



Industry 4.0: Evolution or Revolution?

BY LUIGI DE BERNARDINI | TUE DEC 20 2016

There's an ongoing debate if Industry 4.0 (or Smart Manufacturing) is a revolution or just an evolution, with conference speakers bringing arguments in favor of one side or the other. Besides the fact that I personally believe the discussion is not very relevant (our world is changing and we need to adapt as fast as possible to survive or excel), it's somehow interesting to analyze the various components that have revolutionary or evolutionary aspects.

First, it's useful to define the difference between evolution and revolution. In my mind, there are two ways to look at it.

One is the ability to create something totally new, unexpected and at the end unrequested. To give you a well-known example, let's consider Microsoft vs. Apple. In the past decades, Microsoft has been one of the most

evolutionary companies in the market—usually starting with an idea and making incremental changes over time. Consider the Office suite, for example, where each tool has been progressively updated since its release. Each new update brings some new features, but the latest Word is fundamentally the same as the first one. Apple's history, on the other hand, has included the release of several "unexpected" products. Starting with the Macintosh back in the '80s, Apple has been able to anticipate or sometimes create the consumer need. One of the better examples is the iPod, which dramatically changed the consumer habits and the music industry itself.

The second way to differentiate between evolution and revolution takes into consideration the speed at which change happens. In chemistry, an explosion differs from a reaction based on its speed; it is a fast (almost sudden) exothermic reaction that transforms components and generates energy.

I believe the transformation we are looking at in the industry is something similar. We are observing a transformation (evolution) that is happening so rapidly that it's almost a revolution and, in parallel with the chemistry example, is generating a lot of energy in the market.

Like the explosion, it needs to be controlled to produce the expected results, or else the damages might exceed the advantages.

✖ But the scenario is not so homogeneous, and what we are really looking at is a combination of revolutionary and evolutionary trends.

Additive technologies (like 3D printing) are revolutionary. They are disrupting the way things are built and creating new opportunities both in terms of things that can be produced and business models. They are a significant part of the "next-shoring" trend. Personalized production is moving closer to customers, shortening the supply chain, reducing costs and helping to reduce the negative impact on the planet related to long transportation.

Co-creation or embedding the customer in the supply chain is revolutionary. It's dramatically changing the paradigm of how things are invented and designed. It's not the invention capability of a few people that can create something new, but rather the analysis of usage data that can reveal behavior patterns that bring better or new products to the market.

The digital thread is evolutionary. It's a significant improvement of the entire supply chain management, enabling better efficiency and cost reduction, but it's not a dramatic change of what was done until now. The increased communication speed and the availability of a common data set along the whole supply chain to orchestrate all the chain components can have a big impact, but doesn't disrupt production or business models.

The usage of robots in inside or outside logistics is evolutionary. Plants in which humans and robots work side by side without the safety barriers of the past are modifying the approach to both production and logistics. Amazon has already flipped the picking principle. It's not operators that go to the product locations to get what they need to ship; it's the shelving units that, based on the orders to be shipped, move automatically to the employees. The same sort of principle is being experimented with in operations environments, using information about production plans and component availability to automatically feed products into line stocks.

There are many more examples that can be considered to demonstrate that any Industry 4.0 or Smart Manufacturing initiative is at the same time both evolution and revolution. New technological solutions become suddenly available and enable approaches that were not considerable before; others improve much faster than in the past and allow quick modification of how things are done both technologically and business-wise.

We are in a precarious situation full of opportunities. This is more important than defining if Industry 4.0 is the fourth industrial revolution or evolution.