Industrial organizations worldwide are seeking to employ the Industrial Internet of Things (IIoT), a transformative digital evolution focused on Big Data analytics, to improve production efficiency, operational reliability, and supply chain performance. To be successful, operating companies should develop a flexible IIoT framework to enable secure collaboration across sites and disciplines, change work processes to improve information sharing and cooperation between functional teams, and leverage external expertise and knowledge vendors to complement internal resources. An effective strategy for implementing the IIoT will examine the best ways to get started with the technology to drive operational efficiencies along with more innovation and, ultimately, new sources of revenue.

**Assets, processes, connectivity**
Almost every industrial facility stands to benefit from the emergence of the industrial Internet. On one hand, operating sites with widely distributed assets are frequently limited to localized expertise to manage connectivity and aggregation of data. On the other hand, entrenched traditional work processes constrain many facilities and do not contribute to improved performance and profitability.

Equipment health is an important concern for all types of operations. If an asset fails, too often, there’s no logical way to analyze what happened because there’s not enough meaningful information, or the right people cannot analyze it until hours or days after the failure. Engineers spend too much time extracting and aligning data from various sources. Moreover, they’re burdened with isolated and inconsistent analysis tools.

It is not uncommon for plant facilities to suffer from a lack of visibility to real-time performance against business metrics. They require better techniques for collecting and storing all relevant data in the organization, visualizing information to gain valuable insights, and then predicting and detecting issues and opportunities.

**Putting the IIoT into perspective**
Today, manufacturers and other industrial firms are contemplating the next step to effectively manage and exploit data at single sites or in enterprise-wide operations. Business success demands that the right decisions are made at the right time with the right information.

A growing number of companies are looking to harness the power of the IIoT. By using machine learning, Big Data, and
Develop an effective IIoT framework

Much has been written about the IIoT and the benefits it can offer industrial organizations. Very little, however, has been discussed about the implementation realities of the technology and addressing various decision points throughout the process.

Several important factors are involved in realizing maximum value from the IIoT. Its real power comes from centralizing data and then integrating applications to digest and process this information. Instead of deploying applications in a control system, they can be located in the cloud, totally eliminating maintenance requirements in the plant and making additional data available in those applications from multiple sites. Typical applications that add value in the cloud include advanced process control (APC) monitoring, condition-based monitoring (CBM), enterprise data historian, mobility solutions, and planning and scheduling among others.

Industrial organizations should consolidate data from different sources using open integration and communication technologies like OPC Unified Architecture (UA). This provides support for existing communications protocols so installed equipment is integrated in the IIoT architecture in a secure way. Next, they can move data from the plant to the enterprise and apply smart analytics to extract meaningful information. It is then essential to apply domain knowledge to understanding the data, leveraging in-house expertise, remote subject matter experts, or third-party knowledge vendors.

With a larger, consolidated data set, firms can apply and develop more advanced analytics in the cloud and deploy these analytical models in edge devices for more detailed insight, scale the data as needed to meet the varied requirements of single-site or enterprise-wide operations, and take advantage of a wider pool of data experts for monitoring and analysis.

For example, a major mining company is using predictive analytics in the operation of its trucks, shovels, and other mobile equipment. The objective was to equip these assets with data loggers and wireless connectivity so that centrally located reliability professionals could collect performance data in real time, identify potential problems, and take proactive measures to avoid premature failures.

The mining company would not have succeeded with IIoT without making a commitment to change its business processes. A culture of collaboration between operations and maintenance personnel evolved, allowing various predictive technologies and advanced diagnostic tools to be applied to day-to-day operations to sustain higher equipment reliability and availability—thus helping the company become more profitable.

IIoT collaboration, implementation

The true promise of the IIoT is not about the “things,” but rather the people who interact with the operation. Organizations that think about connecting people first and then connecting things will be well-positioned to optimize their plant’s operations.

The key to the success of any IIoT implementation is a willingness to operate differently, which means acquiring the tools necessary to support new roles, responsibilities, and work processes.

Most progressive companies adopting the IIoT share a common characteristic: As they enable smart collaboration across their organization, the lines between operations, maintenance, reliability, supply chain management, and other disciplines become less defined and rigid. If an IIoT plan doesn’t include changes in how functional groups work together, then it probably should be rethought.

Building all of the in-house expertise needed for complex industrial sites is becoming increasingly difficult. As mature markets face the loss of knowledge of retiring baby boomers, the best operations will be those that learn when to develop skills in-house and when to leverage external resources to drive business outcomes.

A major opportunity for the IIoT to improve operational effectiveness is to embrace collaboration with third-party experts. Today’s technology makes it possible to securely tap the domain expertise of a whole ecosystem of partners in the cloud, where other organizations such as process licensors and original equipment manufacturers (OEMs) can help solve specific problems. This approach can also extend to internal resources across the globe.

It’s no coincidence that the knowledge and experience of OEMs and process licensors can have the greatest impact on the reliability of plant equipment and process operations. The IIoT is not just about monitoring; it’s about taking the diagnostic know-how of subject matter experts and embedding it in applications at the edge that can predict and prevent failures.

Getting started with IIoT

For industrial organizations of all sizes, the IIoT is the basis for digital transformation—creating new ways to better collect and analyze the tremendous amount of data created in their operations and turn that data into solutions to solve challenging problems. But the question for many is where—and how—to start?
Firms embracing the IIoT should begin by changing the way they think and act. This means deploying the right resource to solve a problem—not necessarily the resource that is local to the problem. Initial projects should be chosen with an expectation of immediate efficiency gains that will self-fund an IIoT framework expansion. This includes projects that offer enterprise-wide benefits and can be deployed simultaneously at multiple sites to reduce deployment costs. Building an IIoT infrastructure to support collaborative work processes provides a good foundation for other IIoT applications.

Regardless of their implementation strategy, companies new to the IIoT should be willing to “fail fast” so they can learn fast. In other words, it’s a good idea to start small so unsuccessful initial projects won’t have a major impact on the business but rather provide lessons to help guide future technology investments.

It’s also important to choose technology partners that understand industrial automation and as such, know how to best use process data to enhance the capabilities of cloud-based analytics, as well as address control-related issues across the enterprise. Information technology (IT) providers typically lack the domain expertise to leverage existing operational data to attain additional value.

**Realizing the power of IIoT**

Now, more than ever, manufacturers need to harness the power of the Industrial Internet to realize significant operational and business benefits. The IIoT can unite people and systems on the plant floor with those at the enterprise level, and enable users to get the most value from their automation systems without being constrained by technological and economic limitations. A secure IIoT ecosystem adds domain knowledge to solve challenging problems.

To ensure successful deployment of the IIoT, industrial organizations must be willing to embrace change. This includes developing a comprehensive framework that supports collaborative work processes across functional lines, as well as between internal and external resources.

**Seven ways to get started with IIoT**

Processes, digital devices, and systems can support implementation of the Industrial Internet of Things (IIoT). Companies new to the IIoT should start small, so initial projects provide lessons to help guide future technology investments. When looking at an IIoT implementation, examine the following seven considerations.

1. Create a baseline. Look at assets, processes, data collection, analytics, and real-time visibility to assess ability to predict and detect issues and opportunities.
2. Use machine learning, Big Data, and automation technologies to create a “system of systems” that can accurately and consistently capture, analyze, and transmit data.
3. Employ open integration and communications technologies to help consolidate data from varied sources on the way to extracting meaningful value.
4. Consolidate data in the cloud from multiple disparate systems, applying higher level analytics and leveraging experts, often physically remote from the plant site.
5. Consider cloud-based applications to add value, such as advanced process control (APC) monitoring, condition-based monitoring (CBM), enterprise data historian, mobility solutions, and planning and scheduling.
6. Redefine how functional groups work, enabling smart collaboration using IIoT tools across the organization, including operations, maintenance, reliability, supply chain management, and other disciplines.
7. Compensate for demographic changes using technology tools and collaborations with third-party experts that understand industrial automation, process data, and control-related issues across the enterprise. Traditional information technology (IT) providers may not offer that depth.

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**Key Concepts**
- The key factors behind successful IIoT implementation
- How industrial organizations should implement an IIoT solution
- The benefits of implementing IIoT for industrial processes.

**Consider this**

How can industrial organizations measure ROI after implementing IIoT?