 or 9 years ago, this company spent maybe half of our R&D in the consumer space. And we've completely changed the way we do our R&D. And so we pivoted to the industrial market. We pivoted to do these B2B markets. And now we're starting to see the crop -- the product crop starting to come out. So for example, we have a software-configurable input/output device. It's probably 2x more expensive than the competitions but it is gaining a lot of traction because it makes the factory floor very configurable. Think about what's happening, right. So today, for example, if I'm a manufacturer, I need to respond in real time to demand conditions. It's very different than 10 years ago. In order to do that, I have to reconfigure my factory floor very, very quickly. The systems in place today cannot do that. It's very difficult, but we've come up with a way that basically takes all of these nodes on the factory floor and is able to connect it up to a PLC in a way that can make decisions very quickly and reconfigure the factory floor very quickly. On average, in a typical installation, we can save our customers $2 million per install if we do this. Now our solution is more expensive relative to the competition, but the value that we can create is incrementally more than they could ever get with the competition. So that's one area. In the area of robotics, we talked about our dollar content doubling from brownfield upgrades in robotics. We talked about collaborative robotics, our SAM increasing by $300 million to $500 per collaborative robot. So it comes back to the earlier point that you talked about, which is this is a very diverse market. There's a lot of things going on. Health care is another area that comes in our industrial space, lot of dollar content opportunity there; aerospace and defense, another area within our industrial space, a ton of dollar content opportunity. There's no one thing that I can point to. It's just a mix of many, many, many things. But the good news I'd say from an investor perspective should be that, one, ADI pivoted to these markets well ahead of the competition. We have invested heavily in these markets, and I think we're only in the early stages of both realizing value but also creating value for our customers.

Unidentified Analyst

And then just quickly, a second question on the cash flow margins, 34% to 42%, what type of top line growth or macro strength is required to hit the 42%? I mean, if we have a slowdown, can you still hit the 42%? Or does it require mid-single or high single-digit top line growth to get to...

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes. So to get to that, we'll need to grow the business. So at the 42% number, we would need to grow at a mid-single digit rate. We would need to capture $250 million in total cost synergies and see very little revenue synergy growth on top of that. So I'd say there's incremental drivers on the top line. If we do -- again, we've kind of discounted these revenue synergies to The Street in terms of the models that we've provided. And we feel confident about those revenue synergies, but I always want to derisk it when I talk to The Street about it. But -- so that's certainly an opportunity to drive upside. In the consumer space, there's going to be opportunities in the consumer space over the next few years to drive additional dollar content in cash flow, and that could be an upside, too, as well. And we have not incorporated any of those in the 34% to 42% free cash flow range.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Anybody else in the audience?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

A lot of questions here.

Unidentified Analyst

Just a quick question on analog scaling. Is there a natural limit in terms of the node that you can get to because of signal/noise ratio or some other issues?

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

Yes, no, I think what you're seeing is an evolution that's going to continue. I mean, Moore's Law is still alive. It may be on its deathbed, but it's still certainly alive. And to give you an example of where we fall, okay, in kind of the spectrum of semiconductors, I'd say the advanced nodes today are probably, Chris, what, 10 nanometers or something?

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

7.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

7 nanometers. So I have at home. You have a fab in your backyard. We -- most of our manufacturing is done on 180-nanometer. So there's --

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Michael Lucarelli

0.18, I think. 0.18...

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

It's something around for a while.

Ali R. Husain - *Analog Devices, Inc. - Director of IR and Treasurer*

0.18. Yes, 0.18 micron. So there is a long, long evolution here at play. Now we are doing products in 28 nanometers. So we have transceivers that are -- these radios that go on base stations. And it demands a tremendous degree of integration that you can only do with that particular lithography. So we're doing 28 nanometers, but we do it externally. But I'd say for the vast majority of products that we're doing in the industrial space, those are in that kind of 0.18 micron, 0.25 micron space. So there's a long, long, long road for us to travel. Eventually, we'll get to those kinds of nodes, but it's going to take a long period of time. So I think the thing for us is -- at least ADI stand-alone, half of our revenues are fab-ed internally. Half of them are fab-ed externally. And so we get a tremendous amount of flexibility in terms of how we want to manufacture something and what particular node.

Christopher Brett Danely - *Citigroup Inc, Research Division - MD*

Great. And that's all we have time for. Thanks, guys. Thanks, everyone.
