



# How will Manufacturing Adapt to the Digital World?

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## Introduction

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The history of manufacturing shows that there have been numerous attempts to control process complexity, manage human error, reduce waste, eliminate inefficiencies and improve the skills required for modern manufacturing. Simultaneously, manufacturing has waged an unrelenting war against the barriers to quality and cost-to-customer. Dramatic changes such as digitalization and more personalized customer experience have been enforced as a consequence of pursuing these goals. In addition, manufacturing has weathered the storms of economic recession.

More lately, offshoring has changed the balance within the industry. Modern sourcing and supply chain strategies are becoming more focused towards resilience. However, the disruptive change in the manufacturing sector is on its way, moving into Smart Manufacturing. There is a need to act quickly on market demands such as user/customer experience, proactive response, individualism, speed, first time right and zero defects.

## Changing Winds

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Today's markets and consumers are not the same as what we have witnessed earlier. Until a few years ago, it was adequate for a manufacturer of automobiles to produce identical cars on an assembly line that provided the best mileage or the smoothest ride. Now, that is not enough. In addition to the best engines and plush interiors, cars need to be available in custom colors, with different seating configurations, a variety of safety and entertainment features, flexible financing plans, and, of course, immediate delivery. Creating a pleasant customer experience is no longer limited to only choosing and configuring a product. Manufacturers also have to pay heed to product creation.

At the same time, customers are not willing to wait to have their orders fulfilled or their complaints noted. Customers want things now or never. If manufacturer 'A' doesn't have it, customers will buy from manufacturer 'B' or opt for another product.

The customer today has transformed into a digitally smart customer, with quickly changing demands.

# Game Shifter: Smart Manufacturing/Industry 4.0

Smart Manufacturing or Industry 4.0 has become the key enabler for western countries to stay ahead in terms of innovation. At the same time, companies are leveraging Smart Manufacturing to enable them quickly ramp-up volume as well as introduce “extreme” operational excellence within their “make processes.” Smart Manufacturing is characterized by increasing technological advances such as the use of software and data to make machines and products smarter, opening tremendous possibilities for the manufacturer.

Smart Manufacturing helps organizations become more agile, by creating a digital foundation, which includes digitalization of their production processes as well as their integrated product development, business and manufacturing processes. It fulfils the requirements to let customers influence product design and ensures organizations become more responsive to their customers in key markets. On top of the digital foundation, advanced analytics and collaboration can be maximized.

The manufacturing industry has made several attempts to achieve operational excellence. These have included efforts around Manufacturing

Execution Systems (MES), leading to “production and product process operations management” that can help streamline the production and process flow.

However, with today’s development cycles of advanced products, combined with pressing customer demands, manufacturing has to become smarter to be able to capitalize on this, having full flexibility and zero defects.

This has led to the need for solutions with the following features:

- Enterprise-wide integration of product development, manufacturing and business processes
- Advanced analytics for production, process and product quality measurement and control
- Mobile solutions for insights and decision making anytime, everywhere
- Faster and flexible global deployment of shop floor systems

## Am I Ready for Smart Manufacturing?

While Smart Manufacturing holds tremendous promise, and is the inevitable route every manufacturer must adopt in the future, many plants still deal with (legacy) installed base applications. The questions it poses for plant managers are vexing: What is the right roadmap for me to switch to Smart Manufacturing? How do I initiate the switch to Smart Manufacturing? And even if I do find assistance, will I have to abandon my current investment in plant infrastructure that could be anywhere between \$1 million and \$3 million for each plant, or even more for larger plants?

The answer is simple. Consider this example. A plant with operational expenses of say \$50 million a year, shows 5% to 10% improvement a year using Smart Manufacturing techniques. This enables savings of upto \$2.5 million a year and secures your current investment in plant infrastructure. There are compelling [reasons to embrace Smart Manufacturing](#) sooner rather than later. These include:



### Need for First Time Right and Zero Defects on Product Realization and Quality:

Smart Manufacturing helps integrate end-to-end processes as well as product measurement and quality data



### End-to-End Traceability:

Smart Manufacturing helps have end-to-end automated traceability at any time for both, the production process as well as the product genealogy



### User-centric Manufacturing:

Smart Manufacturing includes visualization and mobile insights to decision making, anytime and anywhere



#### **Advancing Workforce Maturity:**

Smart Manufacturing can help capture and enable the transfer of knowledge to the younger generation of human resources with specialized skills and capabilities. For decades, most manufacturing products have had a high craftsmanship factor. With aging workforce as well as the changing requirements with respect to competencies, because of advanced products, domain experience and knowledge need to be sustainable and accessible



#### **Growing Obsolescence of Existing Manufacturing Technology:**

Smart Manufacturing presents the possible option/alternative for ageing technology. It either helps extend the lifecycle of the existing technology or replace it with an affordable, self-sustaining solution



#### **Urgent Need to Expand the Lifecycle of Investments and Solutions:**

Smart Manufacturing can be a critical aid in attaining this goal by introducing a digital foundation that enables rapid synchronization and global alignment across plants. Rather, it is standardizing on common systems or acting in a diverse application landscape, while having advantages that comes with digitalizing



#### **Strategic Consolidation of Plants and Operations:**

Smart Manufacturing frameworks can support organizations that aim to reduce operational complexity through plant consolidation by implementing a digital foundation



#### **Growth and Market Expansion through New Plants and Operations:**

Smart Manufacturing makes the ideal starting point for new investments that are future ready



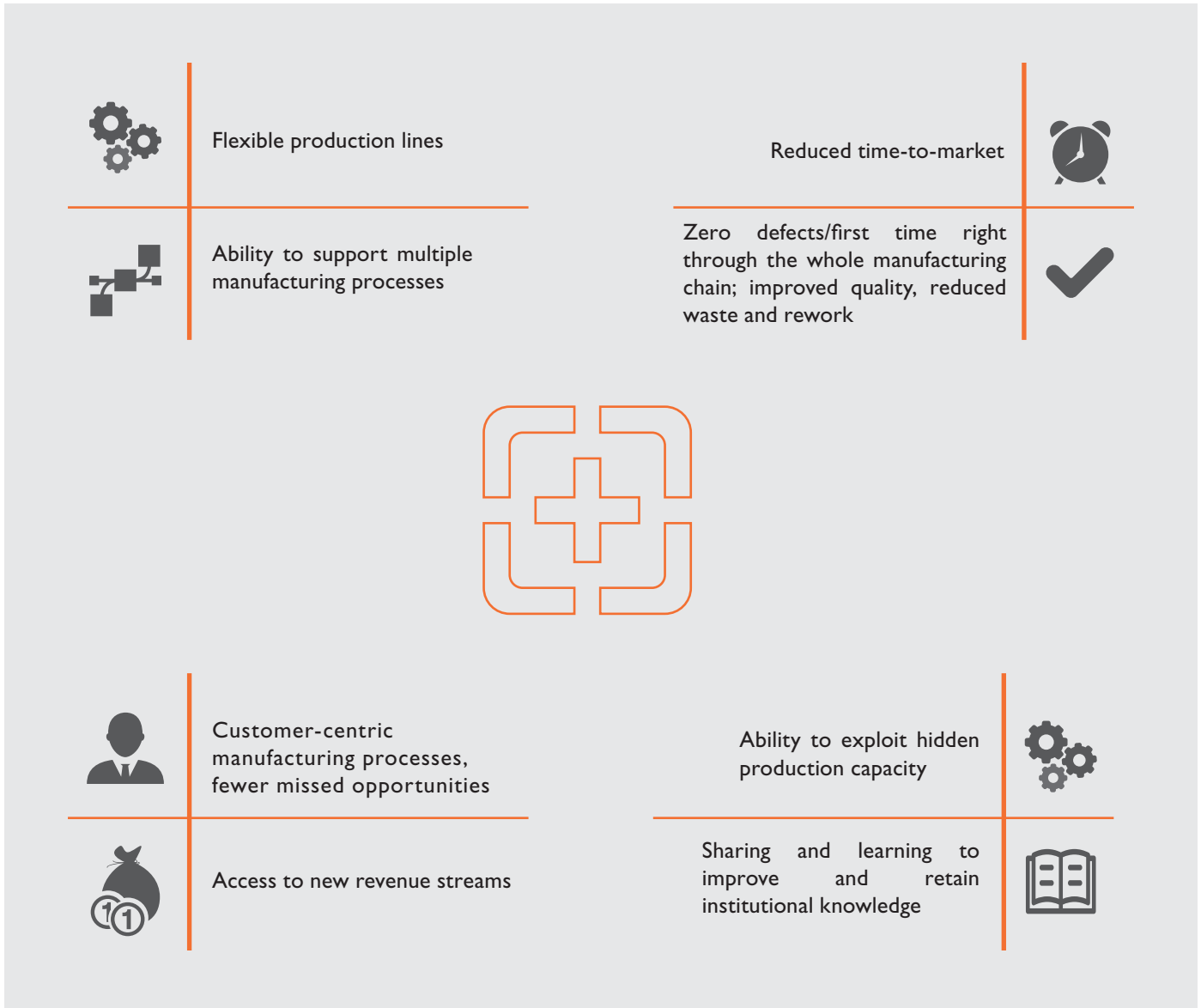
#### **Integration for More Efficient and Agile Response to Market Changes:**

Smart Manufacturing can be the fabric that integrates internal with external processes to ensure agility and responsiveness



# Benefits of Smart Manufacturing

Those adopting Smart Manufacturing are meeting future readiness, realizing the following benefits:



## Smart Manufacturing Sounds Good, But What's Next?

With Smart Manufacturing being the hot new trend, it is probable that challenges will be faced when adopting associated technologies such as Big Data, Advanced Analytics and Internet of Things. This could be related to having the right set of skills, competences and experience. However, it is possible to learn from the mistakes of early adopters. Large global manufacturers, especially in the domain of advanced precision

manufacturing, have been honing their ability to deploy Smart Manufacturing processes within their organizations.

There are multiple points for organizations to start their Smart Manufacturing journey, depending on their level of maturity and priorities. Therefore, having a Smart Manufacturing strategy and roadmap would be the first step.

## About the Author

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[Marlon Hiralal](#) serves as Director Europe – Smart Manufacturing (also known as Industry 4.0) at Wipro and has over 20 years of international experience, working with companies in Europe, the US and Asia. He focuses on integration, digitization and automation of Product Development and Manufacturing Processes and solutions, enabling integration with Business Processes. He has been focusing on Smart/Advanced Manufacturing and Digitalization for the last 6 years. Marlon has a master's degree in Aviation and Aerospace, a PhD in real-time systems - Artificial Intelligence, and an MBA in Business and Management.

## About Wipro Ltd.

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