



# QUALITY 4.0 SERIES:

## The Quality Leader's New Product Introduction Playbook

**Thirty-seven percent of quality leaders say “lack of quality culture” is the top roadblock** to achieve quality objectives ( $n=1198$ ). In fact, many quality leaders have long-recognized that [instilling a culture of quality is critical to achieve quality objectives](#) and desired outcomes. Naturally, culture initiatives are common across the industrial and manufacturing sector, which emphasizes that corporations must evolve to a more proactive quality approach. One critical element to culture initiatives is early and effective engagement in new product introduction (NPI). However, most of the market lacks early and effective engagement of quality processes, insights, and competencies within NPI, and quality teams struggle to justify deeper involvement.

However, several recent shifts in market dynamics have increased the focus on quality for many manufacturers, therefore providing quality with new influence to increase traction with NPI. This is true in business-to-business (B2B) and business-to-consumer (B2C) products and sales, although the reasons are different. For instance, B2B customers are increasingly pairing risk-based supplier scorecards with enhanced data gathering and management, which guides them on future supplier contracts. The quality metric is a critical key performance indicator (KPI) in these scorecards, and therefore the quality organization is increasingly key to contract awards. Quality's role in B2C also changed dramatically with the advent of internet marketplaces and social media. Consumer reviews and five-star ratings have created broad visibility to good quality as well as quality defects, directly influencing consumer purchasing behavior.

The market's visibility to early quality issues has never been greater and will continue to accelerate. The extensive awareness creates opportunities for the prepared enterprise, and substantial risks for those slow to react. Quality leaders should embrace these market changes and use them to [fuel conversations with peers and top management about quality's role in the company's sustainable top line and bottom line growth](#).

LNS surveys reveal that quality is a meaningful contributor to NPI success and innovation. In fact, all functional leaders agree that quality is one of the top mandatory success criteria in NPI, giving it similar weight to product performance, cost, and project timing. While not all



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—DAN JACOB

*Practice Director and Principal Analyst*

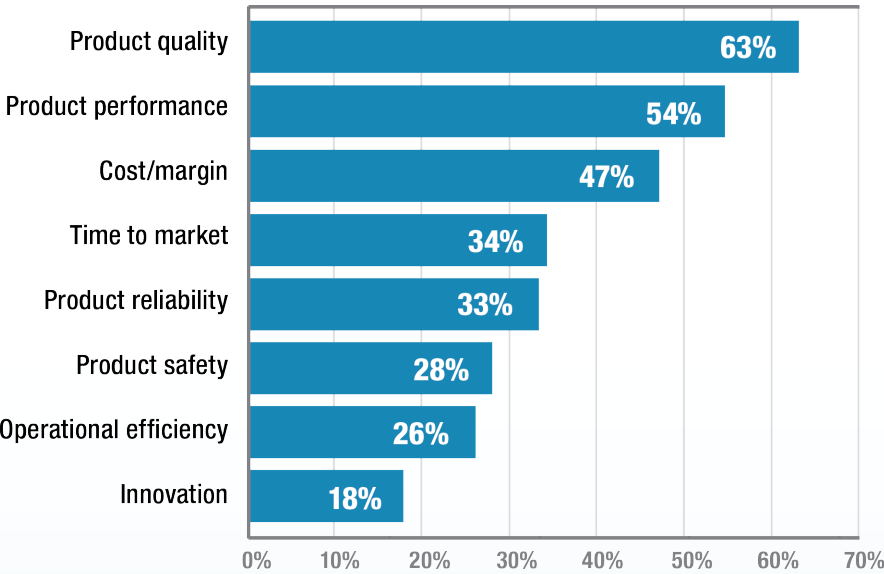


manufacturers include lessons learned from prior product generations in new product development, research data shows that of those that do, 89% rely on data from quality management systems. It’s just one of several important inputs from quality into innovation.

This is a critical insight because corporate success is closely linked to NPI success — top objectives for successful NPI include improved brand recognition, revenue growth, protecting existing revenue streams against global competitors, and entering new markets. However, LNS data reveals that the mean NPI success rate is merely 56%, with substantial room to improve. Quality leaders and their organization can play a vital role in that improvement, which directly aligns with sustainable corporate success.

How does your organization define “successful” NPI?

Select all that MUST be met and do not include secondary criteria.



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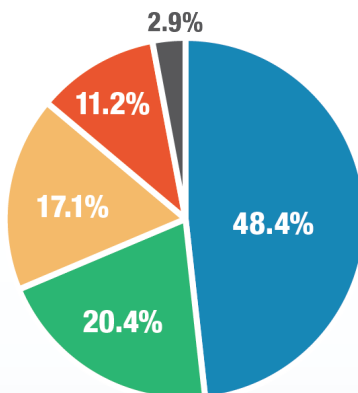
We assert that quality has never been more imperative to the success of the enterprise and of each new product introduced. However, to help the business achieve success in the new market environment, quality leaders must use the right playbook and:

1. Overcome long-standing challenges;
2. Cultivate and achieve cross-functional ownership, and use it to drive culture;
3. Adopt the correct organizational and technology practices to drive earlier quality engagement in NPI;
4. Identify and build upon how quality is adding value to NPI today; and
5. Understand the Digital Transformation of NPI and take a leadership role in the Digital Innovation Cycle.

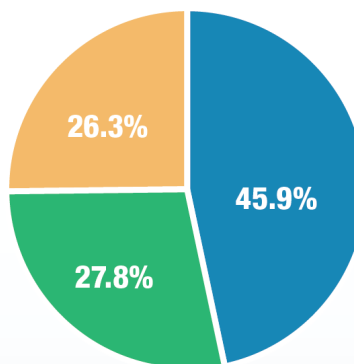
Quality is increasingly critical to NPI success, opening the door for the quality discipline to take a more active role in NPI. However quality leaders must respond with the right strategy.

## Demographics

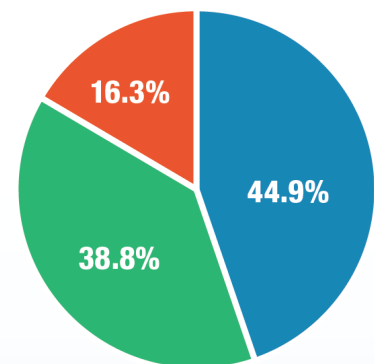
LNS analysts used the data from two surveys for this report. The first is the long-running enterprise quality management system (EQMS) survey, with 1198 respondents. It captures people, process, and technology best practices related to quality, and is a rich source of metrics and KPI data.



**GEOGRAPHY**  
COLOR BY HQ LOCATION



**INDUSTRY**  
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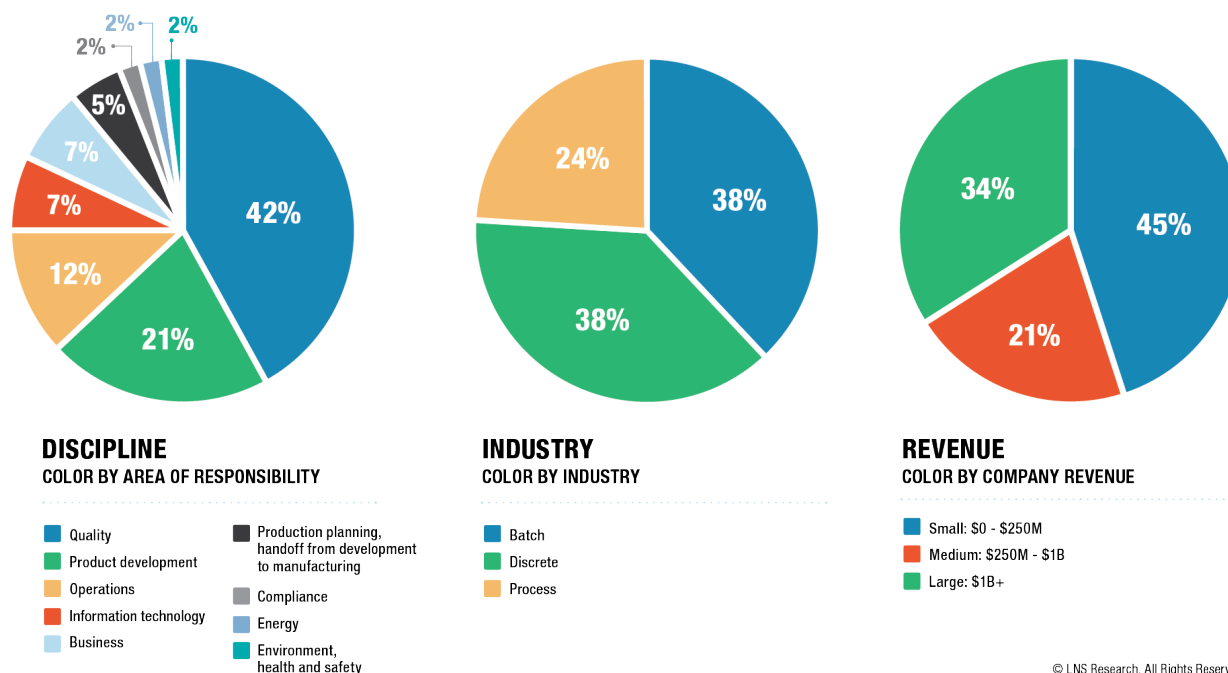


**REVENUE**  
COLOR BY COMPANY REVENUE



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LNS also conducted a survey specifically for this study, to examine NPI and NPI success from a cross-functional perspective. We divided the survey into four sections: overall NPI process objectives and health, multi-stakeholder practice adoption and challenges, KPIs, and quality engagement. Total cleansed response count is 122.



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## Market Dynamics

Design for quality initiatives have been important to corporate success for decades, but current market dynamics increase the need for quality in NPI. LNS has identified the convergence of dynamics, which requires a response by corporate leadership:

- INCREASED ROLE OF NEW PRODUCTS IN REVENUE GROWTH.** Industrial and manufacturing organizations state that the top objective for NPI is increase market share/revenue. The market is broadly emphasizing the importance of NPI to revenue growth, with NPI delivering a growing percentage of new revenue. For some segments, NPI is anticipated to contribute more than 50% of new revenue in the next 12 months. This places substantial pressure on manufacturers to deliver new products that meet success criteria.
- GLOBALIZATION, COMPLEXITY, AND TIME TO MARKET.** Globalization is an ongoing trend, influencing manufacturing inputs (supply

chain), outputs (demand chain), and third-party influences (competition and regulators). Product, manufacturing, and configuration complexity are generally increasing across the market. Meanwhile, time to market pressures are growing, in part due to global competition. These dynamics create clashes and late cycle compromises in less disciplined, more fragmented, and poorly monitored NPI processes.

- **INCREASED SUPPLIER OVERSIGHT.** Customers in complex value chains continue to deploy more sophisticated supplier management technologies. In fact, our research data shows that the market will increase adoption of supplier quality management (SQM) software by 93% over the next 12-18 months, and those with real-time visibility to supplier metrics will triple. This increase in automation and visibility feeds risk-based strategies and supplier scorecards to grade suppliers. Corporations award preferred suppliers more business, while compel high-risk suppliers to improve or discontinue them. Quality is a universal and heavily weighted element in this risk-based grading. Anecdotally, the weight of quality ranges from one-third to 100% of the total score. It's not just the visibility of quality that's increasing; the impact and use of this data is accelerating.
- **INCREASED REGULATORY OVERSIGHT.** Regulators such as the U.S. FDA continue to increase oversight and emphasis on quality. The FDA started a blockchain pilot in 2017 to track supplied goods through the pharmaceutical supply chain, and it launched public dashboards featuring medical device adverse event reports in 2018. Recent changes provide regulators with deeper insights about quality performance, which can harm manufacturers' bottom line and ability to sell.
- **INCREASED CONSUMER VISIBILITY.** Manufacturers that sell to consumers face unprecedented public visibility due to both social media and online marketplaces. These play two very different roles in NPI success and require different responses and strategies from quality leaders. Social media is highly dynamic and somewhat unpredictable. Many leading organizations have social listening centers to monitor social media and diffuse potentially brand-damaging events, particularly in the wake of an adverse incident such as a recall. Social media can also be a

source of customer complaints, where social reviews and commentary can feed directly into the quality system.

Online marketplaces create a new dynamic in NPI, in that potential buyers can view customer five-star ratings and reviews and contribute their own experiences. Many online marketplaces have pre-built filters that eliminate all products below certain thresholds, such as below four stars. The quantitative star system, as well as qualitative reviews, influence customer purchasing behavior. Furthermore, leading manufacturers use online marketplaces to compare themselves against the market and improve performance. This is often the purview of the quality leader and explicitly connects quality with revenue.

Each of these market dynamics is important, but together they require immediate priority by the quality organization. Quality leaders must put a high priority on developing and implementing a strategy to improve NPI success, with consideration for today's market pressures and dynamics.

### Quality: Competitive Fulcrum

It's clear why quality is so important for NPI success given the current market climate, and why poor integration of quality management in NPI causes difficulties. As mentioned previously, product quality is one of the top requirements needed to declare NPI a success, along with product performance, cost, and time to market.

One challenge affecting NPI performance is late cycle changes, when organizations must make tradeoffs between criteria. Three common late cycle tradeoffs are cost, launch timing, and quality. Even though cost and launch timing win the tradeoff slightly more often than quality, the exercise is generally a coin on NPI success.

There are several key takeaways for today's leaders.

- A collaborative environment with collective decision-making early in the process is critical for NPI success. Late cycle tradeoffs result in NPI failure regardless of which concession they choose.
- There are many success criteria for NPI, and quality is among the most prevalent. As a result, quality can greatly influence the success of NPI through effective engagement that starts early – to avoid late-cycle tradeoffs on quality – and continues through the



**ONLY 56% OF NPIS** meet all success criteria, after a mean NPI cycle of 24 months that typically consumes 25% of a company's workforce. In that light, NPI is a high-cost process with extremely poor yields.

—DAN JACOB

*Practice Director and Principal Analyst*

end of NPI, in part to ensure that the organization doesn't sacrifice quality during last minute changes.

### COIN TOSS #1

**HIGHER COST VERSUS QUALITY ...**

HIGHER COST WINS 52% OF THE TIME



### COIN TOSS #2

**DELAY LAUNCH VERSUS QUALITY ...**

DELAY LAUNCH WINS 65% OF THE TIME

### COIN TOSS #3

**NOT SUCCESSFUL PRODUCT  
LAUNCH VERSUS SUCCESSFUL  
PRODUCT LAUNCH ...**

NOT SUCCESSFUL WINS 44% OF THE TIME



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## Quality: Innovation Engine

Innovation happens by applying novel ideas in products, processes, policies, or business management. Innovation leaders are among the first to identify or adapt new approaches for their industries. Quality contributes to innovation in two meaningful ways.

First, closed-loop quality and risk management provides awareness of what does and doesn't work across the value chain, and drives continual improvement. Therefore, quality can be a significant source of innovative ideas. In fact, quality management data is by far the most widely used data source for lessons learned.

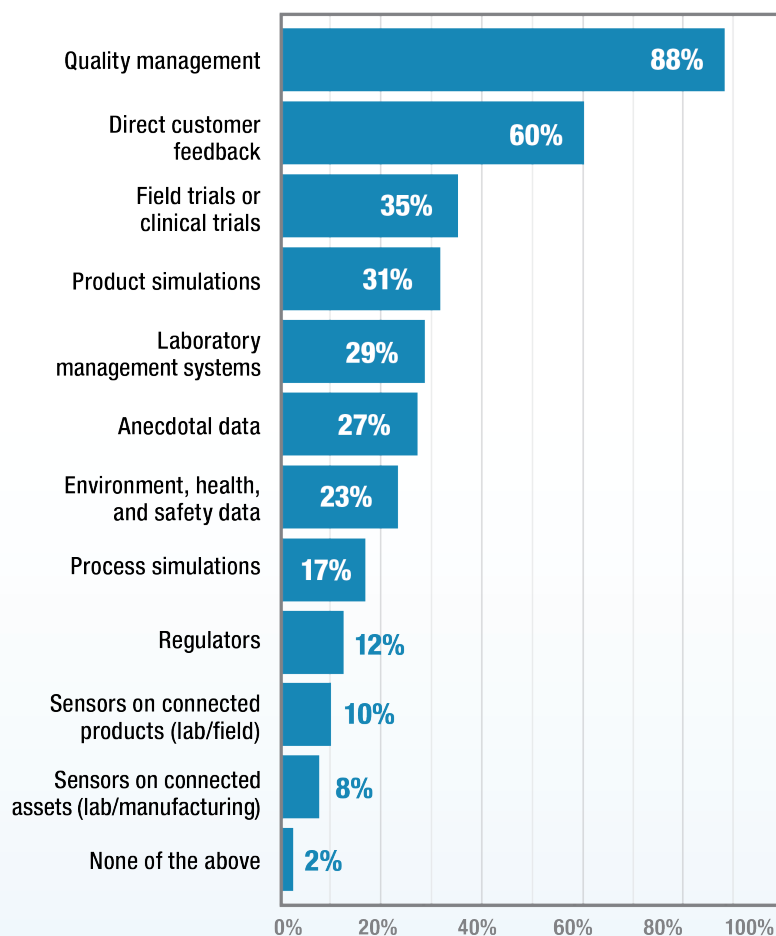
Much of the market expends its energy reacting to quality issues in a siloed fashion, which prevents quality from assuming a meaningful role in innovation. In contrast, innovation leaders have addressed this problem by adopting an average of 4.05 times more best practices than the rest of the market. This means better visibility and quantification of what

is working and what isn't across the lifecycle, better engagement and credibility with other stakeholders, and improved competencies.

Secondly, closed-loop quality ensures that innovations are timely and successful by reducing innovation risk — the risk of failure or poor performance when introducing new, unique, and difficult capabilities and features. Innovation leaders generate 2.95 times more real-time metrics, are 7.1 times more likely to have closed-loop quality processes across the lifecycle and have 5.6 times more mature operational risk capabilities than the rest of the market.

Quality has an important role to play in innovation. While quality is not wholly accountable for the success of NPI, it provides meaningful inputs for innovation, risk discipline, and a process approach.

### Data Sources to Drive Lessons Learned (from prior products to new products)



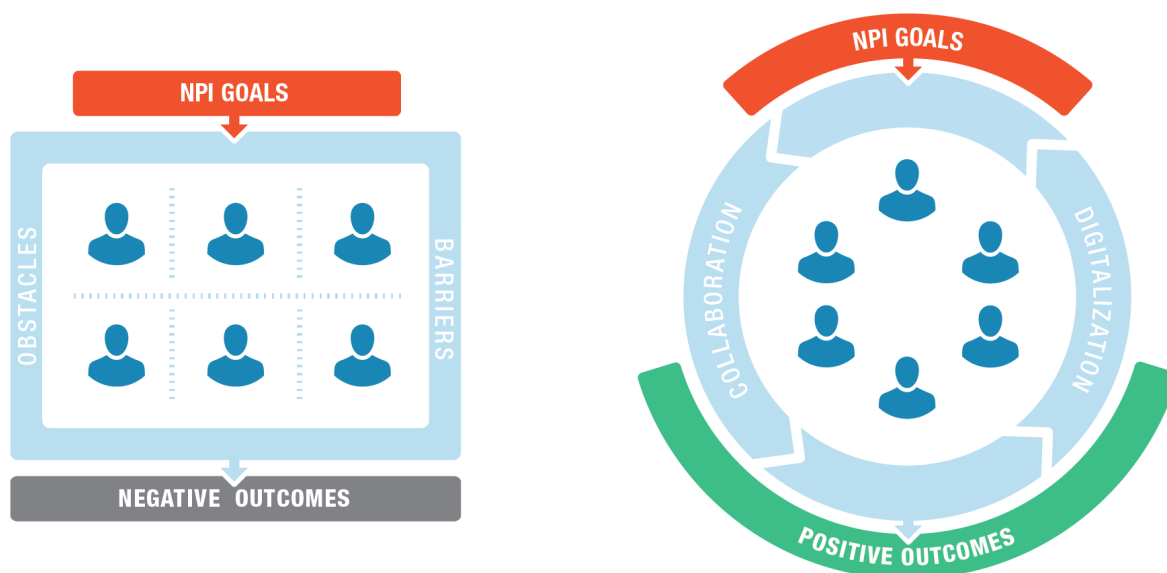
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## Taking The Right Steps: The Quality Leaders NPI Playbook

### STEP 1 | OVERCOME TRADITIONAL QUALITY CHALLENGES

Quality has long-standing challenges with quality culture, harmonization, and technology. These obstacles prevent the quality function from achieving objectives and deter other functions from engaging with quality. Among the roadblocks that prevent earlier engagement of quality in NPI are challenges with technology:

- Disparate systems and data sources
- Low veracity and low-value data
- Lack of integration of quality with change management

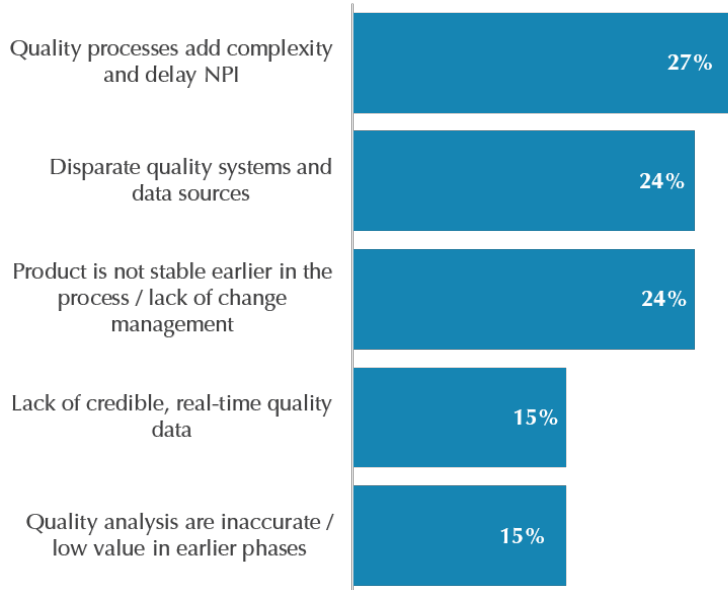


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One leading roadblock is that other disciplines perceive that quality processes add complexity to NPI efforts and NPI. This roadblock is process, culture, and technology-related. Quality leaders should understand the underlying reasons behind this concern within their organizations:

- Are processes too complex?
- Should quality personnel assist with process execution?
- Is the process too manual or disconnected from other NPI stakeholders?

### Roadblocks Preventing Quality From Early Engagement in NPI

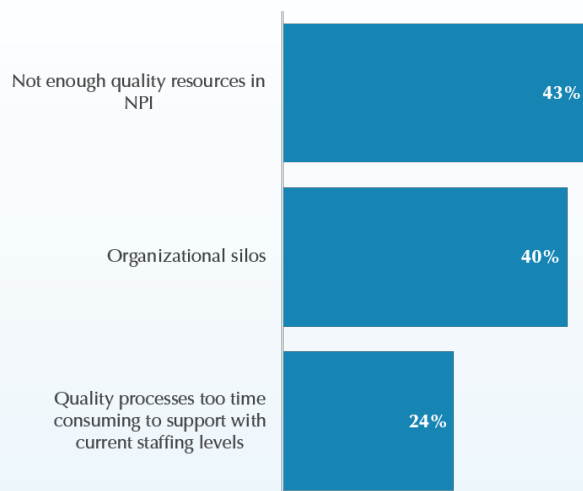


The challenges are legitimate, and the organization must identify solutions during strategic planning.

### STEP 2 | ALLOCATE SUFFICIENT QUALITY RESOURCES TO NPI

Interestingly, the most significant challenges blocking earlier engagement of quality in NPI stemmed from resource issues. The market clearly said that the quality department provided too few resources to support NPI, that ever-present organizational silos were a concern, and that quality processes were too time-consuming with current staffing levels.

### Roadblocks Preventing Quality From Early Engagement in NPI



**IT'S NO SURPRISE** that the market sees risk as the most critical business process to NPI success. An effective risk plan spans the product lifecycle, connects predicted risks to experienced operational risks, and is a valuable lever for continuous improvement.

—DAN JACOB

*Practice Director and Principal Analyst*

LNS recommends the following actions to eliminate these challenges:

- **QUALITY LEADERS SHOULD CONSIDER RE-BALANCING THE QUALITY ORGANIZATION** to increase NPI-focused resources, to play a key role and contribute more meaningfully to NPI. Today, only 5% of all quality resources are dedicated to NPI. That means the quality organization has a bias toward operations. By allocating additional resources, the quality function can support stakeholder engagement, design for quality or similar initiatives.
- **STREAMLINE QUALITY PROCESSES AND REDUCE COMPETENCY THRESHOLDS** for stakeholders outside the quality department. A hybrid model where quality mentors cross-functional stakeholders and executes more complex tasks is constructive during transitional periods.
- **INVEST IN TECHNOLOGIES THAT STREAMLINE PROCESSES** and reduce cross-functional resource investment in NPI.
- **BUILD A DATA STRATEGY** that connects information technology (IT) and operational technology (OT) to improve the veracity of quality inputs to NPI.

### STEP 3 | INVEST IN RISK DATA MANAGEMENT

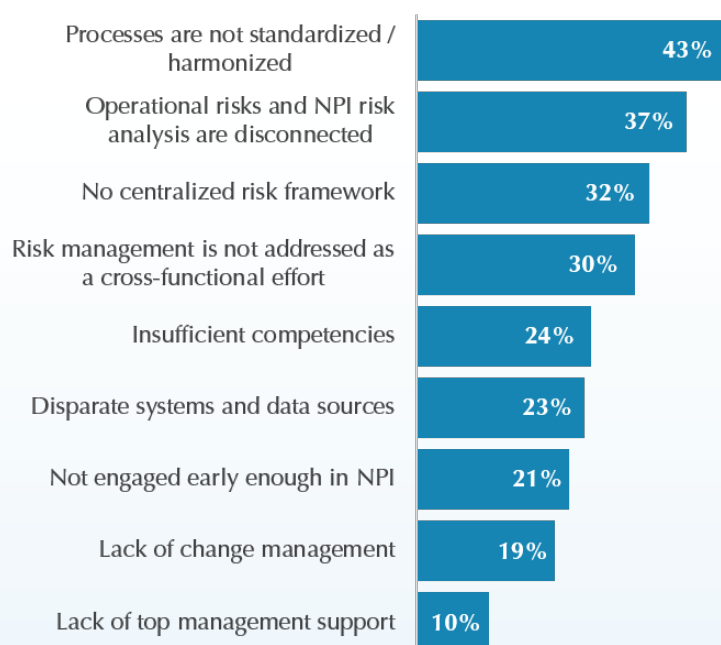
Risk analysis and risk management are high-value quality-led NPI processes. Using risk management, quality can convey lessons learned for NPI as early as concept assessment, improving requirement definition. Risk tools such as design failure mode and effects analysis (FMEA) and process FMEAs allow teams to determine hardware, software, and manufacturing risks, mitigations, verification plans, and quality control plans for critical parameters and key characteristics. The organization can assess these same risks during quality execution and compare risk-based decisions and assumptions made during earlier phases to actual results. In short, an effective risk plan spans the product lifecycle, connects predicted risks to experienced operational risks, and is a valuable lever for continuous improvement. It's no surprise that the market sees risk as the most critical business process to NPI success.

## Five Most Critical Business Processes to Modern NPI Success



Unfortunately, companies today perform much of risk management in a siloed fashion, making effective risk management arduous or nearly impossible. Quality leaders should evaluate their operations against the market's top challenges and assess areas for improvement.

## Top Challenges in Risk Management



## STEP 4 | BUILD ON STRENGTHS

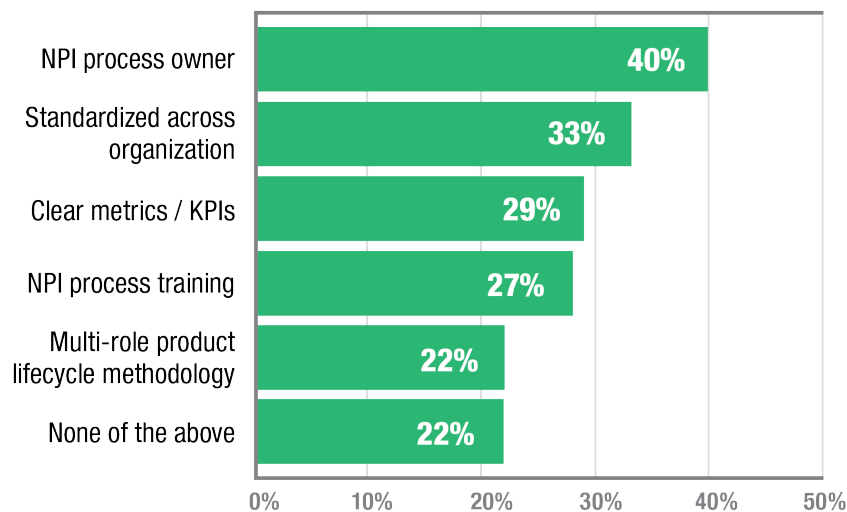
Quality teams have several beachheads in NPI from which to expand. Some key areas include:

### 1. Process Approach

Quality teams have a fundamental focus on process approach, which fuels continuous improvement.

Surprisingly however, 22% of all manufacturers have not adopted any process-based best practices enterprise-wide, yet this is an area that can benefit NPI. Since NPI success rates average only 56%, a consistent and monitored approach to NPI should be a priority.

### NPI Practices Adopted Enterprise-Wide



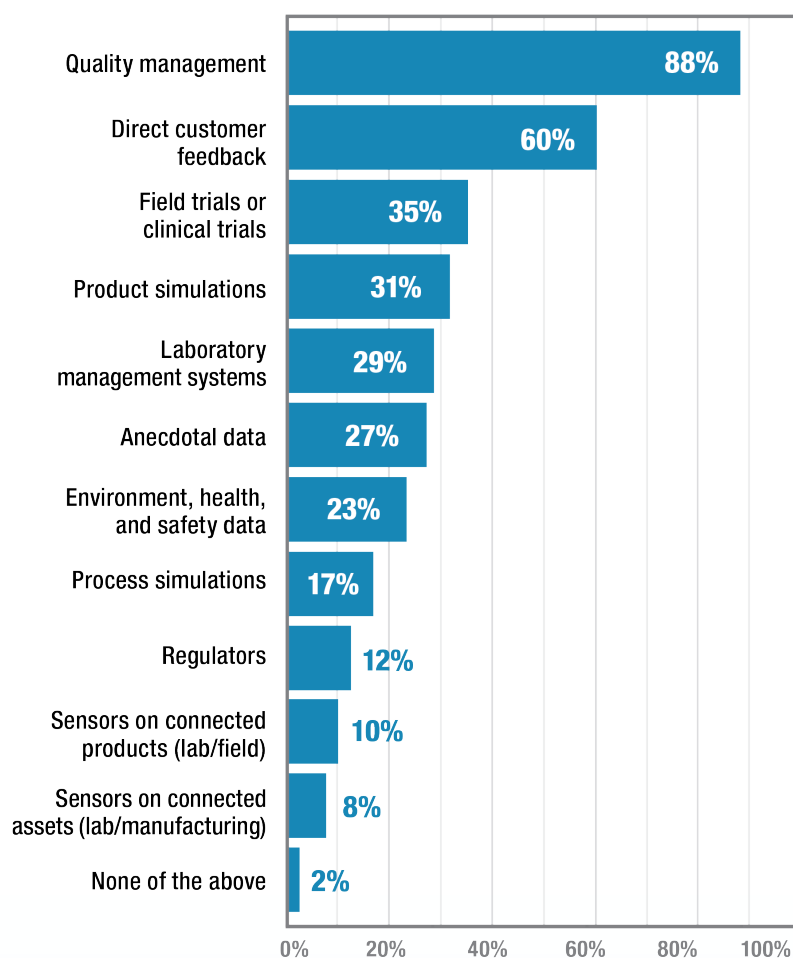
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### 2. Lessons Learned

Quality has the advantage of supporting the product lifecycle both internally and externally. Quality processes, therefore, contain a large quantity of highly valuable data such as supplier performance, product testing, ability to deliver critical parameters, customer complaints, and so forth. While organizations struggle to manage much of this data effectively, the data that does exist is the most widely used lessons learned inputs in NPI. Lessons learned are highly valuable as they drive continuous improvement across products and product generations. Quality

leaders can build on this by centralizing and expanding their quality data management.

### Data Sources to Drive Lessons Learned (from prior products to new products)



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### 3. Cross-Functional Accountability














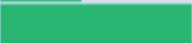
While some see “quality” (meaning quality products and services) as the responsibility of the quality department, it is truly a corporate-wide concern, but only leading companies make it the responsibility of everyone enterprise-wide. This somewhat cavalier attitude is true for NPI as well. Quality is an important input into product management, product development, requirements, sourcing / supplier management, procurement, and production planning. Quality is also an important input into risk and new

product test. In fact, depending upon the manufacturer some or all of these may report into the quality organization. Obviously, quality metrics, findings, and continuous improvement are outcomes of these process areas.

Upon product launch, quality has a close connection to operations and aftermarket service and support, which is recognized by all disciplines and groups; product development and operations leaders say that their top strategic objectives are to deliver quality. In fact, a sizable percentage of these teams view themselves as fully accountable for meeting quality expectations.

Executive and functional leaders looking to differentiate the enterprise through NPI should understand quality's impact on the success of new products and the existing vested interest by multiple stakeholders. Furthermore, they must adjust processes and data management plans to accommodate the interplay between quality and the many other NPI stakeholders.

#### Accountability by Function

	Engaged only for specific tasks	Informed and act when necessary	Responsible for specific tasks	Fully accountable
Information technology	 43%	 57%	0%	0%
Operations	 20%	 20%	 30%	 30%
Product development	 15%	 31%	 15%	 30%
Quality	 10%	 7%	 14%	 69%

### STEP 5 | DIGITALLY TRANSFORM QUALITY TO ENABLE THE DIGITAL INNOVATION CYCLE

Agility, adaptation, and innovation are prized competencies in today's business climate. Disruption is top of mind because it is both a genuine opportunity for the organization that creates or leverages it, and it's a potentially serious risk for the competitor. Today's manufacturers are exposed to unprecedented external forces, but also have the potential to access unprecedented insights through Digital Transformation.

What is Digital Transformation and how does it stimulate new insights? Digital Transformation has arisen from technological advances such as cheap, wireless sensors, new data management capabilities like data lakes, advanced analytics and autonomous operation, new collaboration tools such as social media and blockchain, and apps such as mobile, augmented reality (AR), and virtual reality (VR). It extends the digital impact

of the third industrial revolution and merges it with the physical and natural worlds. A company that conducts Digital Transformation connects people, machines, and data in new ways, democratizes technologies that were previously only accessible to the specialized few, and creates new value from technologies such as simulation, material science, and 3D printing.

For quality, these technologies are critical because they enable the transformation of culture, leadership, collaboration, and compliance, and have already been deployed by leaders to achieve new levels of quality insights and performance. LNS calls [the Digital Transformation of quality, Quality 4.0](#) and published the definitive research on it in 2017.

However, insights alone don't generate disruption. Organizations need to adapt, decide and act upon insights to create or achieve disruption. The [Digital Innovation Cycle blends strategically aligned functions, collaborative working models, and digitalized insights](#) into a cycle that drives innovation and disruption and enables manufacturers to excel in today's market. It is a framework for industrial companies to capture insights with less ambiguity, use these clearer insights to adapt, decide to commit resources to drive NPIs based on the new perspectives, competently act, drive positive outcomes, and achieve objectives. It doesn't replace existing processes such as phase-gate, agile, or plan-do-check-act. Instead, the framework captures how to embed innovation and digital insights into the existing process.

Quality leaders should understand that:

- Most organizations are in the process of digitally transforming, and quality is a top use case. Get involved and lead the transformation.
- Digital Transformation improves the NPI process and NPI success, as illustrated by the Digital Innovation Cycle. Digital Transformation provides new insights that reduce ambiguity, aid in the adaptation of this new data, can autonomously make certain decisions, and improve actions by connecting the digital to the physical.
- Just as with Quality 4.0, Digital Transformation is only partially about technology. Quality leaders must recognize that the Digital Innovation Cycle requires collective thinking, which means that the enterprise must eliminate NPI silos and adopt cross-discipline NPI approaches. Quality's inputs into NPI are some of the

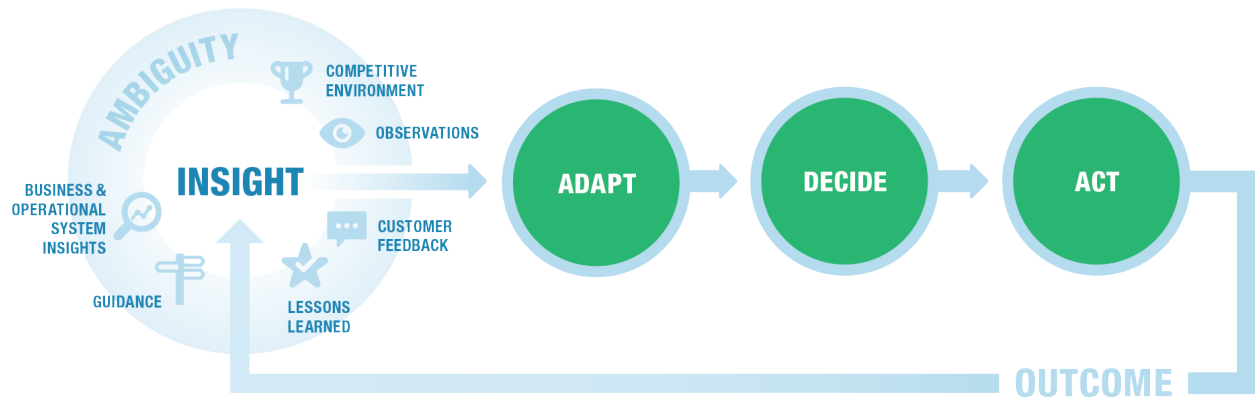


**QUALITY 4.0** by LNS Research describes how manufacturers use modern technologies such as advanced analytics and digital connectivity to transform traditional quality and improve operational excellence; enabling enterprise efficiencies, innovation, performance, or strategic objectives.



Click to learn more about the  
**Quality 4.0 Framework**

most broadly used, which is a starting point for stronger collaboration.



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## Put Your Playbook into Practice

### USE CASE 1 | M&A CREATES DISJOINTED DATA, FUNCTIONAL SILOS

Mergers and acquisitions (M&A) are very common in life sciences. One large life science manufacturer had grown through a series of acquisitions. In an ideal world the acquired companies would have harmonized quality processes, however this was not the case. The sequence of acquisitions significantly compounded process fragmentation. The enterprise stored quality data in dozens of systems and many more spreadsheets and electronic documents, which created difficulty in maintaining compliance. Additionally, the scattered and disjointed data made it impossible to drive quality decisions much less leverage it in new product introduction. The fragmented data also led to substantial cultural issues since product teams came to expect a lack of data and relied on contacting a local quality representative to extract data. Not surprisingly, the data extracts were low veracity. Quality insights were only marginally used in NPI, resulting in a reactive quality environment, quality escapes, and recalls.

The firm's executive leadership identified that quality, product development, production planning, and customer support data silos were creating significant issues. They took steps to centralize the data in a single system to create a single source of truth for quality, product development, production planning, and customer support. The

company also leveraged this technology event to harmonize quality processes, and to deploy a centralized risk management process to connect risk analysis with risk execution. The result was a streamlined NPI process that integrated risk management, was informed by quality lessons learned, and tightly aligned with operations. The transformation also improved the culture of quality through better access to quality data.

### USE CASE 2 | CONSUMER DURABLE GOODS MANUFACTURER

As explained previously, social media and online marketplaces create significantly more visibility of consumer goods quality, and manufacturers in that industry segment face exponentially more data. One consumer durable goods manufacturer turned this to its advantage by mining social media and online marketplaces to quantitatively compare itself to the market and identify opportunities for improvement. It feeds this data into the NPI process. The company also implemented a zero defects initiative that combines data from connected manufacturing assets, operations, quality, and warranty processes to accurately predict which goods passed inspections but might still fail in warranty.

Because of these initiatives, the company quantified its market-leading quality and performance, improved online marketplace revenue, and improved margins. The initiatives have also been a beacon for cultural improvement, since the efforts improved mutual trust and increased the perceived value of quality.

## Takeaways and Recommended Actions

While quality doesn't "own" NPI, it absolutely plays an essential role in its success. In fact, quality's active participation in NPI is increasingly critical given current market dynamics. Quality leaders eager to improve NPI success and deliver increased revenue and sustainable growth to the enterprise can take specific steps to live up to its vital role; they should:

- **OVERCOME TRADITIONAL QUALITY HURDLES** by investing in data management and process harmonization.
- **ALLOCATE SUFFICIENT QUALITY RESOURCES TO NPI** to eliminate roadblocks against earlier engagement in NPI.
- **INVEST IN RISK DATA MANAGEMENT** to address top challenges in this most critical NPI process.

- **BUILD ON QUALITY STRENGTHS IN NPI** by treating existing high-value contributions as beachheads for more integral engagement.
- **DIGITALLY TRANSFORM QUALITY** to enable the digital innovation cycle, to develop new insights that will foster innovation.

The market's visibility to early quality issues has never been higher and will continue to increase. Widespread visibility creates opportunities for the prepared and substantial risks for those slow to react. Astute quality leaders will embrace the changes and use them to fuel conversations with cross-functional colleagues and top management about quality's role in the company's sustainable top line and bottom line growth.

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