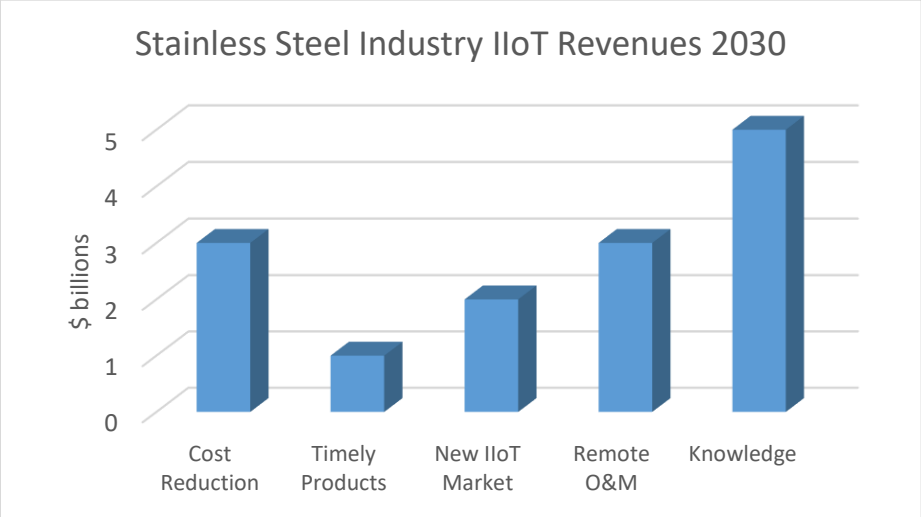
IIoT and the Stainless Steel Industry

The Industrial internet of things (IIOT) combined with remote operations and maintenance will generate revenues in 2030 of over $1.4 trillion up from $155 billion in 2016*. Stainless steel suppliers using a holistic approach could capture up to 1% of this market e.g. $14 billion/yr.

What is this holistic approach? It involves both savings and additional sales revenues. The specific initiatives would be

- Reduce the cost of manufacture and delivery of stainless steel products
- Create and provide products more in tune with customer desires
- Supply stainless steel products used in IIoT
- Generate revenues from remote O&M of facilities owned by others
- Generate revenues from corrosion reduction and other knowledge



<u>Reduce the cost of manufacture and delivery of stainless steel products</u>

When thousands of sensors are installed in each of the big pieces of production equipment as well as fans, compressors, valves, pumps, and filters, it is possible to aggregate and analyze this information to improve operations and reduce maintenance.

Stainless steel delivery costs can be reduced in many ways. For example, the cost of fuel for trucks making deliveries can be reduced by centralized monitoring and guidance on speeds, routes and other factors impacting delivery costs. It is anticipated that product savings as much as $3 billion per year can be achieved with IIoT.

Create and provide products more in tune with customer desires

Scheduling production of different grades of stainless involves market anticipation, current inventories, economics of switching products and other operating factors. The status of each piece of production equipment and the impact of switching is possible with IIoT. This potential could grow to over $1 billon/yr. by 2030.

Supply stainless steel products used in IIoT

The market for stainless steel products used in IIoT will be substantial. Sensors and processors operating in industrial environments are subject to corrosion. Stainless steel is therefore popular. Here are some examples.

GE Digital has developed SCADA Edge, a preconfigured control and automation platform designed to reduce time to solution for applications enabled by IIoT. The design combines GE Digital's Industrial PC platform with GE Digital's HMI/SCADA. The chassis is constructed of either aluminum or stainless steel. For rugged industrial environments, stainless is the preferred option.

Rosemount 648 Wireless Temperature Transmitter provides a Solution for accurately measuring process temperature without the requirement of a thermowell or process penetration. The housing is made either from low copper aluminum or stainless steel.

This segment offers a potential market of $2 billion/yr. by 2030.

Generate revenues from remote O&M of facilities owned by others

With cloud based analysis, much of the decision making will no longer be accomplished at the plant. Large multi plant companies such as Arcelor Mittal can spend the necessary capital for IIoT and leverage it by use at all their plants. Small stainless steel manufacturers will be looking to third parties to install the IIoT systems and then to operate and maintain them. It is unclear at this point whether the biggest players in remote operation and maintenance will be owners, plant providers, or third party specialists.

What is clear is that the ultimate provider will utilize remote monitoring systems furnished by specialist providers. There are now platforms which allow incorporation of the output from the specialist provider in the overall program. So, a condition monitoring system could be communicating with a valve health system and one which analyzes filter performance.

A remote monitoring center such as operated by Nalco can be communicating water quality information. It has specialists available night and day to interface with the plant or with other providers. MHPS could be monitoring the stainless steel mills power generator from its remote center in Florida or the Philippines.

This could easily be a $3 billion market for stainless steel companies if they take the lead and do not defer to other types of providers.

Generate revenues from corrosion reduction and other knowledge

The suppliers of stainless steel have the world's top corrosion experts on their staffs. This resource can be used to generate subject matter expertise revenues. There is a big opportunity for continuous corrosion monitoring. It includes measuring and recording of all key parameters that influence corrosion. Developments in sensors, data loggers and communication technology now make it possible to remotely monitor a range of parameters continuously in real time and provide electronic alerts if critical levels are exceeded. Not only can this prevent potentially very expensive and disruptive problems, but systems can be maintained at optimum efficiency throughout their lifetimes, saving costs and helping meet sustainability targets.

Parameters That Need to Be Monitored include galvanic currents, crevice corrosion, corrosion rates, pH, chemicals such as HF, HCl, mercury, temperature, pressure, etc. Remote monitoring involves communicating this data to the

- Owner (he can make the simple adjustments)
- The condition monitoring system supplier who can analyze the data and provide insights
- The supplier of the valve, pump, compressor, or pipe which is being monitored (he can add insights from his product experience)
- The subject matter expert on corrosion (this can be a stainless steel supplier staff member)

Many corrosion problems are the result of a complex interaction between many variables. These complex problems should be addressed by niche experts who are dedicated to this type of problem solving. The promise of IIoT is to generate more revenues from the information about things than from the things themselves. So, this is too big an opportunity to be ignored.

The byproduct opportunity is even greater. The knowledge gained by the subject matter expert can be transmitted to the R&D group to help create new and better products.

The revenues from the direct provision of expertise are pegged at $1 billion /yr. by 2030. The biggest piece of the pie will be the new and better stainless steel products created by this avalanche of knowledge. Product improvement will accelerate. Those companies adjusting to the new pace will develop superior products and change the markets for stainless steel.

This will only happen if the stainless steel companies adopt the equivalent of IIoT which could be called the Industrial Internet of Wisdom (IIoW). The subject matter experts need to develop efficient communication with the engineering, sales and R&D people in their organizations. There is niche expertise in many places. The sales engineer who focuses on selling stainless to the mining industry in South Africa has knowledge which will be useful. The available knowledge in the form of papers and other printed matter needs to be made available to those who can use it without excessive searching.

By 2030 the stainless steel industry will be transformed. The additional revenues created by this transformation are there for the taking. However, there will be competition from many sources. So, the path to success will not be easy.

* Industrial IIoT and Remote O &M published by the Mcilvaine Company