



Smarter Factory Blueprint

# The Relentless Quest to Achieve First-Time Quality



## Fueling the Future

An intense drive to ensure continued agility and production of high-quality products is accelerating digital transformation. Manufacturers are increasingly turning to advanced technologies, such as machine vision, to identify and resolve issues while preemptively upholding exceptionally high-quality standards.



## Elevating Excellence in Manufacturing

**The pursuit of quality in manufacturing isn't a novel concept; it's a time-honored commitment that takes on renewed importance in the era of Industry 4.0 and smart manufacturing.** As global markets become increasingly competitive, the onus is on manufacturers to deliver products that meet stringent quality standards or they risk damaging their brand reputation, eroding customer trust and facing potential financial setbacks.

Yet, as manufacturers know only too well, the challenge of ensuring consistent quality is complex. From sourcing the right raw materials and components to deploying precise production techniques and rigorous testing mechanisms, quality assurance requires a holistic approach. The dynamics of supply chains, variability in human labor, imprecision in machinery and external factors like regulations and standards add layers of complexity to the task.

### Navigating the Quality Maze with Innovation

Enter Zebra Technologies, a name synonymous with precision, efficiency and innovation. Drawing from our extensive experience as a manufacturer — with firsthand insights into our own production requirements and when partnering with third-party manufacturers — we understand the nuances and complexities of the quality conundrum. With deep-rooted knowledge spanning multiple industries, we've developed a comprehensive suite of solutions tailored to address the multi faceted dimensions of manufacturing quality.

In our journey to delve into manufacturing quality, we understand that the pursuit of peak quality is ongoing and requires collaboration. By partnering with Zebra, manufacturers can leverage the groundbreaking solutions necessary to navigate the ever-evolving landscape of quality assurance. Together, we aim to elevate the manufacturing quality standard, one solution at a time.

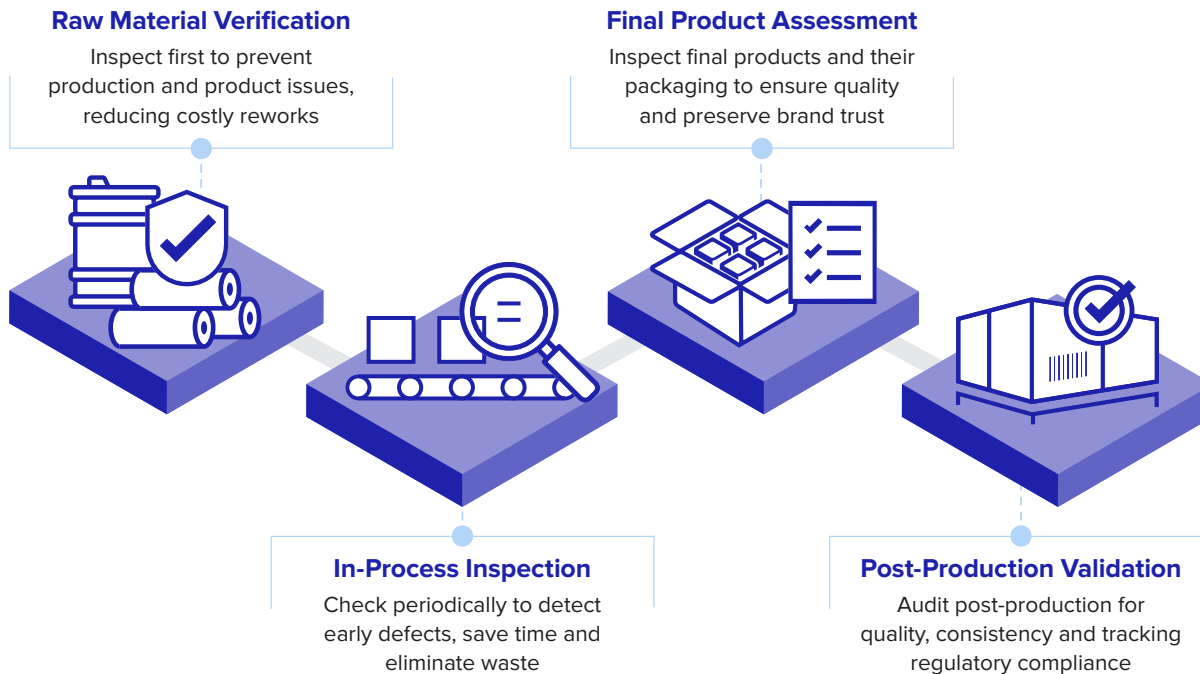


**This e-Book delves into four use cases for quality control and assurance in contemporary manufacturing, highlighting the essential capabilities and technologies that bolster processes for the modern age.**

## Tech's Transformative Touch

Every phase in the manufacturing process determines the product's final quality and the trust it garners from customers. It's not merely about meeting standards but about building lasting brand trust. This guide delves into crucial quality touchpoints, from initial raw material verification to post-production validation. Moreover, it underscores how technology and automation are pivotal in reinforcing and elevating the quality assurance process.

### Charting the Journey



These use cases are integral to a robust quality control system, ensuring that products are of the highest quality from the moment raw materials arrive to when the finished product reaches the consumer. The touch points emphasize first-time quality and perfect orders, guaranteeing shipping integrity, appropriate warning labels, and timely delivery with the correct quantities.



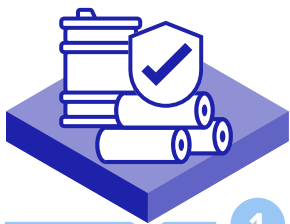
### Top 5 Internal Obstacles Manufacturers Face<sup>1</sup>

- 1 Balancing profitable growth and quality
- 2 Deploying and integrating new technology
- 3 Worker retention/knowledge retention
- 4 Using and understanding data
- 5 Product quality

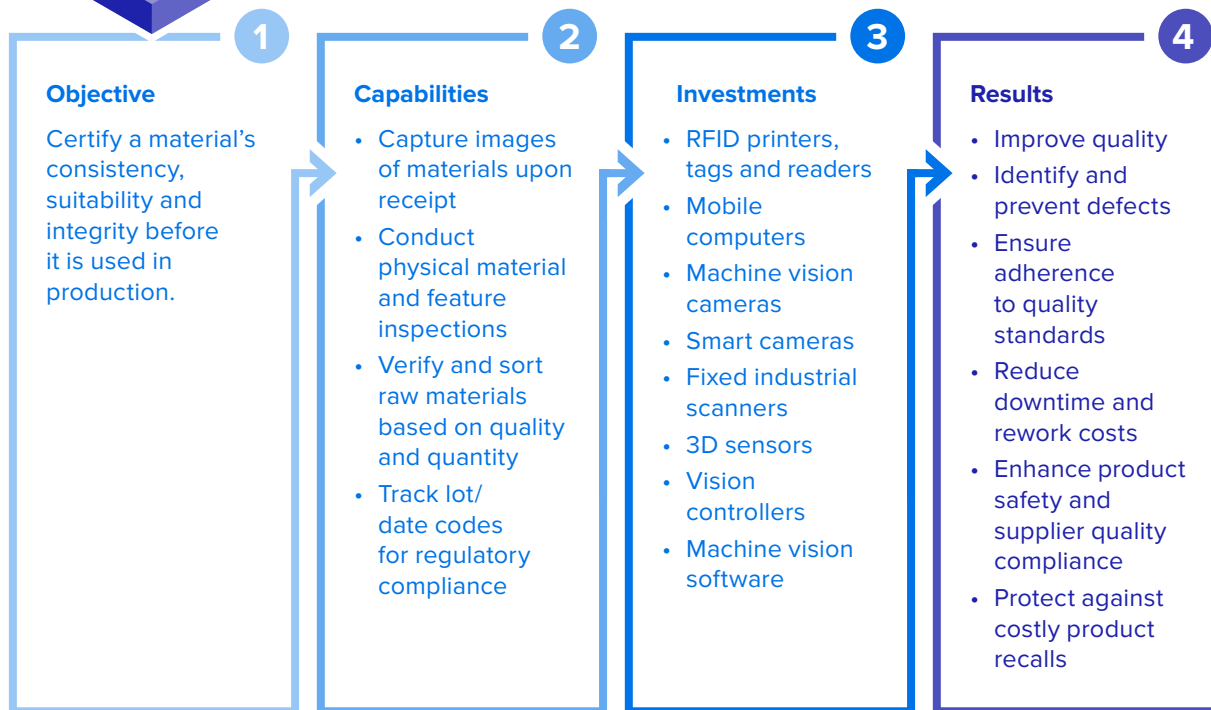
USE CASE

## From the Ground Up: Setting the Quality Standard

Before a product even begins its journey through the manufacturing line, it starts with raw materials. These foundational elements dictate the end product's integrity, functionality, safety and durability. If there's even a hint of compromise in these materials, it risks the final product's quality and the brand's reputation. Ensuring these materials meet stringent standards from the outset is vital. Through technology integration, material tracking and verification processes are streamlined, enhancing supply chain transparency and guaranteeing consistent quality.



### Ensuring Authenticity from the Start Raw Material Verification



of manufacturing decision-makers feel that improving quality is creating the need to accelerate digital transformation.<sup>2</sup>



#### A ZEBRA SUCCESS STORY: Marexi Marine Technology

Discover the impact of Zebra 3D profile sensors in the marine technology sector. With advanced data analysis techniques, the company has achieved remarkable accuracy rates of over 95% in sorting frozen tuna products, based on species, size and quality.

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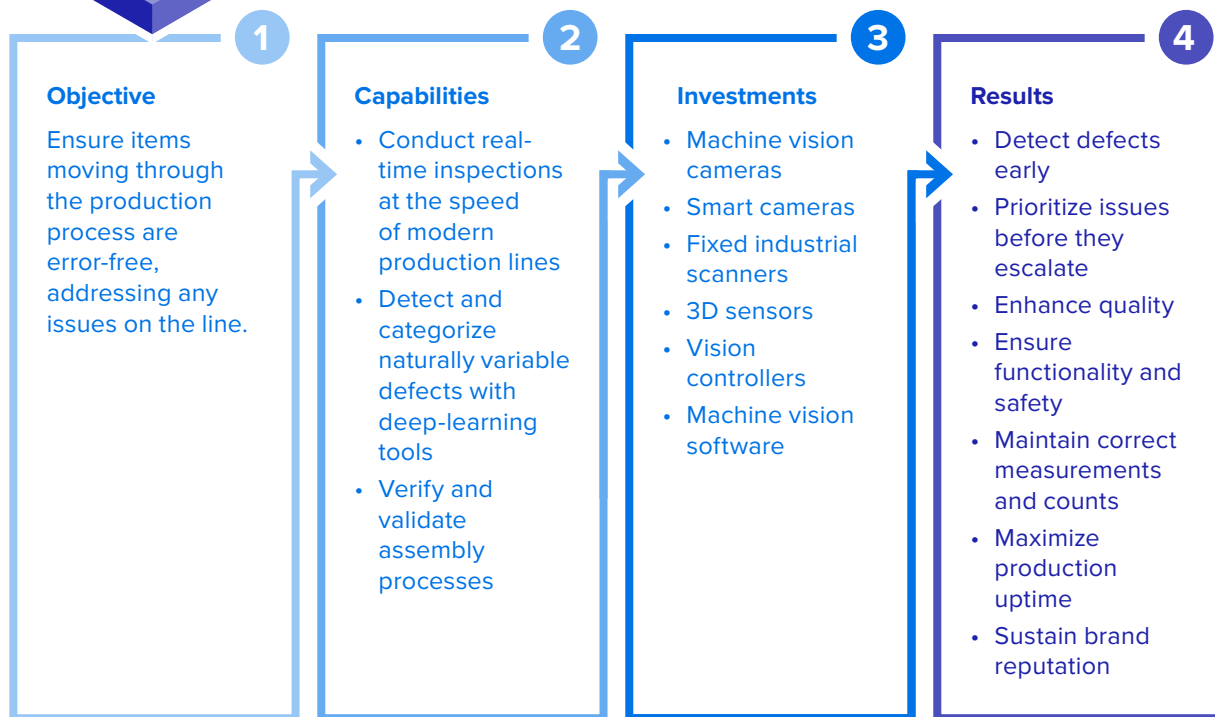
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# Eyes on Production: Ensuring Perfection at Every Step

As products move through the manufacturing line, there are many opportunities for errors to occur. Be it a misalignment, a missing component or a flawed application, catching discrepancies as they occur is crucial to efficient operations. Real-time checks at this stage ensure the product's quality, reduce waste/rework and increase efficiency. In today's fast-paced manufacturing environment, where production lines move at unprecedented speeds, rapid response and immediate rectification are more critical than ever. With real-time monitoring, manufacturers can address recalls, conserve resources and uphold their reputations.



## Tracking Excellence from Start to Finish In-Process Inspection



53% of manufacturers report they've invested in machine learning and artificial intelligence.<sup>3</sup>



### A ZEBRA SUCCESS STORY: STIHL Group

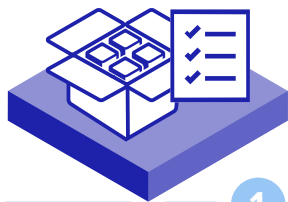
See how a global power tool manufacturer achieved 99.5% accuracy rates in the visual quality assessment of parts before production. The fully automated inspection process, made possible by Zebra's deep-learning-based machine vision solution, has enabled significant cost and time savings.

[VIEW SUCCESS STORY >](#)

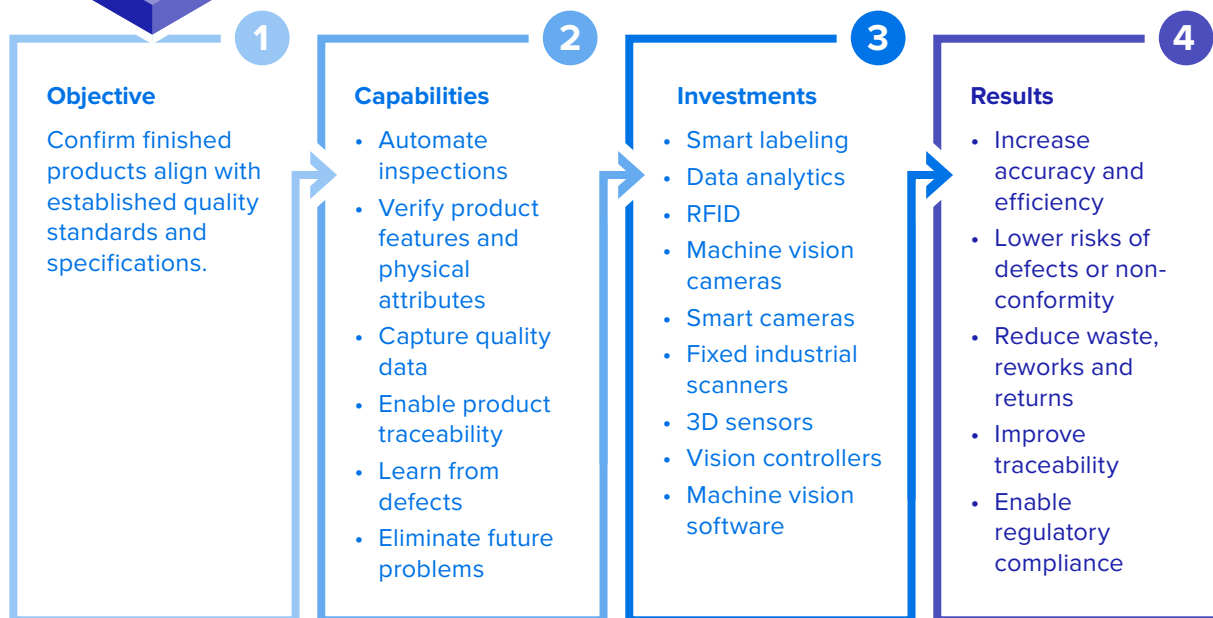
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# The Finishing Touch: Quality Confirmed

A final assessment is the last line of defense in quality control. It's the stage that determines whether a product is fit for the market. A thorough final inspection ensures that the finished product meets all quality standards and that consumers receive only the best. This phase is also where the culmination of all prior checks and balances manifests. It's where brands either earn their stripes or face the consequences of oversight. A rigorous final inspection acts as a brand's commitment to delivering nothing but the best to its customers.



## Only the Best Gets a Shipping Label Final Product Assessment



of manufacturing decision-makers reported plans to use smart manufacturing technology.<sup>4</sup>



### A ZEBRA SUCCESS STORY: M.O.S.A.I.C. Motion System and Information Control

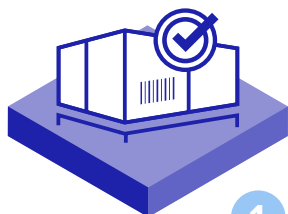
MOSAIC, a global organization specializing in robotics and industrial automation, implemented a machine vision system for an automotive brake manufacturer. The system detects minute defects and ensures quality for 200+ disk models, removing faulty units and standardizing inspection processes.

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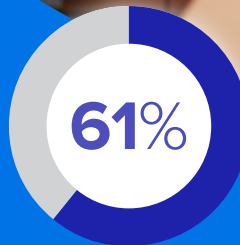
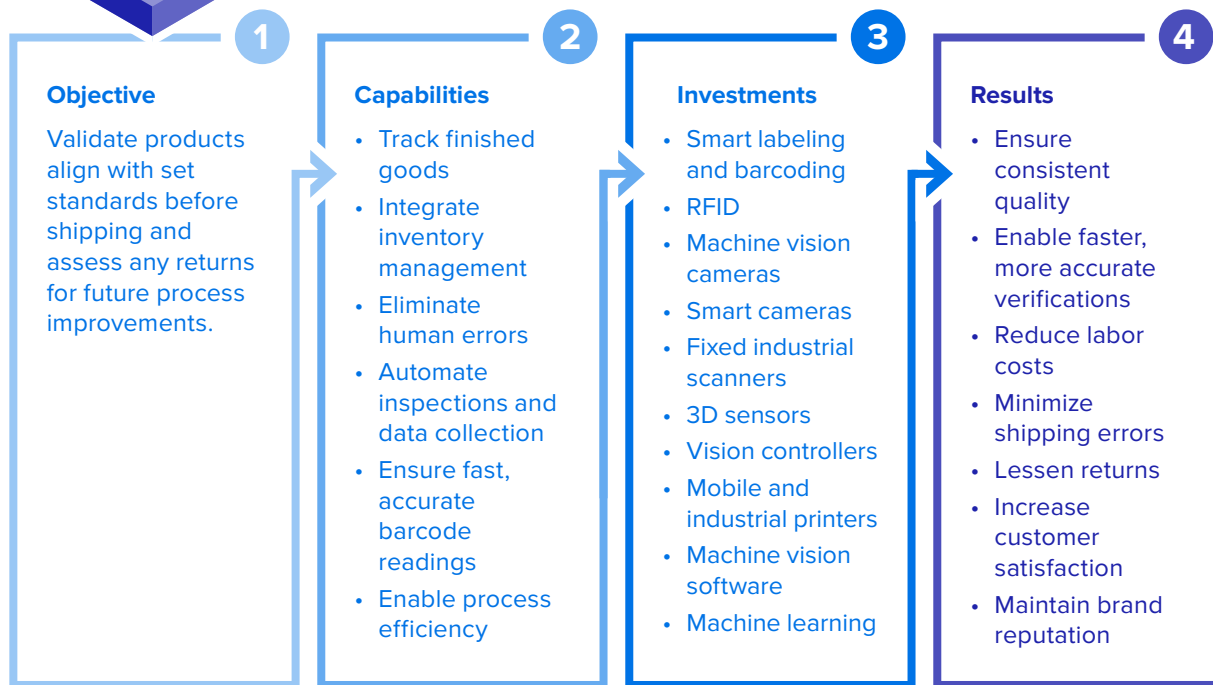
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## Final Check: Precision Beyond Production

After products are assembled, it's vital for manufacturers to ensure quality at every level. Post-production inspections rigorously review individual items, cases and pallets. Each finished good must be complete, defect-free and labeled correctly before dispatch. These checks confirm the promised quality standard. Re-inspection showcases a manufacturer's dedication to excellence. Analyzing returned products and collecting defect data aids in refining and enhancing future processes.



### Beyond the Production Line Post-Production Validation



of manufacturing decision-makers said that customer demands are shifting, and higher quality is a frequent demand.<sup>5</sup>



#### A ZEBRA SUCCESS STORY:

##### **Bosch Group**

Bosch Group, a leading global supplier of automotive components, improved product quality and traceability by implementing a machine vision inspection system from Zebra. Learn how the company decreased rejection rates and increased production volumes.

[VIEW SUCCESS STORY >](#)

# Crafting Precision: A Blueprint to Manufacturing Mastery

In the intricate machinery of manufacturing, every cog and gear plays a vital role. The use cases spotlighted in this e-Book highlight the pivotal stages of robust quality assurance. With Zebra's innovative solutions guiding each phase, manufacturing operations aren't just enhanced; they're transformed. Engage components strategically and let Zebra help steer your organization toward an era of unparalleled operational excellence.

## About Zebra

Zebra empowers organizations to thrive in the on-demand economy by making every front-line worker and asset at the edge visible, connected and fully optimized. With an ecosystem of more than 10,000 partners across more than 100 countries, Zebra serves customers of all sizes — including 94% of the Fortune 100 — with an award-winning portfolio of hardware, software, services and solutions that digitize and automate workflows. Zebra recently expanded its industrial automation portfolio with its Fetch Robotics acquisition and increased its machine vision and AI software capabilities with the acquisitions of Adaptive Vision, Matrox Imaging and Antuit.ai.

## Embrace automation. Elevate your operations.

To learn more, visit [zebra.com/manufacturing](https://zebra.com/manufacturing)

### SOURCES:

<sup>1,2,3,4</sup> Rockwell Automation, "Eight Annual State of Smart Manufacturing Report," 2023.

<sup>5</sup> American Express, "Manufacturing: 2023 Industry Outlook and Opportunities," 2023.



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