

Quality Concepts

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Course: Industrial Product Development

Internal Assessment 01

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Quality Concept

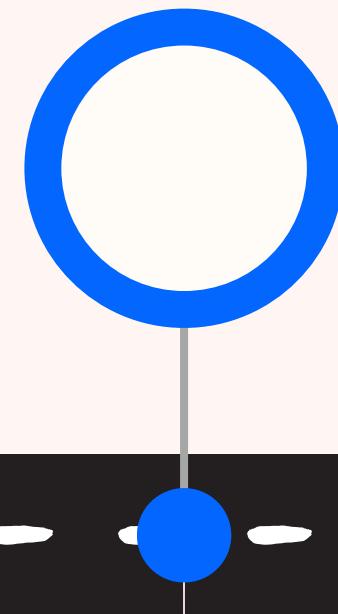
In industrial product design, quality means delivering products that **consistently meet specifications** and **customer needs**. True manufacturing quality is about producing the right product "**on time, every time**" – a product built to spec without defects. Achieving this requires **building quality into every stage** of design and production through methods like APQP, Lean, Six Sigma so defects are prevented rather than fixed later.



Samsung Galaxy
Note7 → example of
quality failure +
corrective measures

Case Study 1

Samsung Galaxy Note7 Battery Recall (2016)

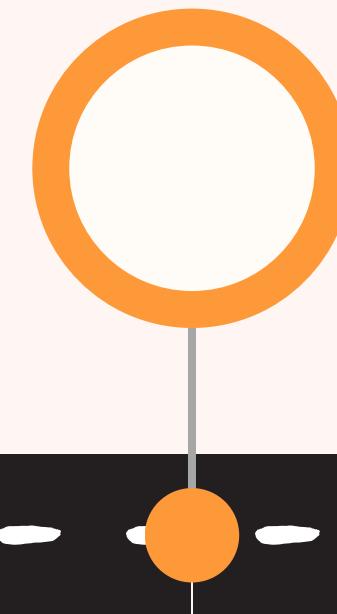


CONTEXT

Galaxy Note7 launched in August 2016 as Samsung's flagship smartphone.

Soon after release, users reported overheating, smoke, and even explosions.

Investigations showed lithium-ion batteries were improperly fitted, leading to short circuits and created serious safety hazards.

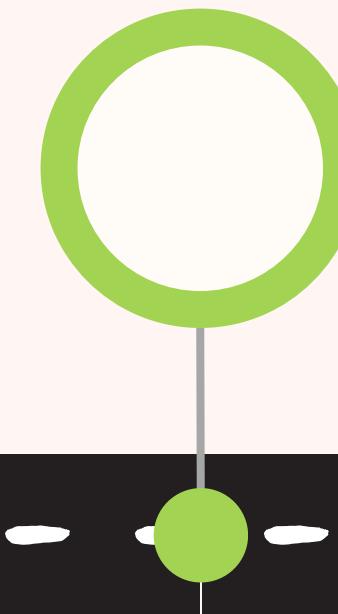


PROBLEM

Design and QA failure: Testing stages did not catch the battery defects before launch.

Pressure to compete with Apple drove Samsung to rush development, compromising safety validation.

Defects affected millions of units, damaging Samsung's global brand image.



OBJECTIVE

Protect consumers from safety risks and prevent further damage to brand reputation.

Identify root cause of the failures and develop stronger preventive systems.

Recall and replace all Galaxy Note7 devices (~2.5 million units worldwide).



Case Study 1

Samsung Galaxy Note7 Battery Recall (2016)

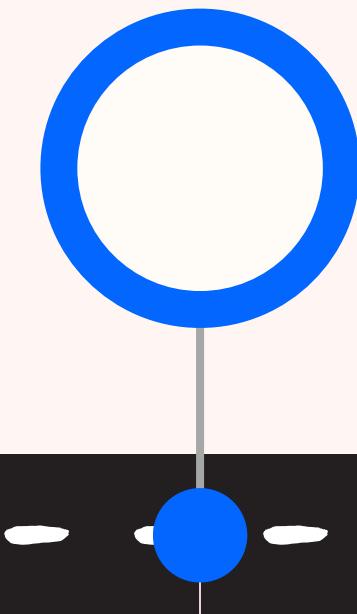
Samsung recalls Galaxy Note 7 after battery explosions and fires
The recall happens just days before rival Apple is set to release the iPhone 7
by The Washington Post / Dec 5, 2016



Samsung reveals cause of Galaxy Note7 defects, unveils new quality control checklist
The defects were caused by quality problems overlooked by the company's primary and backup suppliers, which led the company to recall the product twice before halting production.
Supply Chain Dive | Jan 23, 2017



How Samsung moved beyond its exploding phones
just 18 months later, the company — and consumers — have shrugged it all off.
The Washington Post / Feb 24, 2018



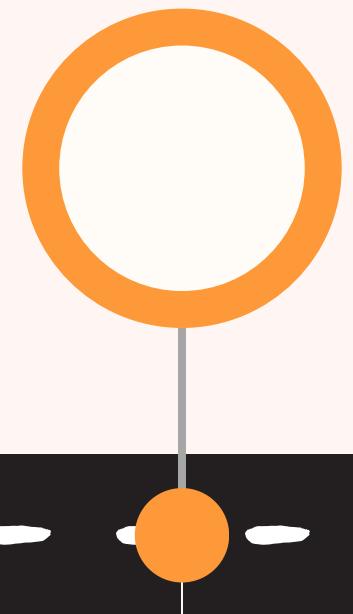
SOLUTION

Halted Note7 production entirely and issued two worldwide recalls.

Conducted joint investigation with internal teams & third-party experts, and introduced 8-Point Battery Safety Check.

Strengthened supplier oversight to ensure batteries met global standards.

Implemented stricter design-stage quality validation.



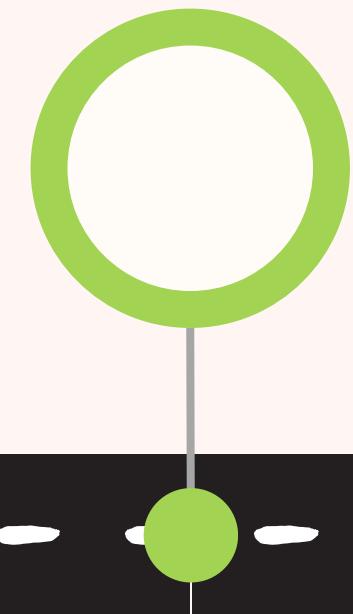
RESULTS

About 2.5 million units recalled and collected worldwide.

Estimated financial loss: \$10 billion in sales, recall costs, and lost market opportunities.

Short-term: severe reputational damage; Note7 discontinued permanently.

Long-term: Rebuilt trust by adopting industry-leading safety protocols & emphasizing transparency.



QUALITY CONCEPT LINK

The Note7 failure highlights a gap in Quality Assurance and Design Validation.

Reliance on post-production fixes is insufficient for safety-critical components like batteries.

Corrective measures demonstrate QA must be integrated at every stage of product design and supplier management, not just at the final inspection stage.

**Motorola Six Sigma →
innovative approach to
systematic quality
improvement**

Case Study 2

Motorola's Six Sigma Quality Initiative (1980s–1990s)

PROBLEM

In the late 1970s–early 1980s, Motorola faced intense competition from Japanese electronics firms producing higher-quality, more reliable products.

Customers complained about defects, inconsistent performance, and reliability issues.

Existing quality practices were insufficient to meet market demands and maintain leadership.

OBJECTIVE

Dramatically reduce defects across all products.

Improve quality tenfold, then achieve near-zero defects (Six Sigma level) within a few years.

Establish a systematic, data-driven quality culture across the organization.

SOLUTION

Motorola pioneered the **Six Sigma methodology**, applying statistical and process improvement tools across all production lines.

Implemented the **DMAIC framework**: Define, Measure, Analyze, Improve, Control.

Used cross-functional teams and statistical tools to identify root causes of defects.

Applied the “**5 Whys**” analysis for every defect to ensure permanent solutions.

Embedded continuous improvement into corporate culture: all employees encouraged to suggest small daily improvements.



Case Study 2

Motorola's Six Sigma Quality Initiative (1980s–1990s)

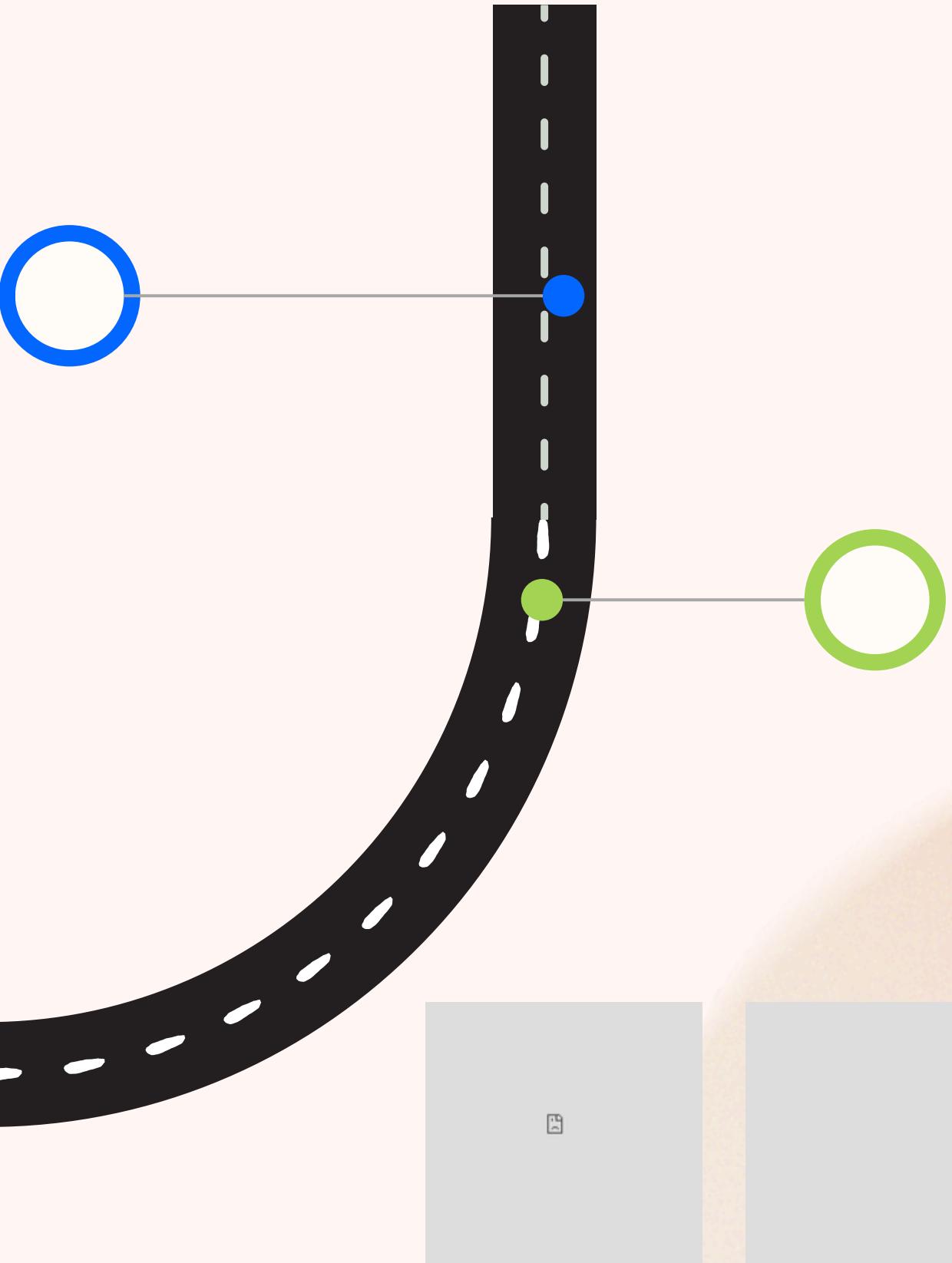
RESULTS

By 1992, Motorola achieved 3.4 defects per million opportunities (DPMO) — the classic Six Sigma target.

Processes became world-class and virtually defect-free.

Documented over \$16 billion in savings from reduced scrap, rework, warranty claims, and faster time-to-market.

Motorola's Six Sigma success inspired thousands of companies worldwide to adopt similar quality initiatives.



QUALITY CONCEPT LINK

Demonstrates statistical quality control and process optimization to achieve near-perfect quality.

Shows that data-driven, proactive defect prevention is more effective than reactive fixes.

Highlights the importance of leadership commitment, employee involvement, and continuous improvement in embedding quality into the organization.



Motorola's Six Sigma Journey: In pursuit of perfection
Before you read this, check out the upper-right hand corner of this page to view this article in our digital reader. Trust us, it's way cooler! Win...
SupplyChainD - May 17, 2009

Toyota →
legendary example
of quality success

Case Study 3

Toyota Production System (TPS) – Total Quality Management Excellence

PROBLEM

Post-WWII, Toyota faced resource constraints (limited capital and materials) and needed to compete globally with U.S. automakers.

Existing Japanese manufacturing methods were inefficient and prone to defects.

Objective: Build high-quality vehicles efficiently, with minimal waste, to survive and grow in a competitive market.

OBJECTIVES

Achieve zero defects in manufacturing.

Implement continuous improvement (Kaizen) to refine processes.

Reduce waste and inefficiency in production.

Empower employees to identify and solve quality issues proactively.



SOLUTION: TOYOTA PRODUCTION SYSTEM (TPS)

Just-In-Time (JIT): Produce only what's needed, when needed

Jidoka: Automation with human touch - stop production when defects occur

Kaizen: Continuous improvement culture

Poka-Yoke: Error-proofing mechanisms

5S Methodology: Workplace organization and standardization

Case Study 3

Toyota Production System (TPS) – Total Quality Management Excellence

RESULTS & STATISTICS

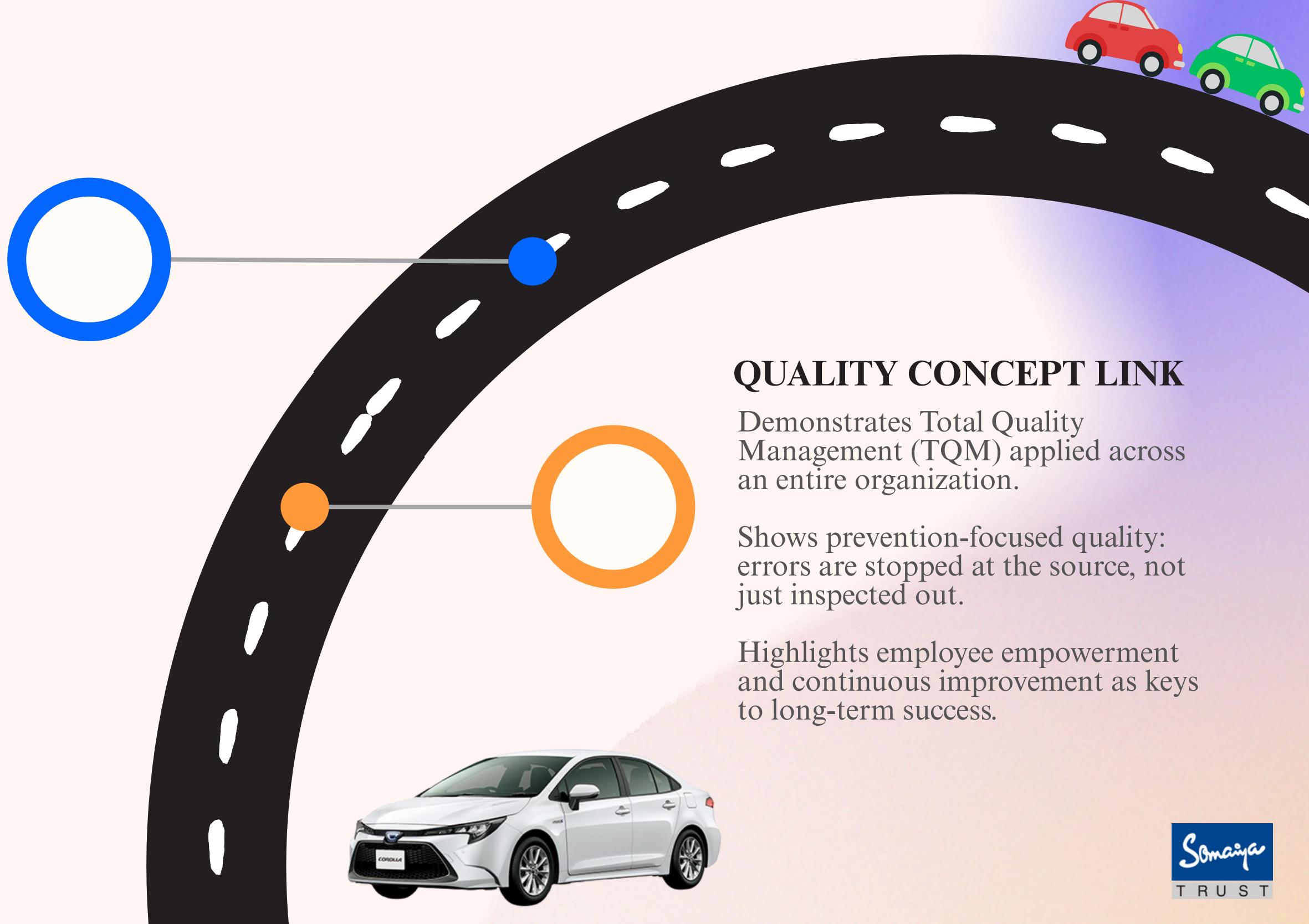
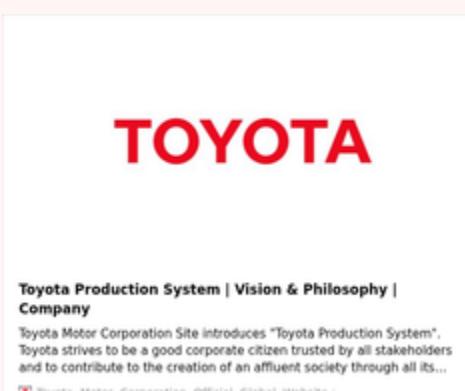
Became world's largest automaker, competing successfully with global manufacturers.

Achieved industry-leading low defect rates and high reliability.

Consistently ranked in top 3 for initial quality.

TPS principles adopted globally in manufacturing and service industries.

Sustained profitability and long-term growth due to operational excellence and quality culture.



QUALITY CONCEPT LINK

Demonstrates Total Quality Management (TQM) applied across an entire organization.

Shows prevention-focused quality: errors are stopped at the source, not just inspected out.

Highlights employee empowerment and continuous improvement as keys to long-term success.

Comparative Insights

Case	Quality Concept	Approach & Outcome	Lessons Learned
Samsung Galaxy Note7 (2016)	QA/QC failure in design validation & supplier oversight	Problem: Battery defects → overheating & fires. Solution: 2 recalls, 2.5M phones pulled, new <i>8-Point Battery Safety Check</i> . Outcome: \$10B loss + reputational hit.	QA must be built into design & supplier processes , not just tested later. Prevention is cheaper than recall.
Toyota Production System (1950s–present)	TQM, Kaizen, JIT, Jidoka, Poka-Yoke	Problem: Post-WWII resource constraints, global competition. Solution: Developed TPS → JIT production, error-proofing, employee empowerment. Outcome: Industry-leading low defects, world's largest automaker, sustained profitability.	Quality as a culture/system prevents defects and waste. Employee involvement = long-term excellence.
Motorola Six Sigma (1980s–1990s)	Six Sigma (DMAIC, defect reduction)	Problem: Losing market share to high-quality Japanese rivals. Solution: Six Sigma rollout, defect tracking, statistical control. Outcome: Defects cut to 3.4 DPMO, \$16B savings, Six Sigma adopted worldwide.	Data-driven quality management delivers measurable results, boosts competitiveness, and spreads globally.

Thank You!