Industrials Digital Solutions

Get S.M.A.R.T.: An R&D Strategy for the Industrial Internet of Things

The industrial world is going digital. By 2021, according to Gartner, 25 billion things will be connected to the internet. From engines and boilers to pumps and compressors, monitoring and controlling industrial equipment from afar will soon seem as natural as flipping a virtual switch.

Industrial companies are taking note. Increasingly, they're looking to integrate smart sensors and high-powered analytics with an expanding network of machine-to-machine communications. By plugging into the industrial "internet of things" (IIoT), they aim to build out functionality, gain deeper insights, open up new business models, and drive greater value for themselves and their customers.

Finding the opportunity

But commercial success is not a given. Some kinds of industrial equipment — and some industrial customers — have more to gain from connected functionality than others. With or without IIoT capabilities, a product concept remains subject to the same basic R&D calculation, which includes factors like:

- How will this product be used and serviced in the field?
- How critical is this component to the mission of the broader system or facility?
- How can this product boost efficiency, productivity or safety?
- How expensive is this product to replace?
- Who interacts with this product, and how can that relationship be made more simple, intuitive or valuable?

With this customer-centric lens, some IIoT opportunities turn out to be unfeasible. Others may have their niche. And then there are those that are exciting enough to merit significant investment. Where does a particular product land as far as IIoT connectivity is concerned? Much of the answer depends on the S.M.A.R.T. score.

Evaluating a product's suitability

L.E.K. Consulting's S.M.A.R.T. framework is an analytical approach to evaluating the appropriate level of smart functionality that a product and an application can support and that the market values. The framework also helps determine what level of connected functionality the product should include.

S.M.A.R.T. stands for five attributes:

1. **Service-intensive.** The product requires recurring, ongoing maintenance.
2. **Mission-critical.** The product has a very high cost of failure.
3. **Analytics-ready.** The product can make use of data analytics and produce useful data that other systems can analyze.
4. **Replacement-costly.** The product is expensive to replace or has few substitutes.
5. **Transformative.** The product could, if connected, create new business opportunities and improve the user experience.

The more a product embodies these attributes, the stronger its candidacy for connected-feature development.

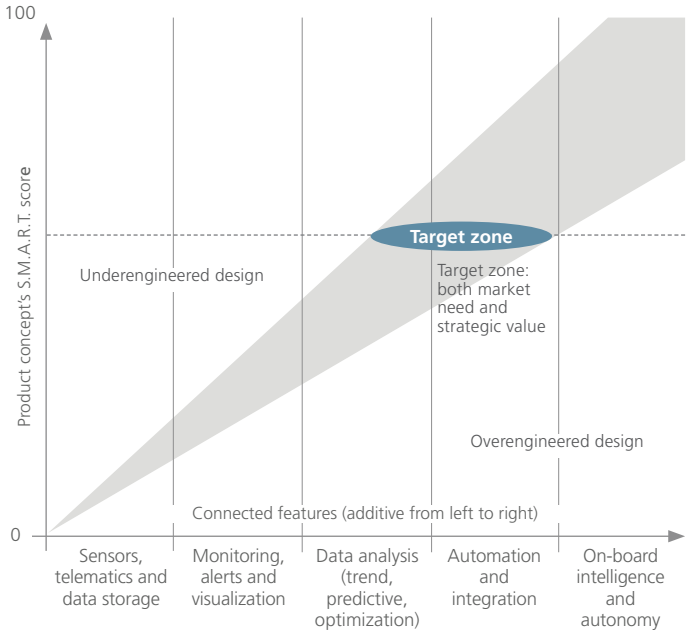
Aiming for the target zone

However, design is critical. Add too few smart features, and the product falls short of market needs. Add too many, and you risk saddling the product with functionality that has little demand or strategic value — or that customers simply aren't willing to pay for.

Between an overdesigned product and an underdesigned one lies the target zone. That's the range in which an IIoT-enabled product fulfills both customer needs and internal business objectives. In general, a higher S.M.A.R.T. score indicates the product design has more relevant functionality and more room to include sophisticated connected features (see sample S.M.A.R.T. assessment in Chart 1).

The S.M.A.R.T. framework is a gauge of development priority for internet connectivity. However, context is important: A product's S.M.A.R.T. score can vary dramatically depending on its intended market or use. Take commercial lighting as an example. Ordinarily, lighting elements are neither mission-critical nor expensive to replace — but some, such as the lighting systems on marine buoys, are both. In such cases, a connected lighting element could have significant market value.

Figure 1
S.M.A.R.T. products design strategy



A S.M.A.R.T. move forward

In an economy at the cusp of a fourth industrial revolution — the economic fusion of automation, artificial intelligence and mobile technology — it's tempting to fast-track the development of IIoT-connected equipment and overdesign with all the bells and whistles.

But not all products can derive the same value from being online. And it is not prudent to add connected features before determining how much functionality the market demands and what value it ascribes to that functionality. From our work with industrial clients looking to integrate the IIoT into their products, we've developed a S.M.A.R.T. way to focus development resources on a connected product design that hits the target, both for growth opportunity and for return on investment.

Contact

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An illustrative example

To see how a S.M.A.R.T. assessment can play out, let's look at a simple example. Suppose a marine engine manufacturer is considering a new line of motor products for recreational boats. Chart 1 shows a sample S.M.A.R.T. assessment for incorporating connected features into the new models.

Of course, a real-life scenario would involve many more nuances, assumptions and dependencies — many of them unique to the company and the needs it is trying to address. For instance, the S.M.A.R.T. score for the service-intensive attribute might turn on factors such as how frequently the engine needs servicing, how much skill it takes to service the equipment and what wear parts need regular replacement.

Chart 1
Sample S.M.A.R.T. assessment

	Maximum Points	**Assigned Points**	Rationale
Service-intensive	20	**20**	Boat engines require a substantial amount of maintenance to extend the longevity of the product, especially since they're typically raw water-cooled and exposed to elements and corrosion.
Mission-critical	20	**15**	A worst-case failure may lead to a lengthy repair that could prevent customer usage during limited leisure time or present a dangerous situation (e.g., failure at sea or in a storm).
Analytics-ready	25	**20**	Data analytics and trend analysis could improve system performance (such as fuel efficiency), enable proactive maintenance to extend product longevity and enable digital twin models for ongoing product R&D.
Replacement-costly	10	**10**	For many boat owners, a full rebuild or replacement of an old or poorly maintained motor can be prohibitively expensive.
Transformative	25	**15**	A connected motor could enable new service or business models (e.g., predictive maintenance) and increase product quality for users (e.g., active fuel or maintenance monitoring).
S.M.A.R.T. score		**80**	*(out of a possible 100)*