

# Moving Quality Upstream Gives Manufacturers an Upper Hand



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Quality can be an elusive goal, especially when applied to a process as complex as manufacturing. But consistently producing high-quality goods and services can be managed and achieved by leveraging precise data, smart and well-designed processes, and state-of-the-art measurement tools.

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Most manufacturers know that smart data applications and analytics are revolutionizing their industry, but advanced digital metrology tools that quickly provide precise measurement information are also important contributors. They can streamline processes and greatly improve quality control. These capabilities lead to better outcomes, particularly when advanced metrology tools are used from the outset and during the design process.

How can businesses best utilize these measurement technologies and other digital applications for better results in the manufacturing space? How can these tools improve the production process and enable best-in-class customer service? This article will explore these issues and related industry challenges and offer insights to help manufacturers achieve quality from the start.



## Measuring to Ensure Quality from the Outset

Incorporating quality in the design phase of a part or product is essential to improve outcomes. As Martin Renaud, Quality Manager, Cooper Standard, told Frost & Sullivan in a recent conversation about advanced metrology in manufacturing, “It’s very important to incorporate quality in the design phase of a part or product. We need to think ahead before we go forward with a certain design. Is it able to be manufactured? Is it [a] new technology? Is it something we did before?” It is critical to start the process with a robust design that meets customer needs, performance standards, and other key criteria.

Initial inspection, in-process verification, and prototype inspection are especially important at the design stage and at the beginning of the manufacturing process. It is here that data can be used to identify potential issues with building out deliverables and design or process adjustments can be made. Manufacturers want to catch potential production issues as early as possible so that processes can be refined and quality can be improved. Frank Wilson, Quality Manager at Pratt Miller, states, “The more that we are able to do upfront, and the less truncated our timeline is to get whatever it is done, we usually end up better off the second round.”



## Leveraging Measurement Data Upstream

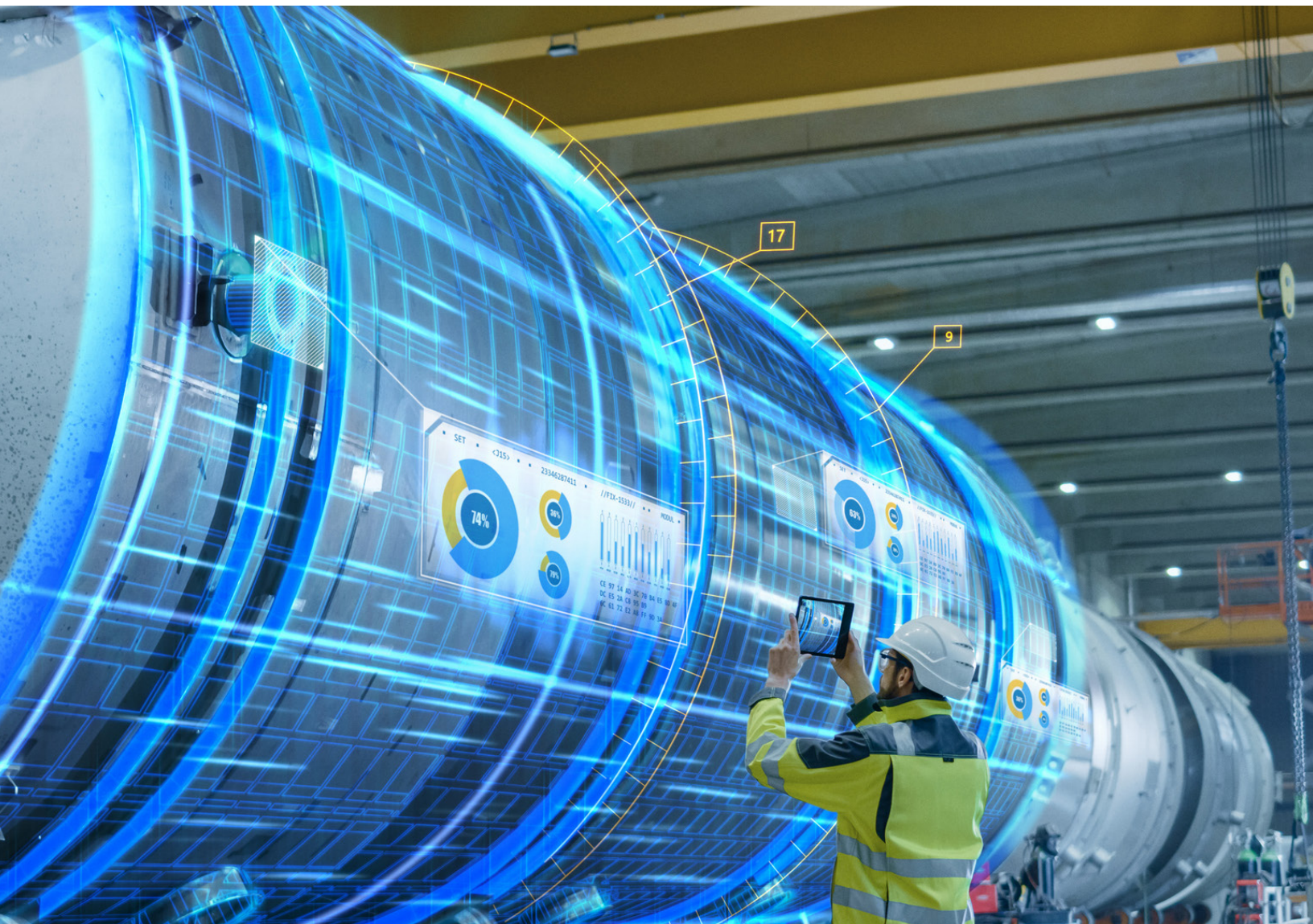
Today, many companies are moving away from traditional quality control processes and toward providing a personalized, end-to-end customer experience. The role of quality control in manufacturing is also evolving and becoming more customer-focused in the upstream process. Leo Martinez, Product Marketing Manager at FARO, told Frost & Sullivan, “Most of our ecosystem and supply chain is built off of just-in-time manufacturing. And the real challenge there is if you don’t have control of your upstream processes, then you get to the point where you can’t manufacture them in time and you can’t deliver them in time. And that has huge implications.”

Martinez elaborated, “Pushing that measurement data more upstream is much more valuable than having more measurement downstream. If you can catch an issue with an incoming part, or if you catch an issue with your actual production equipment, it saves you so much more than if you just found that issue during the QC check.”



## Optimizing 3D Manufacturing Tools


Optimizing the 3D manufacturing process upfront is also desirable, and 3D measurement is another growing application in the manufacturing space. Companies are increasingly using multi-dimensional equipment to inspect their 3D equipment and better calibrate 3D printers. Mariana Filipic, Executive Director of Global Quality at Mold Masters, told Frost & Sullivan, “We work in automotive and many other industries that are optimizing design tolerances with 3D, optimizing material usage, and reducing the cycle time. 3D measurements are important at the end of the process...and in the prototyping, even in reverse engineering applications, if you will, it is really useful.”



## Leveraging Data Internally and Externally

Accurate and timely inspection data is a key component of the manufacturing process as it helps uncover issues with building out products. Tools that provide accurate data enable improved designs or processes and enhanced quality. When properly supervised and applied, tools like robotic arms and trackers can aid inspections. Overall, intelligently sharing data across the production cycle often leads to greater manufacturing efficiencies resulting in cost and labor savings.

The Internet of Things (IoT) and artificial intelligence are just a few of the applications that can be used to facilitate data-sharing and data usage throughout the manufacturing process. Efficiently sharing information and insights across the value chain—internally and externally, from upstream technologies to downstream sales—can improve the manufacturing and distribution process.



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## Creating a Workforce Culture that Drives Quality

Beyond the process improvements technology can provide, it is important to educate employees and cultivate a culture that drives quality. Developing a workforce comfortable with change and evolving responsibilities (including re-training) can positively influence and affect production outcomes. As the factory floor of the past recedes and smart manufacturing grows, it can be challenging to find employees with the right skill sets and competencies; however, human oversight is always needed. Ideally, enterprises foster a quality mindset that empowers everyone to drive positive change, solve problems, and make improvements both upstream and downstream.





## Manufacturing's Future will be Driven by Data

When the manufacturing experts were asked what they would like to see or expect to see in manufacturing five or ten years from now, most circled back to data as a change driver. Martinez said, "I think we're really going to see more and more data from every single stage of the production process that is going to continue to build out a database for your entire manufacturing system every single day. It will be so much data that a human operator can't really do anything with it. That's where we'll see things like artificial intelligence and machine learning being used to go through that data and start picking out trends, and systems that can start reading those trends. We can provide suggestions for a human to act on them and make changes to their part, and to production processes."

Moving forward, shared data will connect internal manufacturing operations with external vendors and suppliers, effectively transforming the entire manufacturing ecosystem. Enterprises must learn to capitalize on the power of all this data without being overwhelmed by it.





This article was based on a recent  
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hosted by Frost & Sullivan.

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