

# Focus on World Class MANUFACTURING

## REALITY CHECK FOR AR

Since early *Star Trek* – cue Geordi's VISOR – AR devices have captured our imagination. But will AR be as eye-catching in real life as it was on the *Starship Enterprise*? ... p5

## 7 PERSONALITY TYPES FOR IOT

Discover the seven characteristics behind successful IIoT initiatives – hint, it's not just being an Inspector Gadget ... p7

## 5 WAYS IOT IS TRANSFORMING MANUFACTURING

Preventing a \$300M gas turbine catastrophe in India, through an early alert to employees, is just one example of IIoT's transforming power ... p9



Manufacturing has been behind in adopting newer technologies for decades. But that's changing. As disruptive technologies converge and offer meaningful reasons to adopt, the pace is picking up significantly.

At Factoria, we see IIoT (Industrial Internet of Things) and allied technologies (advanced analytics, AR, machine learning, mobility) to be enablers and accelerators of Industry 4.0. At least as significantly, the line between IT and OT is increasingly blurred.

It's true, control systems (DCS, PLC, Scada) and MES systems are not going away. However, IIoT offers a new path to maximize value rapidly, at a much lower cost point. Lagging enterprises are seeing an excellent opportunity to play catch up.

This magazine offers a curated view of the latest in IIoT, MES, and Industry 4.0. Enjoy! And if you'd like to know what it's like to work with Factoria, please reach out. We'll send you our hot-off-the-press whitepaper on the Factoria Engagement Model; you'll get a very clear idea of what it's like to partner with us.

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At Factora, we're being asked to achieve the same performance improvements as we have been for years.

The big difference is the velocity to value.

Now we can get the right data to the right people at the right time for a cost far below that of just a few years ago. Forget those high-cost custom programs and siloed databases. Now it's real-time, mobile, and role-based.

Best yet, control is in your hands. No need for a call to us or any other consultant when you'd like an improvement – you can move forward on your own.

As always, feel free to reach out with any questions or issues you may have.

Charles Horth, CEO  
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Increasingly, as we begin new engagements, I find we're not talking to OT people, or even IT. Now it's DT – digital transformation. DT leadership is charged with connecting all those traditional islands of OT, making them work as one.


IIoT is the magic enabler. Properly executed, IIoT can connect the islands and the applications. But its power is its peril. With the wealth of IIoT possibilities, it's easy to head down the wrong path.

At Factora, we've learned that our strong governance model is particularly suited to IIoT initiatives. It provides a much-needed level of protection against blind alleys and wasted efforts. Give me a call, if you'd like to talk shop and hear examples!



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A man in a dark polo shirt is shown in profile, looking towards the right. He is in a factory or industrial setting, with a robotic arm visible on the right side of the frame. The background is filled with various industrial components and machinery. Overlaid on the image are several white technical diagrams: a large gear with a central hub and radial spokes, a smaller gear, a cluster of interconnected hexagons, and a series of horizontal lines with arrows pointing left. The entire image has a warm, orange-brown color cast.

***Today, the promises of IIoT and smart manufacturing are presented with an abundance of hype. Most manufacturers are unsure what promises to trust or go with — and at the same time are wary of being left behind.***



# IIoT

## Let's sound a loud R.I.P. for rip-and-replace

Over decades of installing MES and MOM systems in multiple industries, I'm more than familiar with the enormous effort, investment and pain involved. To list just some of the complexities, an integrator like Factora is often dealing with equipment from multiple vendors, from multiple generations, with multiple applications, and with a considerable amount of investment in training as well — for users and support.

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### When you have a solid foundation, keep it

Essentially MES focuses on:

- Visualization
- OEE
- Centerlining
- Schedule execution
- Recipe and batch tracking, etc.

This short list, of course, varies considerably based on the type of industry — e.g. process, discrete, hybrid. However, in sum, the capabilities of MES represent large investments in software, processes, training, change management, and equipment.

They also offer considerable rewards. It's not something you want to walk away from.

### IIoT isn't MES

IIoT is not an MES or MOM system — it does not replace MES.

IIoT can, however, surround-and-extend an MES. It can deliver additional functionality as well as increasing the value delivery of existing assets. Like MES, IIoT provides advances in visualization, but it also offers new opportunities in analytics, machine learning and augmented reality.



## What do we mean by surround-and-extend?

What does surround-and-extend really mean?  
How exactly can IIoT extend your MES package?

With IIoT capabilities, you can:

- Extend data collection, with new wireless sensors and telemetry for remote or moving assets. New sensors can be connected direct-to-IIoT, rather than going through the control systems. Similarly, in the future, we'll see only the measurements needed for the controls/historian/MES systems connected to them; the rest will go only to IIoT.
- Extend visualization capabilities, by surrounding and extending existing systems with integrated visual screen mashups of "things" that include existing MES, applications, sensors and cloud-based data. Extended visualization blends cloud data with on-premise system data.
- Extend analytics. Often LIMS are independent from MES. IIoT brings in data from LIMS for better analytics.
- Extend the availability of the data, through cloud aggregation, to remote teams, offices, or even suppliers and customers
- Extend the value of on-site data repositories with cloud analytics

- Extend the MES system into the supply chain. Linking WMS and MES systems can offer better information to both sets of users. Deliver line material when needed. Prepare in WH for changeovers.
- Extend by merging. Often sites have multiple MES systems, or historians, or DT management systems. IIoT brings them together.
- Extend the angles of insight given to applications with AR — take a look at a machine with your smartphone, and have process data overlaid on the machine as you walk the shop floor.
- Last but not least, APM systems often don't have access to signals like flow rates, product, etc. IIoT can be extremely valuable for APM analytics.

## Why do you care?

Three categories of business drivers should drive IIoT decisions:

1. Pain: What must I do to stay in the game?
2. Continuous improvement: What should I do to stay in the game?
3. Opportunity: What can I do to get ahead of the competition?
4. IIoT can help with the time-to-value aspect of all three by building on the existing foundations you have, rather than needing to start anew. IIoT can surround and extend the existing infrastructure to address the business drivers above.

## In sum

Given massive existing investments in physical, digital, and human resources — not to mention the pitfalls of radical change projects — the too-prevalent IIoT argument of rip-and-replace should R.I.P., ASAP.





# The future of AR is exciting, but probably not as sexy as we hope

Remember when LeVar Burton played Geordi La Forge on *Star Trek: The Next Generation*, and wore his metallic VISOR?

What about if (or when) you awakened your inner Jedi with the new augmented reality *Star Wars* game that arrived on the market a month ago ... with its own lightsaber and headset?

It's inspiring gear, way cool, all those good things. But on the factory floor — you heard it here first — the new tools that will go mainstream will look less futuristic. Bulky headsets / helmets may be used for specialized tasks that are rarely carried out, but they aren't the future of AR.

## So, what *will* be the future of AR?

Let's start with the device:

- To earn the sales volume, the credibility, and the standardized quality that are a prerequisite to widespread take-up, an AR device needs to be physically practical. Something that could be used daily, maybe all day, by people working in plants around the world — not just by an actor in a movie, or a kid playing a game.
- To manufacturers around the world who would need to invest, the device needs to feel like more than a fad. Something that will work *day in and day out*. Plus be supported the following year, and the year after that.

In other words, why not use mature devices? Ones that we trust? Better yet, why not mature devices and equipment that we all already use?



## The future is the phone, or AR-enabled safety glasses. Or both!

Phones and tablets are mature devices. The kinks are worked out, we have brands we trust, we know how to use them. Our plant operators and line supervisors and quality inspectors will have no problem adapting to one — they already have. We won't even have to make an investment in devices, everyone's already got one.

For operational staff, AR-enabled safety glasses would be a natural adoption. The design and functionality of the latest products in the marketplace suggest that this could be a real possibility in the next several years. And mass production would bring incremental cost to affordable levels.

## It's awkward? How do we define awkward?

You'll read online criticism that it's awkward to hold a phone in your hand to view a visual overlay of the insides of a machine, from which a repair technician can see how to remove a defective part. There's truth in that. But again, visors and bulky headsets have some awkwardness too, quite a few more, in terms of risk, employee pushback, cost, and other considerations evoked by equipment that is not market-mature.

To put it another way, would you rather have a display on your car dashboard, showing you the route you're taking to your weekend destination? Or wear a special headset?

## Here's the big argument

Everybody is already enabled. Everyone already *has* a smartphone and/or tablet. For operational staff, many are *already wearing* safety glasses.

## Let's talk focus and timing

The focus of what we can now do with VR and AR should be on the *application*, not on the *device*.

We get a head start, we'll go further and faster, if we start by using the devices that everyone already has, uses and trusts. Let's talk about what we can do with AR using any one of smartphone, tablet, and/or smart glasses as a device. By taking that route, we're already halfway to a working, cost-effective solution that can rapidly bring the magic of VR and AR right to the factory floor.

What will the factory floor look like 25 years from now? Time will tell. But for the immediate future, the real progress to be made is in the proven technology we already have.



# The 7 personality types needed for the internet of things

Forbes, December 13, 2017



How analytical is your nose? How mobile is your mindset? How cloudy is your outlook? IoT calls for a new package of skills, several of which you may have not yet considered to be part of the new outlook, or seen as part of the new package. You too can get scaley fast ... if you build teams that have the right skills and traits for IoT success.

Read the complete article here:

<http://bit.ly/2C8lepM>

*What characteristics, skillsets and personality traits should IoT builders and developers exhibit? Is it just a love of gadgets and a desire to build web-controlled toasters? Or could it be more than that?"*



## The problems smart manufacturing solves for the C-Suite

Forbes, January 2, 2018

*The demands never end. Each advance gained from new technology requires another, in a never-ending arms race to serve the customer the way the customer wants, while maintaining cost-effective production.*

For the C-suite, the factory used to be a black box: orders went in, product came out. No more. With today's demand-driven supply chain, the factory is now core. The demand for localization and customization – in China, consumers want green tea-flavored Oreos – means that the C-suite must be highly involved.

Read the complete article here:

<http://bit.ly/2Hy9Jsu>

# How augmented reality is transforming the manufacturing industry

B2B News Network, August 8, 2017



How do you wire a new 787-8 freighter?  
A: With great care! Boeing now uses AR technology (Google Glass; Skylight software platform from Upskill) to ease the enormously complex electrical task of wiring every new freighter.

Read the complete article here:  
<http://bit.ly/2oogSmu>

*Technicians used to work using charts and laptops ... so they needed to look away constantly to get assembly instructions. With voice commands, technicians and workers can free up both hands, while Google Glass cameras help them in identifying and confirming the wiring inventory.*



## IoT to grow out of awkward adolescence in 2018 and other trends for the new year

TechTarget | IoT Agenda, January 10, 2018

*We've been collecting data from physical devices for a long time, going back to things like barcodes, which were invented in 1949. So it's ironic that IoT has struggled with settling on a standard since IoT is all about connecting all sorts of things.*

2017 was big for the internet of things with investment pouring in, like Dell putting \$1 billion into IoT, and impressive projects taking off, like what San Diego is doing to build a smart city.

We've seen farm equipment manufacturers asking questions about LPWAN compared to mesh networking options for better and lower-cost field coverage. 2018 will be a year where industries ask vendors the tough, but very important questions about their IoT projects.

Read the complete article here:  
<http://bit.ly/2ED3NMR>

# Business is embracing internet of things as most important technology, says new study

Forbes, January 16, 2018



Forbes Insights partnered with Hitachi Vantara to survey more than 500 senior executives leading IoT initiatives. Their new report highlights key findings from this research. Such as ...who typically champions an IoT initiative? Are external vendors typically included? How popular are third-party platforms? And just how important is IoT to today's top executives?

Read the complete article here:

<http://bit.ly/2HvSYOI>

*Of all emerging technologies, executives believe the IoT will be the most important, ranking it above others such as artificial intelligence or robotics.*



## Five ways IoT is transforming the manufacturing industry

TechTarget | IoT Agenda, January 17, 2018

*Research firm BI Intelligence expects the number of connected machines in manufacturing environments to swell from 237 million in 2015 to 923 million in 2020.*

At Tata Power in India, a gas turbine early warning saved the company \$300M, alerting employees to a bypass valve that was partially open. The only way to get an early warning such as this is through the real-time monitoring that IoT provides. IoT is transforming manufacturing in other ways as well, including asset avatars, smart safety helmets, and ... a self-healing power grid.

Read the complete article here:

<http://bit.ly/2Fk6Jze>





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