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# EDITED TRANSCRIPT

ADI - Analog Devices Inc at Sanford C Bernstein Strategic Decisions Conference

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## CORPORATE PARTICIPANTS

**Vincent Roche** *Analog Devices, Inc. - President, CEO*

## CONFERENCE CALL PARTICIPANTS

**Stacy Rasgon** *Sanford C. Bernstein & Co. - Analyst*

## PRESENTATION

**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Good morning, everyone. I'm Stacy Rasgon, I cover the US semiconductor sector here at Bernstein. And it is my great honor today to introduce our guest, the President and CEO of Analog Devices, Mr. Vincent Roche. Of all the companies I cover, ADI is probably one of the most respected. It's got an extremely high quality franchise in the analog space, particularly as it relates to signal conversion and processing.

Over the last decade or so, they've embarked on a rationalization program of both their product portfolio, as well as their manufacturing footprint. They were smart enough to exit mobile early enough to actually get paid to do it versus some of the other things we've seen recently. And they've increasingly focused their product offerings on high-value applications, whatever the end market, as well as greatly increasing their presence in new markets like automotive, healthcare and more recently consumer, there is a story developing there. And they took very early steps, I think, before many of their peers actually [shutter] unnecessary capacity.

This has also been a company with a steadily improving economics, their trough margins today are now higher than their peak margins used to be before the downturn. I'd say in my conversations with clients, investment controversies right now tend to be focused on potential upside of new consumer and portable socket wins. Questions of how much margin expansion, if any, could remain in the model given their running in the ballpark of their long-term models that they put forward. Whether the recent return to growth can be sustainable for the long-term and whether renewed focus on cash return can actually continue to drive value over the long haul. So to answer these and hopefully many other questions, it gives me great pleasure to introduce the President and CEO of Analog Devices, Mr. Vincent Roche.

Vince, thank you so much for being here today.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Thank you, Stacy.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

There're question cards on your seats by the way, you can feel free to fill those out, so to be brought up and we'll leave some time at the end for those questions.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Great, thank you for the introduction.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Thank you. Thank you for being here. I've got a number of questions I want to attack on many things. I think the thing right now that is probably in most top of mind for most investors actually is the new consumer ramp and I've had clients put it to me like this, you have this kind of very stable, if not, boring high quality story has now all of a sudden become potentially very exciting.

I was wondering, you have always also said, anyway you -- you look to provide differentiation in order to produce good economics and stickiness whether it's consumer, whether it's anything else. Can you talk to us a little bit about these new wins, what is it about these new types of products that actually is truly differentiated and defensible versus anybody else actually coming in because you utilize capabilities or IT that other competitors just can't deliver. I mean that's one of the big concerns that [Indian] investors have, given that this could provide upside how sticky is it, how can they get confidence that it is sticky and sustainable?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Okay. Great question. So maybe I can step back a little, you have touched on during your introduction that, we've been busily rationalizing ADI over the past five or seven years on the product portfolio side, on the manufacturing side and we steered ADI very much towards, what I would call, more B2B applications. Five, six years ago, we were spending virtually 40% of all the R&D of the company in what I'll call very volatile more vertically oriented consumer type applications in PC, mobile and so on so forth. So we have greatly trimmed the spend in those areas and really targeted the R&D now, heavily towards industrial automation, instrumentation, healthcare, automotive and communications infrastructure. So, to a large extent, ADI's core business can be considered B2B related. But we have always been very consistent as well that, in the consumer area where we can leverage the technology platforms, that we build and sell into that diverse set of applications in B2B, where we can leverage that technology to solve really difficult problems for the market-leading consumer customers. Particularly in precision technology where we can see, not just a one shot wonder, but we can see several generations worth of performance enhancement, where we are playing at the edge of technology what the technology is capable of doing that we play. And I think what you are seeing is, for several years, we were sitting here talking about the headwinds that consumer was pushing on the ADI.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Well, that's one problem because I think there was a socket loss involved in that. Right? You people want to make sure that that doesn't happen again.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

It was more about the re-configuring of our entire consumer business from a 40% R&D spend across multiple areas to a more, I would say, more modest spend, we are spending less than 10% to the R&D now in consumer. High and -- a chunk of it goes into what we call Prosumer A/V, that's you know, been about half of our total consumer business for the last two or three years, but that has all the attributes of our B2B business, lots of sockets, lots of customers, longer lifecycles. In the portable space, you've got to play in there in a very, very careful way, you've got to be sure that you can get multiple sockets or ensure it sure could be. And that's how we're playing that game. So I think it's a modest R&D spend. We're in a very good position at the edge of technology and we're going to keep pushing it. There is an appetite for ADI to keep extending the performance leadership there.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it. So that modest R&D spend however is sufficient enough, you think, to provide differentiation and stickiness for these new products?

**Vincent Roche** - Analog Devices, Inc. - President, CEO

It is, because we are leveraging technology platforms that are already available and what we're doing is really customizing the platform to build a particular product for a particular center type, on a particular interface type.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Can you give us an example of the other models, other end-markets for applications where you've used this sort of similar platform technology that's going into this new market?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yeah. Well, for example in healthcare, we've been very busily tuning up our healthcare strategy as well around areas like building integrated photonics, precision signal processing modules for things like CAT scanners, MRI systems, digital X-ray. That again is the use of the precision technology platform. Another one would be in industrial automation, developing integrated platforms for things like robotics control. So those are examples of where the precision technology of the Company is being -- yes, there is a platform that we've been developing for 50 years and then we leverage that, we keep pushing the performance in terms of process technologies and circuits. And we're one of the kind of the cornerstones of this Company, aside from innovation being critical, diversity of business is important to ADI. So we're always looking for as many applications and customers we can find for our technologies.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it, so let's move to another application, automotive? Now I think automotive as a percent of your total revenues probably doubled over the last three, four, five years? You are in the ballpark of 20% now?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yes, 17%, I think in the last quarter.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Yes. I've been a big fan of automotive for a long time. I'm a firm believer in the content story, can you give your -- give us your views of content increase in general and automotive and where you see ADI's opportunity to jump on the back of that content increase, where do you see that going? I guess, long-term like if autos are going grow, [auto TAM] grows 3% a year, give or take, like where do you see ADI's potential would drive that in automotive over the next few years?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yes. So, let me start with your last question first, in terms of growth pattern. In my sense, we last year at our Analyst Day, we put out a target of growing the Company sustainably at two to three times global GDP. We'll let you know (inaudible) volume measures probably 6%, 9% something like that 5%, 8%. I think over the long-term for ADI, we believe we can grow at the higher end of that expectation. So it's a big business for the Company now, it's about \$0.5 billion plus, so the denominator is getting bigger and bigger. But I think if we can sustainably grow and based on the pipeline that we have and the breadth of technology that we have, my sense is that, that's possible. I think the reasons at a macro level are that, car companies to a large extent are automating and electrifying. And they have to use semiconductor technology as the means to create those modalities.

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There is -- we have publically talked about our relationship with Audi, so I can talk a little about that one. They are using on average now between 6,000 and 8,000 semiconductors per car and the number of sensor types they are going to use will increase exponentially in the years ahead. So every time there's a sensor, there is an opportunity for ADI because our business is about interfacing with the real world and bringing very high quality data streams and information about motion, light, sound and all those different physical modalities into the world of digital. So again we are true to our thesis we play on the high-end and we look for -- we look for the toughest challenges with the car companies and the Tier ones in areas like powertrain, infotainment and safety systems. So I think it's -- the car will continue, as I said, there will be more and more sensors adopted and the communication systems adopt, it's all these adoptions create opportunity for ADI.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

I (inaudible), the number you just gave 6,000, 8,000 sort of individual semiconductor component. So what does that mean for the [price point], I've always thought about average semi content per car in terms of a few hundred dollars which were put in ASP there like \$0.10, is that my under thinking the amount of content that is in?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Well let me say that, we are not selling \$0.10 things in the cars. Well I think there's a spectrum state. I mean there are probably things less than \$0.10, there is a spectrum, but we are very much playing on the high end where performance makes a difference and we can get well paid for the technology we developed.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

So would you say your average content in a car is in your average and if it makes sense, talk about an average ASP?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yeah, it is very, very hard to tell. I mean, if you're looking at a high-end car high-end German car, it could be \$100 plus in a...

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Of your own content?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Of our own content. In a more modest car, low-end car might be couple of dollars as safety, so, it depends very much.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. Which of them, electronic subsystems and automobiles, do you see has provided the most growth opportunity for ADI. Where are you putting your incremental investment dollars in automotive these days?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

I think safety is critically important. Everybody wants more and more safety, governments are mandating safety more and more. We have a play there that goes across the passive safety, active safety, so -- and predictive safety. Predictive safety based on radar, active based on gyros technologies

particularly and passive safety based on inertial sensors. So, we see that as an area where we can continue to push the performance envelope. Powertrain, you know that's an area where more and more sensors are being used to make the powertrain more efficient, to electrify things that are today electromechanical or mechanical, make them electrical. And we're developing some brand new technologies like torque sensor, for example, that will continue to allow ADI to enable some of these things that happen in the car.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

How much of your automotive business today, what you say, sensors versus more traditional semiconductors?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

It's probably in the region of 40% sensor, something like that.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Oh really? Would you say that split is similar in your industrial business as well?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

There is less sensors in the industrial business, it tends to be more classical active circuit technology.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

I understand. I want to say we're into industrial actually and I have short-term and long term. I do want to get the short-term question out of the way or you don't like to use this forum for that, but it is on customer minds. I think broadly in the industry right now we've been seeing, I call, pockets of weakness in markets that seem to be under PCs, wireless conversing, obviously you don't really have any PC exposure anymore, I mean certainly in semiconductor investors you've seen this movie play out before. In many cases, you can see pockets of weakness, one or two -- tomorrow you could have one or two more, right? So far, I think from you and from many of your peers the core industrial, even automotive markets seem okay, they don't seem fantastic, they don't seem bad, kind of Steady Eddy at this point.

Can you just talk a little bit about what you're seeing right now in terms of customer comments, order patterns, anything that seems out of the ordinary, how can investors get any sort of degree of confidence right now, the things actually are stable and can remain stable? And that's a lot of short-term question?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

That's quite okay, we have to captive audience here. I think what we see, what customers tell us is that, inventories, there's a good match, I think, between supply and demand across the entire chain of industrial today. Our distributors tell us the same thing. So I think what you're seeing is a good pattern of steady growth, as you said it's not -- I think you said earlier on, it's probably little boring.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Going wrong with that?



**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Nothing wrong, it's just a beautiful business, I thank industrial for its economics, but you know we have seen as well, I think, a steady incremental increase in orders in that space since kind of February of this year, every month we have seen a slight increase. So I think it is steady as she goes. Our customers are busy innovating and we continue to go from strength-to-strength, particularly with bigger customers in the industrial area. We're developing a lot of new things around the IoT for example, so it's our core business, it's 40% plus of ADI. Tens of thousands of customers, probably 15,000, 18,000 products used. And I think it will continue to be stable for many, many years to come. This whole IoT or this whole intelligent sensing of machine, prediction and so on. That is an area where I think we have an opportunity to change the growth profile in the industrial area.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

So let's talk about IoT. I guess first question, I guess is, how does ADI actually define IoT, because it's one of these things right now that can almost mean anything you wanted to be in? How does the ADI define it?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Well I hate the moniker, I mean in many ways, one is, it is something that's actually been evolving when a marketing person got hold of it and give it a name. But it's evolving around ubiquitous sensing, everything that can be sensed, will be sensed. It's about drawing great information out of machines that help you predict health, produce maybe new service, businesses around the health of machines and aircraft and robotics plants and so on so forth, but requires sensing, it requires conversion, it requires computing, interpreting and connection. That's really what it is and we are seeing it now. When I talk with a lot of industrial customers, the executives, they ask me about what we can do to help them really get a grip to make their machines smarter, more intelligent, more connected. But that essentially is what it is and that has been emerging, it didn't just happen in the last year or two.

I've read somewhere that, everybody asks why now? why is it happening now? I think the best description I heard is, an analogy with the world of biology, the pre-Cambrian explosion was about lots of little pieces developing, little uni-cell organisms and when enough of them were available and kind of cohabitating, new life forms could develop. So I think what you are seeing in the world of semiconductors now is, a lot of computing power is available cheaply, connectivity, sensing is more pervasive, we can sense more things, we can do it more accurately. And again we're going to pickoff the higher end of that spectrum. And in fact we've been organizing our own marketing and engineering activities inside the Company to help us build the platforms that we need to be a player in that business.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

So, is the value in that business to customers derive from the ability to do the sensing and the computing and the data collection, or is the value derived from the use case and the business model of the application and the analysis? And what I've always struggled with is, can the semiconductor companies actually derive excess value from this market without actually having a hand in developing the applications and the analytics in the business model? And I wonder, I'd say you all about Intel, most of you know I haven't been a huge fan of (inaudible) in IoT, I think their view is it drives like server sales and analytics. I'm not convinced that that is the wrong way to look at it, what's your view on...

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Well, if I have the same vantage point of Intel, I would probably say the same thing. I'm looking at a very much from the real world in, where you need a lot of knowledge of both the applications. And one of ADI's great strengths over the years is that, we play in many, many hundreds of unique applications where we develop a lot of knowledge about how those applications work and how to sense and to capture high quality representations in digital form about those worlds, right, those applications. So I see it differently, I think in the areas that we will play in healthcare, industrial, for example, where, our silicon technology makes a big performance difference. We'll get well paid for that. We've also been developing algorithmic technology, that we will get paid for.

**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Meaning, around the analytics.

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Around the analytics, around interpreting the signals and producing high quality information that we can move around the cloud or the computing system. So I think you'll see some new opportunities to develop some new forms -- new streams of revenue in this space, we're seeing some evidence of that now.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. The semiconductor companies, [do you think get] a better monetizing software in order to re-capitalize on that?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yes, they do. I mean all of us are putting more-and-more software in and you know I...

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Can you get paid? Semiconductor companies historically have not been good at getting paid?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Some of them have, I mean, there are some of them who have -- [Q] company in the West Coast is one good example of that. But I think we're learning how to do that because you know, fundamentally we're being asked to do more-and-more by our customers. In fact what I've seen -- the big shift I've seen in the customer behavior over the last five or 10 years is that, more and more of our interactions with our customers are now with systems engineers, with software engineers. But the hardware engineering has now been to a large extent outsourced the companies like ADI with a specific domain competence and with the scale to be able to solve meaningful [size] problems for our customers. So I think that gives us an opportunity to not only produce hardware in the future but to produce for ADI -- to be able to produce the solutions that have a mixture of hardware and potentially algorithms over the longer term.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

How many, I guess, engineers working on algorithms and software do you have versus hardware design engineers today?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

It's very hard to quantify because we had this spectacle conference recently in Boston, where we bring a couple of thousands of our engineers in every year as a -- it's a learning and teaching experience for people, a cross-pollination of ideas, and in our demo room there, we - what you see is more and more and more graphically user interface technology, more algorithmic technology, more software in general combined with the hardware, but it's now an appreciable amount of the R&D spend, although the lion's share of what we spend is still in development of process technologies, circuit technologies and products. But it's a -- it's an appreciable number and growing as a portion of the R&D.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Do you see the algorithmic piece of it actually becoming bigger potentially in the semiconductor piece or do they have to go -- do they go together?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

I think they go together. I mean there is an awful lot to be able to do good algorithms, they need a tremendous amount of knowledge of the application and the whole signal processing chain. Very hard to say, well I mean, I think if that does happen, it will be a long, long way up. I still think the way we monetize the value of this company is through hardware -- selling hardware, but the other parts of it will become a bigger piece over time.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

So how long does this take like over what time period do you see this driving growth and is there any way so that you can help us quantify, I guess, degree of content increase from IoT, however you want to define that?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

I think in the markets we're playing, it's probably, we will probably start seeing signs of life in terms of real revenue. We do by the way today, so a lot of solutions in the vital signs monitor for different applications. So our endgame there is clinical grade vital signs monitoring. So that is an example of we are today, we are already selling IoT-related technology. Well, I think, to see an appreciable growth in areas like industrial, it'll probably take another three, five years before we see anything of any significance.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. But you're engaged with the customers now to develop a solution?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

We are. And also by the way, you need an ecosystem of partners as well to be able to play to connect your technologies in the cloud for example. So, we're building out that whole eco system.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. Who is running that, who is managing that at ADI in terms of forming those partnerships?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

We have a VP level. One of our, one of our Vice Presidents is (inaudible) building out that technology across the Company, leveraging the platforms and building the technology. So it's at a high level in the company.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Okay. I wanted to take a look at one more end-market and that's healthcare. I think this is the one, I think, this has also grown materially, I mean, it hasn't got big enough yet for you to necessarily break out of industrial. But sound is like on the last call it was starting to get reasonably close potentially to where you might start to do it, 10% will be the threshold?

**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yes, we're in a good position, we have a lot of new technologies that are going into, as I said, vital signs monitoring and things like monitoring of diabetes, human vital signs, blood pressure that's vital too and so on. And you know I mentioned earlier that we've also got a good position in things like imaging systems for CAT scanning and so on, digital X-ray. So I think over the next (inaudible) see a steady growth path, probably the higher end of our growth guidance and 10% of the Company's revenue is the path around them.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it, I guess, is the issue on the ramp, is it more like the timeframe and the regulatory issues? Or is it a matter like finding and growing the applications?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

It is much, Stacy, I think this is much about adoption as it is anything to do with government regulations. It just takes longer to bring the technologies into a conservative industry and get them applied, any appreciable level of volume.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. I want to switch to a broader topic which is, I think is probably top of mind for a lot of investors here, M&A. Obviously the industry itself has been in a wave of consolidation. In my own opinion, it seems to be today a lot more around sort of scale and cost synergies versus maybe what we saw in the past. You've talked about within your long-term growth model inorganic growth being a portion of that, you have a good amount of cash that's sort of sitting there that's offshore mostly right now, but it's available dry powder for opportunity by Hittite obviously. What are your views, I guess, on M&A in the industry today in general versus what we used to see and your views on M&A as it applies to ADI specifically?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yes, I think you're right. Maybe most, there is a frenetic pace of the person type.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Yes, in busy morning.

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

It has been a busy morning, it has been an interesting announcement. But I think most of the activity has been about consolidate and get the operating synergies as quickly as possible. You know, I think the other side of that M&A equation is, you buy something of strategic value that brings long-term capability and returns for you. We're in that latter count, I mean Hittite was clearly, by a very strong capability that allows us to bring more confidence to our customers in the world or of a microwave domain. It was a well-run company with a very, very good balance sheet, very good P&L. We're looking -- we are going to be on the acquisition side. We are going to be an acquirer, as we've shown with the Hittite deal, but our standards are high. We are interested in quality and things that bring long-term strategic value of the ADI. Obviously operating synergies, you know, how the part will play as well, but our primary focus is, [bill] capability that we can sustain over the long-term, in the space that we really care about.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Do you think large transformational M&A in Analog is possible?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Of course it is. I think, what you're seeing this morning, shows that everything is possible.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Possible in the sense, it can actually work and drive long-term value. I've always wondered obviously Analog has been very fragmented and it feels like it's been right for consolidation, it hasn't happened to that degree, I've always thought about it in terms of the nature of Analog design itself. And you know it's maybe (inaudible) R&D organizations together naturally drive real value out of that. So given your much broader knowledge of the industry and the complexities of the industries in mind, what's your view on sort of chances of success (inaudible) large scale transformative acquisitions in Analog specifically?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Well, our experience with Hittite, where our instincts were very, very good about the space that we're playing in. That's been a very, very quick melding of the capabilities because we were largely complementary and you put one-on-one together you get something greater than some of the parts. I think where you do that, you've got a very, very strong chance of success where I mentioned earlier, there's a vacuum developing at the customer level. And the more scale you can bring consulting bigger problems, the more valuable you become. So I think it's very, very doable. I think it boils down to a large extent, about the -- and the success of integration really boils down on how well the cultures can be, are they compatible, the engineering philosophy is similar. And I think if those things -- if you can check the boxes in those things, everything is possible.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Right. And the cultural set with Hittite seems to be extremely high.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

It's very, very good. When you look at our people visiting customers, you cannot tell who was on the ADI side or the Hittite side. I think the engineering meld was very strong, the geographic proximity helped us well. But very similar perspective on both -- the Hittite and the ADI side, what makes good business in the long-term.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

So Hittite, you've been -- I think when you're here even last year, you were talking about ADI making much bigger push in RF. Right? So Hittite from that standpoint makes it kind of sense I think, turns out to be a market that's hard to grow organically. Are there any other areas right now where you've been pushing organically where, it some -- and an inorganic option might be -- might be better way to go?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

You know sensors, for example, there are many, many places you can play in sensors. We've up the R&D in many of our sensor applications, but in terms of process development, I think that's an area where, as the IoT emerges and the need to integrate more of the sensor and the signal processing and the algorithms together. That's possibly an area of interest.



**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. And at any point if you want valuations in the space today, when you are evaluating targets? Is it harder to get to return (inaudible) -- you would like to see?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Well, I think we are in a pretty much zero cost of debt kind of atmosphere at the present time. So virtually everything can look accretive, but maybe industry's had a good run over the last while, so that can work for you. Right. So your own valuation can work for you and that is relatively cheap. So as I said, what I am interested in is really a long-term value contribution through growth and profitability.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. Do you think, ADI (inaudible) carrying some debt, are you not enormously levered? Do you think you'd be open to being a little more aggressive with the balance sheet, [just for] whether for acquisitions and cash return or what have you?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Everything is possible. We are looking at many, many different options in terms of how to use the balance sheet. Over the last, last several years, the last few years, we've been using debt as a way to just load up the -- to make sure we have enough cash to pay the dividend, right, based on how the mix -- the geographic mix of business is. But we are looking at all kinds of options, in terms of how to leverage the balance sheet more aggressively.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. That's probably a good segue into the balance sheet and the operating model. So right now you are operating, you've given these long-term targets at your Analyst Day. I think it was worth \$4 to \$5 in earnings by 2020 was the number. I talked to some clients, I think you maybe there considerably sooner...

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

I hope you are right.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

We'll see. On the margins though, like again I mentioned in my opening comments, you've done a phenomenal job on the margin expansion. And I think ADI used to be in the mid-upper 50s and now we're 10 points plus higher than that. You're sort of in the model range now. I think your target maybe being able to be closer to the high-end over time. But, could you talk about what further initiatives that there might be today to improve gross margins. I can imagine things like going after pricing leakage. Rationally sort of -- with other structure levels, so that you can pull or pulling or at this point it's just around revenue leverage, like what takes the margin time?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yeah. So, I think we've got a much better mix of businesses now than we did in the past, right? So the margin, the fundamental margin dynamic is different. I think in terms of getting to the higher end of the gross margin target of which is 68%, a lot of that will come through utilization

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improvement. So for example, last quarter utilization was in the mid 70s. If we can get into the mid 80s, we'll get another 100 basis points of improvement and that's -- where there is a tremendous fall through from that. We also get some accretion from the integration of Hittites, we're moving manufacturing operations offshore.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

So that not all in the model yet at this point?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

It is not all in the model yet, that is still to come, that activity hasn't happened yet, it's in process. And I think the rest is just being smart about capturing value and holding onto it through more disciplined pricing practices and we're getting better and better with that.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Yeah, I think that's been, I remember, Jerry used to talk about some of the things you're doing. This is sort of an ongoing, has it shown, I mean he was talking about that -- I mean it was years ago, has it actually shown improvement since then?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Well, we're actually seeing ASP improvements across the business. So part of that is...

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Due to mix or due to the actions?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Both, part of it is mix and part of it is action. We monitor very carefully, we can look across all our businesses at a market level, at a product level and we have great understanding of what's mix related, what is ASP related, in terms of actions. So we're getting better and better with that.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

How does ADI approach pricing by the way, I mean like the way that many semi (inaudible) frankly as cost wise. Much better way, typically as it rolls a harder conversation (inaudible) the value pricing and being able to demonstrate to the client in terms of exactly what you are, exactly that's -- are you already there, is that what you are moving towards?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

We used to do the former, you take the cost of product and you multiply it. I think that was very much fashion of the industry. But no, it's much smarter now. Five or six years ago we went to a more market-oriented structure in the Company, you know the analytics we have are very, very good around pricing across all our businesses across the globe. And it's really about now understanding better and better the value of the products that we're developing. And as I said, we're improving ASPs partly through mix and product configurations, partly through just better discipline.

**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Do you think you have enough manufacturing capacity in place now to meet your growth goals?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Well, we use manufacturing, we have an internal component and an external component.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

It's about half and half from my understanding...

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

On the foundry side, it's about half and half, the back-end is primarily, in terms of manufacturing the packaging is pretty much outsourced. But it's not half-and-half and I think the way to think about the space is, if the need for internal you know -- if utilization gets into the kind of the mid high 80's, then we are looking at adding more capacity inside the Company. And we can do that with tremendous efficiency. We just -- last year -- a couple of years ago, we increased with two foundries inside the Company, we increased the output capability by over 20% for a \$15 million investment. So it's very much a CapEx like business and there's a lot of scale we can bring to manufacturing with small incremental improvements. So our long-term model and it has been and will continue to be that. The manufacturing side, we expect to spend about 3% of revenue in CapEx, primarily to keep the manufacturing systems fresh and at the right level of utilization.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it. What revenue level do you think would be at if your utilization was upper 80's? And that's not a fair question to ask at all, but I'll ask it anyway.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

I don't know, but higher than where it is.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

I wanted to talk about OpEx. So how should investors think about operating leverage and OpEx growth. Like, with incremental revenue, how much should we think about fall through, is this a -- OpEx is it growing at half the rate of revenue or how do you think about it, particularly as some investors believe, they think there could be a quite a bit of, obviously, near-term revenue upside, they may or may not be in the numbers yet.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Well, I think, what we expect in terms of gross margin is kind of 80% plus fall through. I think on the OpEx side, we've been very, very clear, we're managing the Company to not spending OpEx at more than half the rate of sales growth, increasing OpEx at half the rate of sales growth. And there we're able to get 50% fall through. So I think that is the way to think about the model and that's what we're running the Company too and what we will continue to run the Company too.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Okay. How do I ask this question. So, we had a -- again you had a sort of 20-20 horizon for the sort of \$4 to \$5 EPS number. I think I went back to the math, that implied at the midpoint in place, something like 10% annual growth through both, I guess it was presumably for both organic and inorganic method. They want to put some of the short-term stuff aside, at this point. But in general, like when you gave that long-term model, was that kind of the right level of revenue. I think you're seeing kind of two to three X GDP seems like in the ballpark?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Yeah. I'd say I think that's in the ballpark. So we said, \$5 would equate to hitting the higher end of that long-term growth target and \$4 was probably in the lower end of that growth target.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it. And on -- I guess on that -- question went out of my head, I'll ask it again when it comes back. I want to think of -- I want to ask you a question about again, I think back to OpEx. But how you think about prioritizing investments in product? So there's always this perennial, view it as a controversy on the payoff between revenue growth and margins. And I had a conversation again, this is with Jerry before he passed away, we were at an investor, he was hosting a lunch. And somebody asked him that question, like, about how do you think about trading [off] deal, would you ever get business that doesn't meet your targets, and he kind of looked at it and he said that's the stupidest thing that I've ever heard. And if you know, Jerry, and he said like, when you get business you always take it, always, because you've already made the investment, right, the question is like, do you want to ask yourself, what kind of business do we want to be in, and that's a question we ask ourselves every day. So, I guess in that framework I'm assuming that has not changed. How do you think about prioritizing investments?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

I think the way to think about it is, very much the markets you play and the way you play in the markets will determine ultimately what you can get from, in terms of margin throughput. And the markets we're playing, and some of them have margins way above the corporate average and some little below the corporate average. But I think what we're very heavily focused on is, we're playing in those markets, we're playing at the high end of technology, focus on getting earnings -- focus on getting earnings leverage. So I think that's the way to think about it. So when it comes to, do I -- what do I do, do I focus on all things being equal, do I focus on growth, do I focus on gross margin, focus on growth. Growth solves a lot of problems. So that's the way to think about it.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Okay. And I guess given maybe some of the changes in mix that may be happening over the next couple of quarters possibly, you don't see any significant changes in the -- like the way the Company is running now in terms of operating model?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Correct, that's right.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Okay. Got it, I guess on that one, I want to ask you a cycle question and the question is basically, is there anything as a -- such a thing as a cycle anymore? This has been sort of an odd one, I mean I guess they're all different, you've seen more than your share...

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

30 years plus, I've seen.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Yeah, what do you think about what we're seeing in the industry now for probably in -- I can make the claim or build the case that given some of the drivers out there around industry consolidation and you know concentration (inaudible) expanding and better channel management, for example. I think you're doing some interesting things on the channel side. Like is there a reason to believe that the cyclical should be less and how was ADI sort of managing that?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

I think there was a cycle in our business, probably prior to 2004, 2005, there were kind of two years on a year off, that (inaudible) the cycle, I don't see that anymore. I see a much better correlation between GDP growth and what's happening in the semi-sector, aside from portable. Take portable, there's a much better match between GDP and semi's. I think there are a number of reasons at the present time, I talked earlier on about a good match between supply and demand. I think the transparency that we all have now, we can measure what is happening at every customer, every product, whatever the region, the transparency we have got in terms of being able to look at true demand I think is much, much better than it used to be.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

How do you look at that because I get the idea that you are -- you sell through distribution, you get that, but I mean you still have, I mean there's hundreds of end markets and thousands of products and tens and thousands of customers, how do you get actually a read of what's going on in every individual?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

We have an extraordinary capability. We can literally see every customer irrespective of channel or geography, what is going on with every customer, in terms of point of sale, order rates and so on. I think the other thing that's happened is that, so transparency I think is better across the industry. Consolidation of course has taken at inventory point on the way as well. And I think our customers will become better managing supply and demand. So a lot of it is just better supply chain managements and overall inventories have to move faster. We can move -- information moves faster, we are able to move products faster. So I think all that has helped create a better supply-demand balance.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it. We have got about a little over 10 minutes. I want to talk about and I want to leave some time at the end for question cards if there're any. I do want to talk a bit about use of cash. And so I think you have a target right now to return, I think it's 80% and you're doing a little bit better than that this year. Share count still been going up though, maybe recently it's level up. I mean how should investors think about use of cash in terms of dividend buyback acquisitions? How should investors think about the likely trajectory of share count going forward? And then like, are you able to support those, you are still with the onshore cash generation that you have versus the off-shore?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Yes, well, as I said earlier Stacy, if we need to take on some debt to make sure we can support our commitments we will do that. But I think our primary focus in terms of cash distribution is on the dividend. We have a formulaic approach to share buybacks. We use a formula for buybacks

within certain time windows and at least for the foreseeable future, the focus will be on dividend. And just letting the formula to take care of the share buyback.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

So is that a statement on the current valuation of the stock?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

No, it's just a formula that we use. It's always very hard to figure out when to buy, when to -- so you know we've just -- we've let the formula run for several years now.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

What drives the formula?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

It's time based and -- it's time based and average share price based.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Okay. How do you think about variable compensation and bonus structure? I know you used to, I don't how it's done now. It used to be based on year-over-year revenue growth and operating margin target? And again that growth seems to be picking up and those operating margins seem to be getting pretty close to the high end of those targets. I think you talked a bit before but maybe making some changes to those models, I don't know if you ever actually have, but how should we be thinking about that and the implications that maybe the new trajectories that we're seeing now on variable comp and OpEx growth?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Well, we have shifted over the last couple of years, we have shifted the targets, we've up the operating profit target and we've also up the long-term growth target, so most people who are on the bonus program get paid, it's basically half on operating profit, half on revenue growth still, the sales force, of course is based on incremental gain is on the basis of revenue growth. And I think that's a good -- I think that's a very good formula for running the company, it makes it clear to people that, revenue growth is important, growth in profit is important. And for the sales force, you've got to turn the product -- turn the product portfolio into cash.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it. And so does that basically correspond to the objective function that you are optimizing there (inaudible) basically revenue growth and profits, something like that?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Yes, I think it does. Growth, at the end of it, as I said earlier, growth solves an awful lot of problems and in the businesses we're playing, the -- if we're smart about the technologies we're bringing, the way we're managing pricing, the margin is up, very, very good efficiency.

**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Got it, what's -- what are you doing in China today, that may be different from what you might have been doing say, five or 10 years ago?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Well, I think, 10 years ago, we as a Company got really serious about building a direct infrastructure in the region, both in terms of sales and the applications, but also, over the last five or seven years, we've been building out design teams, product development team to help us to find products for our customers there in a more accurate way. And also to develop products for customers not only in China but elsewhere. So I think the infrastructure that we've got there now to do business in the region is much greater than it used to be. I've seen a tremendous maturation in China as well over the last -- the last few years in the sense that Chinese customers now talk a lot more about innovation than they talk about volume and costs. So I think there's a big opportunity there.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

Is there risk there as well. What's your sort of take on the potential of Chinese homegrown competition in analog?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Analog is, of course, I think you will see particularly startup companies try to, but when you think about what of those we have, it's very hard to replicate. We've got more than 20,000 profit [schemes]. We've got a lot of crust, we've a lot of applications knowhow, lot of process technologies that are very, very proprietary. So, I think what we've got to do is just keep innovating at a very, very high rate and the rest takes care of itself. The competitive side of ADI will be ready for everything.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

I guess a broader question on that, where do you see like the most potential competition like, what do customers say to you when you win a socket and when you lose a socket? Like where does the biggest sort of competitive challenge come from that you work on?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Probably, I mean consumer, I would say, consumer has just more -- it's on a higher clock speed, there is more opportunity for competition as you move from generation to generation and probably the other end of the spectrum, you'd say, industrial less -- much less though and then the other somewhere at the middle.

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**Stacy Rasgon** - Sanford C. Bernstein & Co. - Analyst

So it's a trait question but I'm going to ask it anyway, what keeps you up at night, when you think about running this Company?

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**Vincent Roche** - Analog Devices, Inc. - President, CEO

Imagining what could be. I think -- there's -- we've tremendous opportunity. And I think for us it's more about, how do we continue to build the capabilities inside this Company to capture bigger and bigger slots of opportunity. I think that's, I spend more of my time thinking about that than anything else, about developing this Company for the future.

## QUESTIONS AND ANSWERS

**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it, we have about five minutes left. I'm going put one more call after question cards if anybody has any? We'll go to the lightning round. Got it. What aspect of the IoT infrastructure, ecosystem, data analytics, communication infrastructure, centers, et cetera has a business risk of underwhelming development? I don't know that means actually underwhelming development?

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**Unidentified Audience Member**

(inaudible - microphone inaccessible).

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Yes, well we know, for example, that the opportunities there for in the businesses that are more traditional ADI, like industrial automation, for example, robotics plant automation, process automation. We are working with some of the biggest OEMs in that area across the sensors, but sometimes we will build a sensor, sometimes we will partner with them and partner our technology -- our signal processing technology. I think the question in areas like industrial is how fast does it happen? It's not a question if IoT happens in industrial automation, it's when this happens. You've seen already TV advertisements from some of the bigger OEMs that they run, how they're instrumenting aircraft engines and taking data from aircraft engines and building finance and service models around that, that enables them to build a whole new business model. So I think it's really more of that. In terms of 4G and 5G, look, the penetration of 4G into the world I mean, today in this city you try to get a good connection that you want to bring any form of wide band data to your mobile base, it is this functional. So there is a long, long way to go. I think the penetration rates of 4G are still sub 10% across the globe. So this has got a long, long way to go. And it's fundamentally a lumpy business, some quarters will be better than others, but over the long-term it's a must have, you got to have good quality movement of data and information in a modern economy and it is got to be mobile.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it. There is a question here on capital allocation. I think you've mostly answered, but the more specific question is, is there a certain level of leverage that you might be comfortable with? You talked about you are willing to take on debt, but is there a certain level?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Yeah. Look, we are obviously interested in keeping our credit rating, so that it gives you (inaudible) right to view to deleverage, so that might be the most obvious one.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Got it. At a room full of investors some may be familiar with the story some may not be. Hopefully a little more are familiar now, but why should investors buy ADI stock?

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

How many know the ADI story? Okay. Quite a few. Look, we've just celebrated our 50th anniversary as a Company, and in an industry where the success rate of technology company is by the way is less than one in 1,000 over a 50-year period, we've done well. And I think the best years are



still ahead of us, the technologies that we have sitting at the intersection of the physical world and the digital world, those technologies are coming into play more and more. And I pay a lot of attention to what happens outside with our customers and our competition partners and so on. Our customers are asking us to solve ever more sophisticated and complex profits. So I think we are in a great space, there's a lot of demand for the technologies that we have and you know, we will continue as a company to build more and more capability to allow our footprint to increase within these applications in which we're playing. And you know we talked at the Investor Day last year, we talked about, we believe now that we're in the third wave of information and communication technology. The first one was about big iron, mainframe computing, building fundamental capabilities and semiconductor capabilities. The second wave was about mobility and personal computing. The third wave is about massive deployment of sensor technologies to make machines more and more smart, to make them more automated and to make them more useful to us in healthcare, industrial, automotive and so on so forth. So, I think many of the things we have are instrumental to be able to realize this Internet of things, this third wave of information communication technology. So I'm very bullish. I'm more bullish now than I was 10 years ago and I believe our best years are ahead of us.

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**Stacy Rasgon** - *Sanford C. Bernstein & Co. - Analyst*

Fantastic, thank you so much.

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**Vincent Roche** - *Analog Devices, Inc. - President, CEO*

Thank you Stacy. Thank you.

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