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The internet of things, explained over a glass of wine.

Before I get to the shop floor, I'm going to take a small detour through California's wine country, so please bear with me:

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In winemaking, digitalization offers elegant, simple and clear benefits - with a high probability of supple tannin structures too.

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Never before has there been so much information available that attempts to explain the 4th industrial revolution (eg. industry 4.0, the industrial internet of things, smart manufacturing etc.) – written in a variety of dialects including jargonese, consultant-speak and technobabble.

But one of the best explanations I've heard to explain what these technologies are actually doing for us comes from the world of wine.

Winemaking is an art that people have been doing in more or less the same way for thousands of years – long before the discovery of overpriced Bordeaux's. But one winery in California is changing the status quo.

The vineyard has planted hundreds of wireless sensors alongside its notoriously demanding pinot noir vines. These sensors measure soil moisture and the health of the vines, and can even help detect mildew before it is visible to the eye. Specific readings in different parts of the vineyard help ensure better quality and uniformity – for example if vines on a hillside with strong drainage need more irrigation to maintain the moisture level of flatter land. The sensors also allow the winemaker to precisely spray for pests and mildew where they occur rather than treating large areas.

The data all comes in a dashboard that helps the wine maker make better decisions such as when to harvest to get a maximum yield of higher quality grapes, with less wasteful use of water and pesticides. Elegant, simple and clear benefits from digitalization – with a high probability of supple tannin structures too.

Now let's get back to our factory.
You'd think that the jump from winemaking to factory automation would be a metaphor, but actually in this case it's an analogy.

About the author
Philip Lewin
I'm one of the many people sharing ABB's passion and great stories for robotics and industrial ingenuity. Its exciting for me to be at the forefront of a new age that is changing one of the most fundamental things humans do - we make things. At the same time, the awareness has never been greater that economic progress, higher living standards and new ways of making things cannot come at the price of our environment. Communications

Think about how many productive hours are lost maintaining packaging robots that don't actually need maintenance. How much speed is lost when two machines working side by side – like a robot and a conveyor – cannot coordinate their actions? How many hours of precious production time are wasted waiting for information between separate islands of automation, like production and packaging?

Although information is flowing from robots and cells instead of soil or vines, the concept is the same. And today we are moving beyond the concept of simply connected robots, motors and drives to entirely connected plants. In addition to allowing operators to make better decisions about how to run and maintain a factory under 'normal conditions,' it also allows the factory to remain productive and on-line under less-than-normal conditions.

Let's start at the front line of the plant – robots, motors and other equipment sharing information about their status through sensors. In a simple control loop this equipment is under line-level supervision from programmable logic controllers or human operators at touch screen panels or even manually-operated machines.

In the factory of the future, the line control level can send details up to the supervisory control level – this might include Manufacturing Execution Systems, SCADA systems with operational performance KPI dashboards, or a database compiling data from the robot controller to improve quality.

At a top level, all of these variables can be digested by collaborative Enterprise Resource Planning systems, overseeing everything from production scheduling and inventory optimization to quality control across the entire plant. Or even several plants around the world.

By vertically integrating the entire plant, it's possible to have greater flexibility while still running at maximum efficiency. Product changes can be quickly programmed and the interdependent players work together without stopping production – for example product flows can be re-routed through the shop floor to the most efficient application cells, and the logistics system can adjust transportation schedules based on what the shop floor systems are doing.

I'll resist the temptation for a groan-worthy wine pun here and simply say that these futuristic-sounding concepts aren't in the future. This level of collaboration and flexibility is available today, connected through the Internet of Things from California vineyards to the world's most well-run factories.