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TRUTH IN ADOPTION:

HOW FAR IN THE FUTURE IS
IoT FOR ACM APPLICATIONS?

by Burt Hurlock

Judging from the independent perspectives of three very different industry observers, the Internet of Things (IoT) for asset condition monitoring (ACM) applications is quite far into the future. *Plant Services*, a mainstream industrial trade publication, Gartner, Inc., a prominent global market research organization, and Russell Reynolds Associates, a leading global executive search firm, have each recently published surveys and opinion pieces that offer the perspective of industry insiders on the outlook for IoT ACM applications. The consensus is that the market may not be as ready or willing as its suppliers would have everyone believe.

As of August 2016, Gartner's *Hype Cycle for Emerging Technologies* placed the Internet of Things at the very peak of the hype cycle, poised to descend into the "trough of disillusionment," just behind machine learning, which Gartner shows leading the way into the trough, slightly ahead of IoT. More recently, Russell Reynolds Associates published the results of its *Digital Pulse* survey of executives, which rated the chances for a moderate or massive digital disruption in 13 major markets. The industrial sector placed dead last. And finally, in recent years, *Plant Services* has asked plant managers and maintenance engineers to rate their ACM programs, which should, arguably, be improving by virtue of more powerful and scalable technologies and cloud offerings. For two consecutive years, the data shows that ACM spending is increasing and satisfaction is decreasing, with less than 20 percent of respondents classifying their programs as effective or very effective.

How should one interpret the dissonance between industry headlines (the hype) and the facts

on the ground? Will industry ever cross the chasm between self-evident value propositions and the low rate of adoption?

Before the demise of IoT for ACM gets exaggerated, it's important to understand what vendors are asking customers to do. The self-driving car may be a simpler way to think about the problem. Are you likely to be the first to buy a self-driving car? The second? The hundredth, the thousandth? Not likely and it's probably not because you drive a Lamborghini or love to drive. It's because at some fundamental level, you don't trust it. You won't trust it. There's the concern that a bug with a lethal flaw will reveal itself for the first time only after you're in the car. And therein lies a basic human need that no amount of technology will cure – control.

Put another way: What would it take for you to buy a self-driving car? How much experience data would you need? Or, does it have nothing to do with the experience data? If it's truly about control then all other things being equal, like cost, mileage and safety, experience data doesn't matter. The operator has but one requirement – the option to turn the damn thing off, override the system and take back control if necessary. Call it trust, but verify.

To engineering purists this defeats the whole purpose. Why it's important for the purists to lock out the user, who has relied on a largely effective positive control use case for more than a century, is anyone's guess, but it forces a standoff. The purists say, "This is better by any number of objective measures," while the user says, "I don't care, unless I know I can default to what I know." Surely, there's a middle ground. There is, but it has to be reached the human way.

“And therein lies a basic human need that no amount of technology will cure – control.”

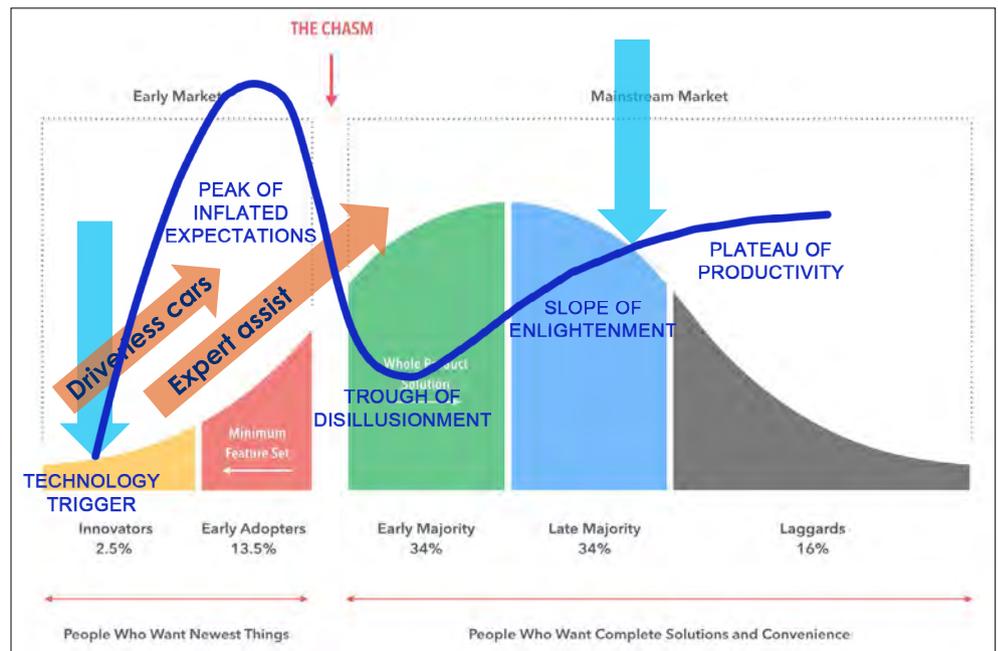


Figure 1: Hype cycle for emerging technologies

“ If trust between people takes interaction over years, why should it be different for technology? ”

At what point does one say, “I trust this or that person unconditionally?” The answer is deceptively simple and lies at the heart of human nature and experience. Trust evolves. It takes time and develops over a series of reaffirming events. Trust is learned, not decreed or ratified. If trust between people takes interaction over years, why should it be different for technology?

It’s not. Most people, especially the kind of leaders and decision makers who would contemplate abandoning an 80 percent solution for a 100 percent solution, thrive on control, accountability and confidence in knowledge and understanding that may have taken decades to amass. The idea

of abdicating any level of decision-making to an algorithm is anathema. At one level, the loss of control runs contrary to every natural instinct of a leader. At another level, it begs the question of human relevance, possibly even their relevance. It may be irrational, illogical and self-serving, but any commercial offering that runs contrary to human nature faces diminished prospects for adoption.

In the words of the Cat in the Hat, “would you, could you” buy a self-driving car if it were interactive, if it solicited your opinion, welcomed your feedback, or asked for your help? Before you answer, think about how people who do that make you feel. Do you prefer someone imperious and

self-centered over someone who wants to know what you think? Like approachable people, the technology needs to communicate. It needs to be likable. Adoption of behavior changing technologies needs to bring the user along by fostering collaboration between operators and technology that builds trust by creating opportunities for reaffirming events.

Gartner’s trough of disillusionment is, in fact, only the middle point in its *Hype Cycle for Emerging Technology*. The next phase is the “slope of enlightenment,” followed by the “plateau of productivity.” If IoT applications of ACM follow Gartner’s curve, the industrial sector’s present dismissal of

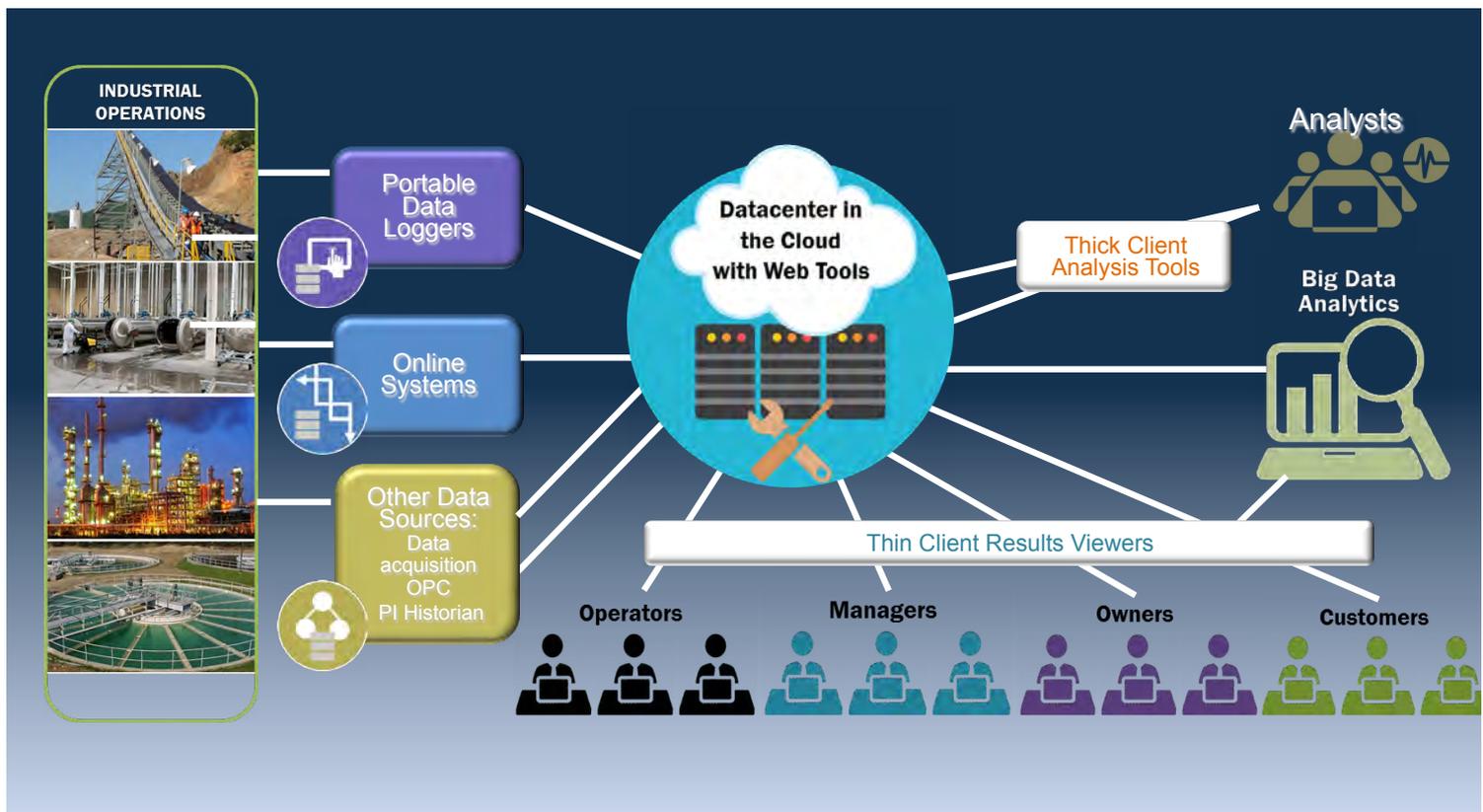


Figure 2: Expert-assisted PdM with IIoT scalability

an “imminent moderate or massive digital disruption” is altogether predictable; a common side effect of the hype that should be expected while the market wrestles with issues of control and trust.

The importance of that wrestling match, however, cannot be underestimated because it's the only way today's operators of cars or plants will develop the confidence to migrate to a new model. The transition will involve advances in efficiency that will move only as fast as operators permit until efficiency and automation become indistinguishable, and even then, operators may still demand the ability to override the system even if they never use it.

That today's computing power already far exceeds any human being's ability to keep pace was proven in 2011 by IBM's Watson, which deftly defeated perennial champions of the television game show, Jeopardy!™ Yet, Watson is still in search of a market. Is the missing link to adoption a human interface, a mechanical analog for the same process by which people come to trust each other, or something else?

Once again, the race for the self-driving car may be instructive. The automobile industry

thinks of automation in four categories: a totally autonomous vehicle with zero human interface, like Google's™ purist vision, being Level 4 and an *almost* autonomous vehicle requiring some human oversight, like Tesla's automation initiative, being Level 3. Guess which one is already on the road, in use by consumers, and which one is “years, but not decades away.” The rumor is that one of Google's challenges is making the behavior of a Level 4 vehicle “more human” because *always* keeping a safe distance from the car ahead and *always* ceding the right of way to a car changing lanes drives the occupant berserk. The user experience of the purist vision conflicts with human nature. It's not what a driver would do, whereas the Level 3 user experience can supply the purist's baseline *and* provide for human nature to express itself. If adoption is the measure of success, Level 3 is winning.

Tesla's expert assist model has many analogs: modern commercial and military aircraft, trains, grocery checkout counters and banking branches. None *requires* the expert assist and yet the expert remains ever present. Even Facebook™ recently conceded that its algorithms bend to the touch of human hands. If these analogs offer a glimpse of how IoT applications of ACM will

evolve, they beg the question of how realistic all the hype is around cognitive computing, smart algorithms and the brave new world of fully automated, closed loop, self-diagnosing and self-repairing smart machines. In a technical sense, it's *mostly* possible, but will human nature permit it? The truth will be in adoption.



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