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GE and the Culture of Analytics

Philip Kim (GE Measurement & Control), interviewed by Renee Boucher Ferguson

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GE's marketing division uses data to continuously improve performance — and democratize analytics.

PHILIP KIM (GE MEASUREMENT & CONTROL), INTERVIEWED BY RENEE BOUCHER FERGUSON

General Electric (GE) is a massive conglomerate that encompasses a number of separate businesses: Power & Water, Oil & Gas, Energy Management, Aviation, Transportation, Healthcare, Home & Business Solutions.

Oil & Gas is the company's fastest growing business, with revenues of $15 billion. It competes in high-growth markets and creates products, like the recently launched first subsea compressor, that utilize GE's broad technical capabilities. Measurement & Control, a division of Oil & Gas, covers a swath of industries and applications, according to its website, including sensing, asset condition monitoring, controls and instrumentation.

But Oil & Gas, along with the rest of GE, is also betting heavy on analytics. The company announced this summer the first-of-its-kind cloud platform for collecting, storing and analyzing large-scale machine data, to handle the massive data from the upcoming Industrial Internet.

GE is also applying that analytic rigor to innovate internally – and drive commercial change. Philip Kim, (former) marketing operations leader for Measurement & Control,[1] talks with *MIT Sloan Management Review* contributing editor Renee Boucher Ferguson about the process of innovation through analytics, driving commercial change, and what others can do to get there.

How are you are using analytics within GE Oil & Gas?

General Electric is a very large conglomerate. So when you use the word "analytics," [providing] context is probably the paramount thing you can and must do, in order to make sure that people understand where you're coming from. When we talk about analytics within the context of our business — Measurement & Control, which is a part of Oil & Gas — we segment analytics into two large categories.

One is what I would call "big machine data" or "big data" — applications, for example, trying to identify from a series of data points if there's a technical issue with a customer asset. For example, detecting when rotating machinery might fail by combining a lot of sensor data with software and analytics.

The second category that comes up with analytics is, how do you take in what available data you have and drive it toward commercial objectives? Whether it be to grow sales, decrease costs, increase productivity — all intended to help provide solutions that are not only optimal, but that continuously improve our performance. What my team works on mostly is the second category. So, what we'll do, often, is figure out what the business problem is that we can help resolve. We're kind of a jack-of-all-trades; we don't turn away anyone from any part of the business, even though we might not necessarily have a lot of skills in that particular vertical area. But we will bring the analytical tool sets and help drive an outcome that we think would improve some strategic outcome.

What are you working on now?

In terms of the actual specifics, we've been working very hard on a lot of visualization techniques, as well as incorporating the data methodology that GE's famous for — Lean Six Sigma — and using that to build and prototype actionable use, which can then help drive change in behavior. So we spend a lot of our time not only getting what data we can, doing a lot of mash-ups, exploring what orthogonal datasets might be useful to help answer the question, but ultimately driving some sort of business strategy improvement with that, and measuring that.

How is it that data and analytics have enabled you to innovate and drive business strategy?

I think analytics in the context of innovation is really bounded by what's different. One of the things that we always strive for is, if we do an analysis, and that analysis basically just confirms what you already knew, we've failed the test for innovation. So one of the things that we always try to look for in a particular project is, why is an analytics approach superior? And typically, it's because the scale or complexity of the problem escapes just simple human intuition, or the data provides something that is fairly counterintuitive.

So we work toward projects that humans just can't process very well. To give you an example, we'll use very sophisticated modeling and statistical multivariate analysis to identify what are the key leading indicators for particular growth segments around the world — by verticals, by product — just so we can understand the question: is it really the market or is it us? That kind of information can then be used to determine our best strategy for resource allocation. If we hadn't provided that kind of normalization function, it would be much more of an intangible, to know whether or not you made the right decision. It also allows us to preplan a lot of our workforce, as well as things that are very hard to substantially, quantitatively prove out. What we're trying to do here is make the case that data helps and bolsters strategic thinking and innovation. But we're very cautious about that, because that is a very hard thing to do.

Can you give me an example of an analytics project that helps bolster strategic thinking? And why is it a hard thing to do?

We did a pretty large study of what kind of segments and customer sites could we map around the world today. And could we identify, using that data, where our best opportunities are, in the hopes that our sales team will spend more of their time identifying and triaging the best opportunity they have in the time frame that they have (rather than prospecting). Our projects around that have been pretty successful.

One thing we do in our group, versus what we see in other parts of General Electric or even outside of General Electric, is [incorporate] a very strong, results-based analytics. We're very conscious about driving change and about measuring the benefits. Some of the projects that we've run through have really helped drive significant incremental changes in sales, because we're answering a very important question in a very simple way.

I think that's probably something that's lacking today in a lot of analytics projects. You have these very complicated models, but they don't translate very well to the commercial operation. Therefore they get lost, or they remain in the academic modeling world, the analytics world, and [are] not driving commercial change. We've been very good at scoping out what makes a difference. The one feedback that we get consistently is not to increase the sophistication of our models, but to make [them] simpler and easier to use. I think that's a lesson we're still learning.

We do measure the ROI, so obviously we have to expend effort, time and money on that. And we do want to make sure that the right projects get the right prioritization. So we let people bid up our services, depending on what kind of benefit that they might be able to provide for us. That's a slightly different approach than I think you'll find in a lot of other businesses, even within General Electric. We'll challenge business users with the benefit up front. But the General Electric culture can accept that. That's something that we are all very comfortable with, as a principle — projects that have more ROI, more benefit, they deserve to get to the front of the line. And there's not a lot of issue with that.

It sounds like different departments are competing for your attention. How is it that this happens? And how does that process play out?

Let me give you the quick background, because it's a very strange process that we've amalgamated. The first thing that we realized, very early on, is that we were absolutely terrible at predicting when we would be done with any one project. We were just bad at it. When you're trying to do analytics, it's really hard to know when you're going to be done. It's really hard to understand what the outcome might be in a certain time frame, especially the more complicated or the more complex, or where the datasets are not readily available.

So what we decided to do was basically borrow and steal the concept of agile methodology, which is, you write very simple stories and you try to scope out the work in a three-week or four-week chunk of work. We incorporated that, and as part of that you get something called sprint planning. And what that means is that you decide what you're going to work on, you decide what your availability is. You decide what the risk and the other challenges might be in that project.

But you work on it very collaboratively, and then you have daily calls to make sure that everything's working really well, or you're making progress. And what it does for us is it simplifies the traditional waterfall requirements that might be driving a lot of IT deployments, and instead, focuses on the business problem, the stories that the end users and stakeholders are very interested in doing.

It's taking a project and scoping it down in such a way that we can do a very fast prototyping and delivery. Without that, we could get into a situation where we'd go after the biggest benefit for the project, and it's a huge project, and it's very feasible, but it just takes time. Then you realize 6 or 12 months down the road that we're not going to be successful and just basically scrap the project. What this allows us to do is be very, very tactical, with very fast prototyping. The adage of "fail fast, fail early" — that's something that we live by. But we incorporate that within the context of analytics, which I think is kind of rare.

What I push my team to always do is to think about, "how do you know you're going to be successful, or how do you know you're not going to be successful," very early in the process. I push for that very quickly, very early. And that's not typical for an analytics group, because they think we can solve everything. We try very hard to bound and constrain it, and integrate that with a deployment or delivery model. I think that's probably our strongest strength so far to date.

How does GE's culture enable analytics innovation?

One thing that we have going for us is, innovation and analytics are really very contingent on the culture of the organization as a whole. And General Electric is, if nothing else, known for data-based decision [making] within our culture, within our operating rhythm. We're also known obviously for some innovation and a lot of the R&D that gets done. It's pretty well known that we're known for grooming leaders who need to look at problems in new and challenging ways, because we're so big that we have to grow using these kind of large decisions. We can't go after minimal changes and expect to sustain the growth that we're accustomed to.

What can other organizations do to better utilize analytics for innovation?

What I find is, many organizations are underestimating the importance of culture in adopting analytics as a strategy. It comes back down to, you need to have some leaders who are fairly bold, that are willing to take data and analytics as a kind of untrusted or unvalidated initiative, where you don't have a lot to go on. You just take it as potentially what's valuable.

What's happening is that the business environment is changing much more rapidly than people were anticipating. And so they're trying to figure out, 'what's that signal? Why are we not able to predict as well as we could have or would have in the past?' That's an interesting thing that I don't have an answer for, but it's my hypothesis as to why people are increasingly looking to data and analytics as a potential solution.

But that's also leading to the mythology of big data, because organizations are seeing it as, "oh, it'll solve everything." The closest corollary I would have is the power of Six Sigma and Lean Six Sigma. Everyone knows that it's potentially very valuable. It could drive huge benefits to the bottom line. But if you were to survey the folks who believe that it's important and the folks who actually kind of pulled it off, I think you'd see a fairly large drop-off or a die-off rate. That's something to factor in with analytics as well. The folks in the businesses who do make the investment have a much better chance of surviving, versus the folks who say that's important but they're not investing at the same rate or the same proportion.

I also believe that where analytics lives is a factor. I'm not in IT, and if analytics is in IT or in BI [Business Intelligence], I personally believe that it's got a more challenging road ahead than a group that is kind of charged with looking around corners, which is what we do in marketing. We've got a bold leader at Measurement & Control who believes in this kind of stuff, and I'm a headquarter function. I've got personal experience, at least anecdotally, that says that that's a big driver for us.

You mentioned early on in the conversation about putting analytics outcomes into commercial use. Can you talk about that process within your group?

I call it a democratization of analytics. Even now, it's a very rarified skill. It's a very uncommon activity that most people don't know how to do, or do very well.

A lot of analysts are terrible at explaining analytics needs or insights in business terms, and I think "terrible" is being polite to them. So, you have this missing link, where you have a need, but they can't articulate it. You have a bunch of folks who can do it, but they don't know how to explain it. Or the data quality is so poor that they don't feel right telling you, because there's not enough R2 or P-value confidence to say, "I can do this." Whereas a lot of folks would be willing to accept "good enough," right?

So, these kinds of conflicts arise, I think, because of the fact that we've not had nearly as much maturity or time in this field as we had in, say, just pure statisticians or people who are sales guys. You can have people with 20 or 30 years' experience in each of those categories, but not nearly as large a population in the middle, between those two.

What our team has really worked to do is bridge that gap, and we've tried to use these very iterative development cycles to come up with a picture — a technique and a process method — that works for both. That measures the changes through the same analytics and visualization that we've constructed, to make sure that we are making a difference. We spend a lot of our time in that middle.

***Renee Boucher Ferguson** is a contributing editor for the Data & Analytics Big Ideas Initiative at* MIT Sloan Management Review*.*

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REFERENCES

1. Kim moved on from his position at GE after this interview was conducted.

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