A WHITEPAPER ON

How will Digital Transformation improve Asset Utilization for Manufacturers?

EXECUTIVE SUMMARY

Improving asset utilization is critical for enterprises to remain competitive. The application of digital migration tools to co-opt Industry 4.0 concepts is the key to improving asset utilization. However, enterprises face many challenges in attaining success:

CHALLENGE 01

The Challenge of Routing Flexibility

Digital Transformation enables the enterprise to become flexible. The enterprise would do well to:
Strike a balance between innovation and keeping the business running. Invest in a strong and robust analysis, to sync product development with customer requirements and preferences.

CHALLENGE 02

Achieving machine flexibility

Implementing 3D printing to customize consumer products and manufacture in batches of one, and investing in robotics offers an effective solution.

CHALLENGE 03

Implementing remote monitoring and control

Implementing a digital platform, and overlaying it with the Industrial Internet of Things (IIoT) offers an effective solution.

CHALLENGE 04

The challenge of implementing predictive maintenance,

to overcome the limitations of traditional maintenance methods. The enterprise needs to devise a system to capture data from various sources, subject the collected data to deep analytics, and translate insights into action.

CHALLENGE 05

The challenge of maintenance repair,

with the technician bogged down by various limitations. Augmented Reality technologies free the technician from all limitations

CONCLUSION

Incumbents who visualize the emerging digital transformation models and make proactive interventions gain a huge competitive advantage.

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In today's highly competitive environment, where margins are under pressure and new customers hard to come by, enterprises have no option but to seek efficiency improvements. Asset utilization is a big area where enterprises can seek to make huge productivity and efficiency gains. The implementation of the latest digital transformation methods can help enterprises overcome the challenges related to asset management, and realize huge gains.

Challenge #1:
THE CHALLENGE OF ROUTING FLEXIBILITY

Today's highly fluid business environment demands flexible systems. Digital transformation empowers the company with flexibility to make choices, depending on the business situation.

The cloud, by itself ensures a great deal of flexibility. Storing data in the cloud gives enterprises flexibility to access it from anywhere, at any time. The cloud also allows easy scalability. Industry 4.0 offers the potential to do more.

Industry 4.0 co-opts new digital tools, which help companies realize smarter energy consumption, gathering data in intelligent lots, and yield better optimization in real-time.

ABB offers a good example. The company has deployed a computer-based system which mimics the actions of an "ideal" operator. The system leverages real-time metrics to adjust fuel flow, kiln feed, fan-damper position, and other key tasks, to boost throughput by about 5%.

TECH TIP #1

Retain existing systems, to keep operations running, while simultaneously migrating to the new system gradually. "Two-speed" or "bimodal IT" entails managing two channels parallelly, with the first system optimized for predictable areas of the business, while the other system is more experimental, and seeks to transform legacy systems to a new one.

TECH TIP #2

Invest in a strong and robust analysis, to sync product development with customer requirements and preferences. Consider the case of an automobile manufacturer who leveraged data to identify options for which customers would pay a premium, and tweaked its manufacturing processes accordingly. The company could not just cater to its customers in a much better way, but also improve gross margin by 30% over a period of two years.

Challenge #2:
ACHIEVING MACHINE FLEXIBILITY

On an average, manufacturers achieve just 52% productive utilization of their machinery, with the rest of the time lost in upgrades, maintenance, shutdown, and replacement activities. The inflexible nature of the operation is the root cause for a lion's share of the 48% downtime.
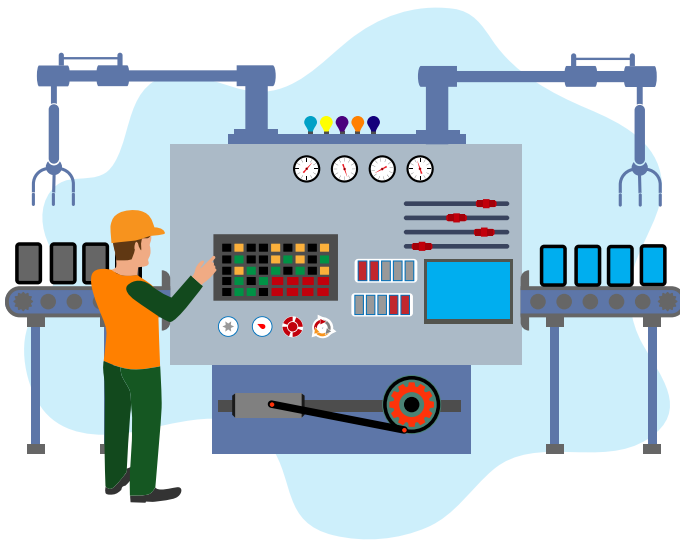
A smart factory has a modular set-up of the manufacturing equipment, with each module capable of communicating with other modules, and also to the operator. The set-up is easily scalable and independent of each other. Each module emits data on its activity, and is also capable of self-assessment and self-regulation.

Advanced robotics and 3-D printing promise a paradigm shift in the way manufacturing takes place, and brings unbound flexibility to the shop-floor.
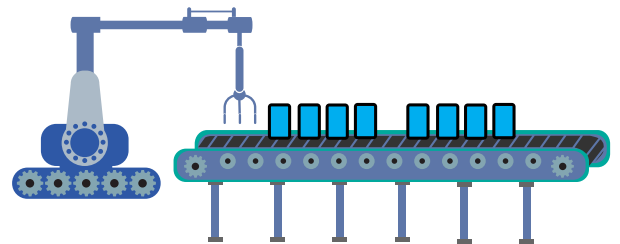
TECH TIP #1

Implement 3D printing. 3D printing or additive manufacturing allows manufacturing of customized consumer products, in batches of one. The technology facilitates manufacturing on demand, with the process starting as soon as the customer places an order online. It enables incorporating customer specific components to the production process, without disrupting the production line.

TECH TIP #2

Invest in robotics. Deploying robotics makes it viable to manufacture in small lots, within a short time period. In the future, advanced robots will work and interact with humans.

Challenge #3:
IMPLEMENT REMOTE MONITORING AND CONTROL

Hitherto, technology merely governed and controlled the production process. But with Industry 4.0 and digital transformation, smart manufacturing will fuse the online world with the physical world of manufacturing. The digital platform will continuously optimize the production process and connect it to the relevant stakeholders, be it customers, suppliers, enterprise managers, etc. The platform will capture even minute data, which the controllers and other stakeholders may use to:

o   Adjust current performance, by optimizing quality, yield, energy utilization and uptime
o   Predict future needs, such as remaining useful life for components and equipment
o   Merge and harmonize data, robotics and people, to improve productivity, enhance   product quality, and deliver better value for customers
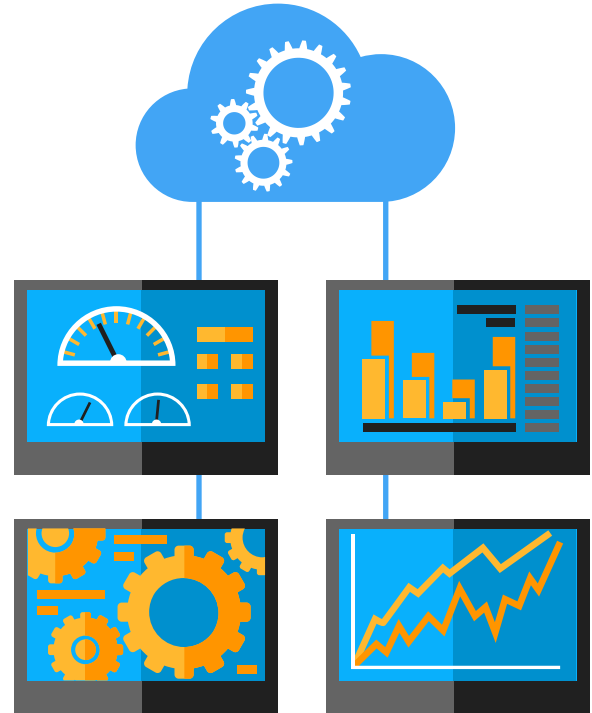
TECH TIP #1

Establish the Industrial Internet of Things (IIoT). The IIoT, powered by the digital platform, emits data and facilitates continuous streaming analysis

Challenge #4:
PREDICTIVE MAINTENANCE

Reactive maintenance entails running the machinery until it breaks down. This not only makes downtime unpredictable, but also causes the risk of poor product quality, as the machinery is run with degraded parts, with the risk of exceeding tolerance limits, overheating, and other risks. Planned maintenance, or maintenance at fixed intervals, breeds inefficiency as perfectly working parts may also be removed after a specific time frame.

Predictive maintenance offers a solution to the drawbacks of traditional maintenance approaches. However, here again, manufacturers have been hamstrung with inaccurate or inadequate data. Digital transformation offers a solution.

Connected technologies pull data from multiple sources, including legacy systems. The cloud offers a convenient and cost-effective storage medium. Enterprises need to develop a system which captures real-time data and intelligence from all available sources, and transmits it to the cloud for the required analysis, atop this underlying infrastructure. GE's Condition Forecaster system collects data from 250+ sensors attached to each motor, besides delving into 40,000+ historical maintenance records. Such data is subject to analytics, to predict when maintenance is required.

TECH TIP #1

Capture data from various sources. Telemetric data from hundreds of sensors placed on the shop floor, data from ERP systems, data from the programmable logic controller (PLC) inside the machinery, and various other sources of data offer a wealth of data.

Challenge #5:
MAINTENANCE REPAIR AND OPERATIONS (MRO)

Repairing and serving machinery is often a cumbersome and messy process. The technician faces many restraints. They work under severe time-pressure, as the machine in question may have brought the entire operations to a grinding halt, causing millions of dollars of lost revenue. They suffer from limitations of restricted access, and even limited information. With the work carried out at the plant site, they have limited access to reference materials, or assistance from the team.

The application of Augmented Reality technologies overcomes all such limitations.

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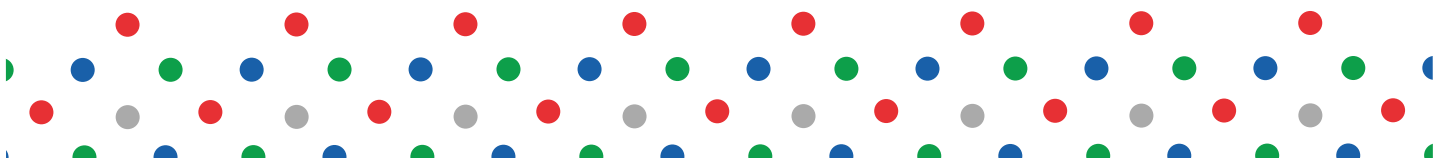
TECH TIP #1

Invest in AR goggles. The service technician, by slipping on a pair of augmented-reality (AR) goggles, gains rich insights overlaid on the real world. The insights would annotate and identify key parts through 3D arrows, offer instructional videos, provide step-by-step instructions, and more. An Android-powered wrist phone enables the technician to control the flow of information to the goggles. A new Augmented Reality system developed at Columbia University on these lines helps users execute maintenance tasks in about half the usual time.

Manufacturing is in the throes of change. Incumbents who visualize the emerging models and make proactive interventions gain a huge competitive advantage. Smart

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