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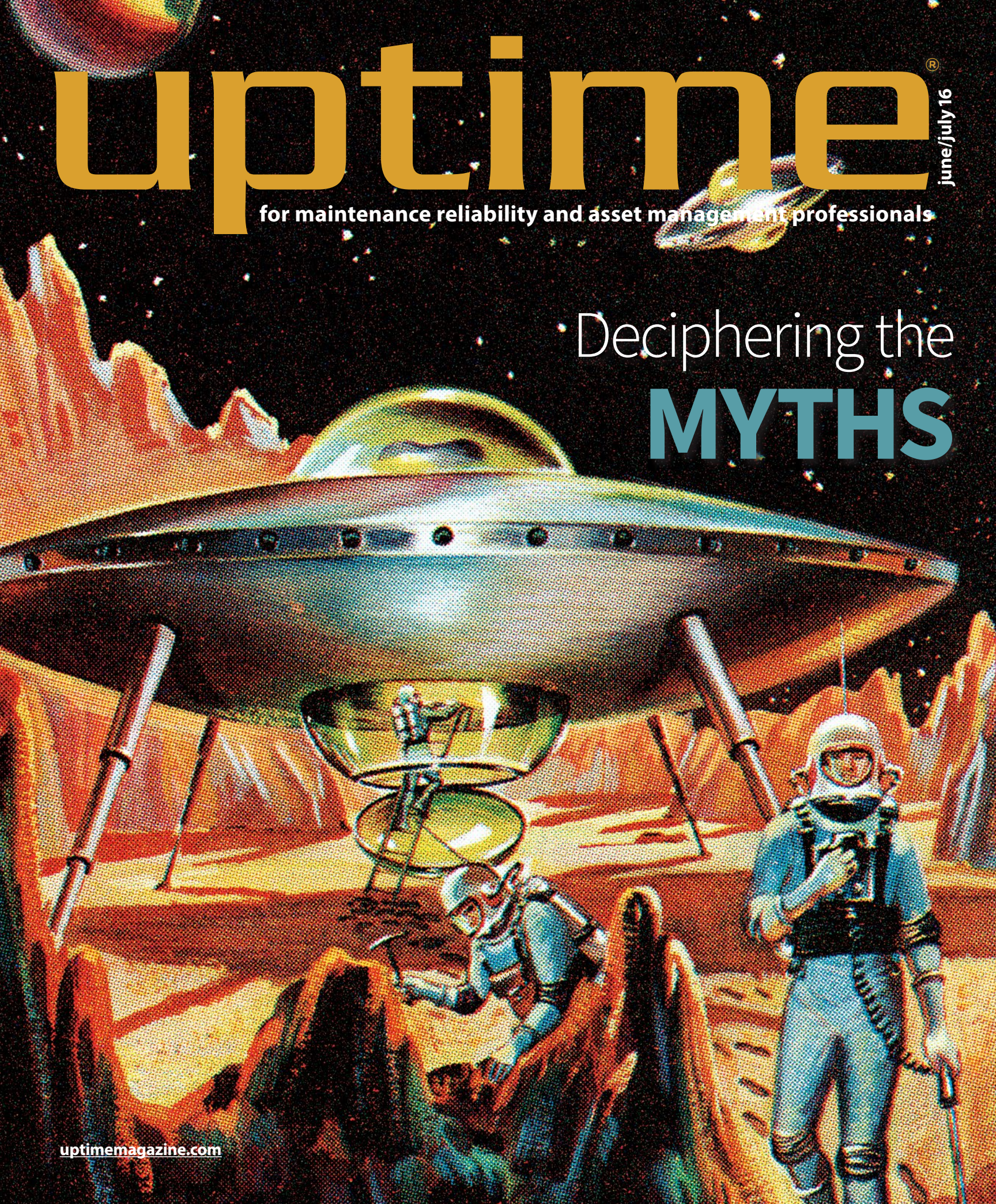

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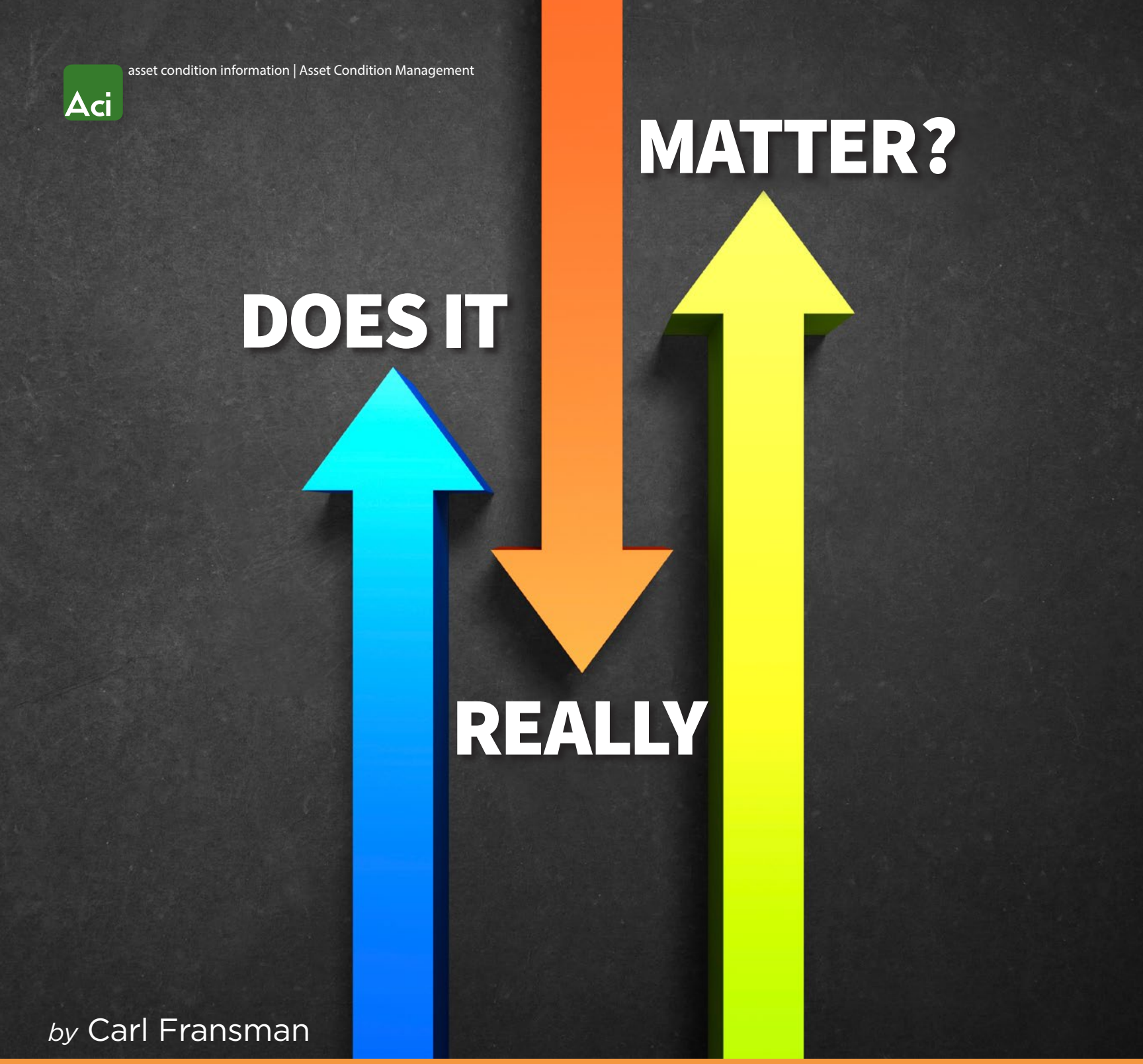


by Carl Fransman

A lot has been said and written about predictive analytics. Most of the attention focuses on applying forecasting techniques to the domains of marketing and security. More recently, however, the rise of machine generated data (e.g., M2M, Industrial Internet of Things, Industrie 4.0, etc.) has opened a new playground for data scientists.

What exactly is at stake? To really understand this, one has to take a step back and look at the changing business environment. Increasingly, competitive markets have led companies to stray away from the traditional, "I'll sell you something and when it breaks, I'll sell you more" model. In this model, clients bought equipment and when the equipment broke, they had to buy spare parts, maintenance, etc. In a weird way, vendors actually benefited from machines breaking down, especially in B2B markets.

But then, buyers finally did the math and understood why this was not a healthy relationship, even less so when one was tied to a specific vendor. Out of this awareness, a new business model was born: servitization. Products are being repackaged as a service that includes maintenance, spare parts and some sort of performance commitment. The commitment is on the output, not just on speed of intervention as is often the case with simpler service level agreements (SLAs). With this type of commitment, when equipment is down, the provider doesn't make money (or less money, or in some cases, even pays fines). The provider's incentive is to keep the equipment running as much as possible. The easiest way to do so would be to make equipment that simply doesn't break. Well, that would be utopia, wouldn't it? But, there's an economic reality to count with and beyond a certain point in mind; it's just not economically sound to keep improving equipment quality.

With predictive analytics, one combines machine data with external data, such as schedule, environmental factors and anything that may influence the equipment's reliability.

The other way is to make the equipment as reliable as possible while making sure it performs when it should. This would be a scheme where the provider makes money when the client runs the machine; it just shouldn't break when it's scheduled to run. Sounds simple enough. First came the maintenance schedules with preventive maintenance more often than not still defined by the equipment provider. Then came periodic analysis of equipment performance, which allowed a refinement of the maintenance schedules. And now, finally, comes predictive analytics.

With predictive analytics, one combines machine data with external data, such as schedule, environmental factors and anything that may influence the equipment's reliability. Even the person operating the equipment should be factored in. Complex algorithms are then derived to use all this data and come up with some sort of prediction as to the state of the equipment. And, unfortunately, that's where most of these projects stop. There are some clever data scientists that may come up with so-called "smarter" maintenance schedules that seem to work well at first, but later seem to be totally off the charts. An intermediate step has been to develop diagnostic solutions that use the machine-generated data to alert operators of an upcoming failure. Unfortunately, these warnings come too late to really allow for scheduled intervention. Their main benefit is limited to speeding up the reaction time and, at best, the diagnosis of what's causing the problem.

So, do predictive analytics really matter? Yes, well applied predictive analytics allow timely, planned intervention. And that's where the true value of predictive analytics lies. It turns unplanned events into planned ones. One of the main misconceptions of this technology is that it will lower the number of events. It really doesn't, however, it changes the event (i.e., a failure) into another type of event (e.g., a maintenance activity, a part replacement, etc.).

Therefore, the really important outcomes are whether you know what will happen, how confident you are that it will happen and how much time you have between the warning and the event.

The WHAT...

is really straightforward, or is it? Well, it's actually more refined than one may think. Let's say you know Machine A will fail next week. Sounds good enough? But if that machine is a big, complex piece of equipment, one may still be looking for a needle in a haystack to find what caused the prediction. Wouldn't it be better if the failure forecast could be made to the level of subassemblies or even individual parts? Well, the capacity to do so depends mainly on availability of data, capability and capacity to interpret the data.

The WHEN...

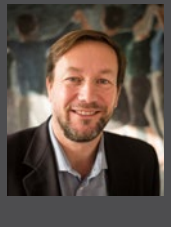
determines how much time you get before the event occurs. Obviously, the more heads-up one gets, the more time one has to schedule an intervention without or with minimal disruption to the production schedule. Also, and this is where things get really interesting, a longer lead time for predictions may allow one to group maintenance activities that, while not lowering the number of events, will lower the total production downtime.

The CONFIDENCE...

(or precision) really impacts whether or not one decides to act upon a prediction. There is no linear relationship here. For example, would you react to a prediction saying a part will fail on an asset and this failure would result in a safety issue? You probably would, but at a way lower confidence level than for a prediction that would result in a quality deterioration of manufactured products.

So, in order to avoid predictive analytics from being no more than an intellectual exercise for data scientists, the key is to use the outcome of the prediction for two things: act and optimize. Without action, the forecasts can't have any real operational impact and only serve the purpose of comforting oneself as to how good you are at predicting certain outcomes. While this has its value, it's best to leave it to academics. In business, one shouldn't care about the tools, methodologies, techniques, etc., only about the outcome! Optimization is where the real value comes from because reactive interventions without optimization are nothing more than reacting before things happen. Introducing better scheduling, grouping, root cause analysis, etc., turns these interventions into proactive events that may result in longer uptime, better adherence to forecasted production schedules, lower maintenance costs, etc.

The quality of the predictions will have a huge impact on the potential value derived from them. But, the true value of predictive analytics lies not with the predictions themselves, but rather in knowing what to do with them!



Carl Fransman, *Managing Director for EMEA at Predikto, has over 25 years of international management experience in high technology industries. He holds a number of board mandates in technology companies and the nonprofit sector. His previous experience includes management roles in technology and the manufacturing sector.* *www.predikto.com*

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