



QUALITY MANAGEMENT 444

PART 2: QUALITY MANAGEMENT

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QM 444 Weeks 5 & 6



5 Module Content and Schedule



QM 444 Weeks 5 - 12



General arrangements:

- Textbook
- Lectures & tuts



QUALITY MANAGEMENT 444

WEEK 5
LECTURE 9

Introduction & Chapter 1 – Universal principles of Quality Management

Prof Imke de Kock
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Why should we care about quality management?



?



Why should we care about quality management?



Customer Expectations

People expect reliability, safety, and sustainability. Poor quality = instant social media backlash.



Reputation & Trust

One failure can damage a brand globally (e.g., McDonald's ice cream machines).



Cost of Poor Quality

Fixing defects later is expensive. Quality reduces waste and rework.



Global Supply Chains

One weak link can disrupt entire industries. Quality ensures smooth collaboration.



Innovation & Technology

AI, software, and digital systems need reliability too (e.g., Tesla recalls).



Sustainability & Responsibility

Quality now includes social and environmental responsibility.



Why should we care about quality management?



You Expect Quality Every Day

When food, apps, or phones fail, you get frustrated. Quality = things that work as promised.



Bad Quality Spreads Fast

One bad review or TikTok can damage a company's reputation instantly.



Mistakes Cost Money

Recalls, repairs, or failures cost companies billions. Fixing later is expensive.



The World is Connected

Global supply chains mean one weak link affects everyone.



The Future Depends on It

Safety, sustainability, and innovation all require strong quality systems.



Your Role as Engineers

You'll design systems. Quality tools ensure they deliver value in the real world.



Why should we care about quality management?



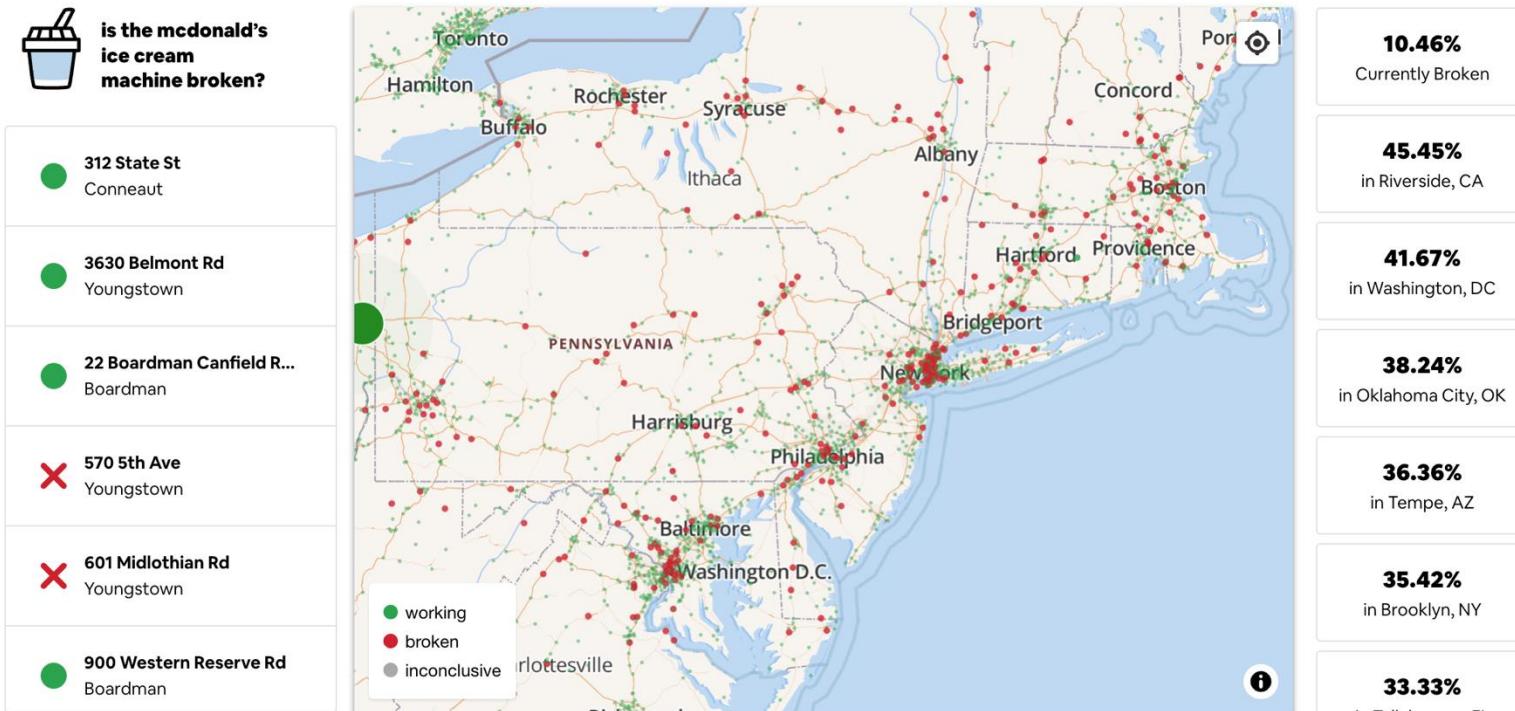


Why should we care about quality management?



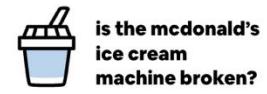


Why should we care about quality management?

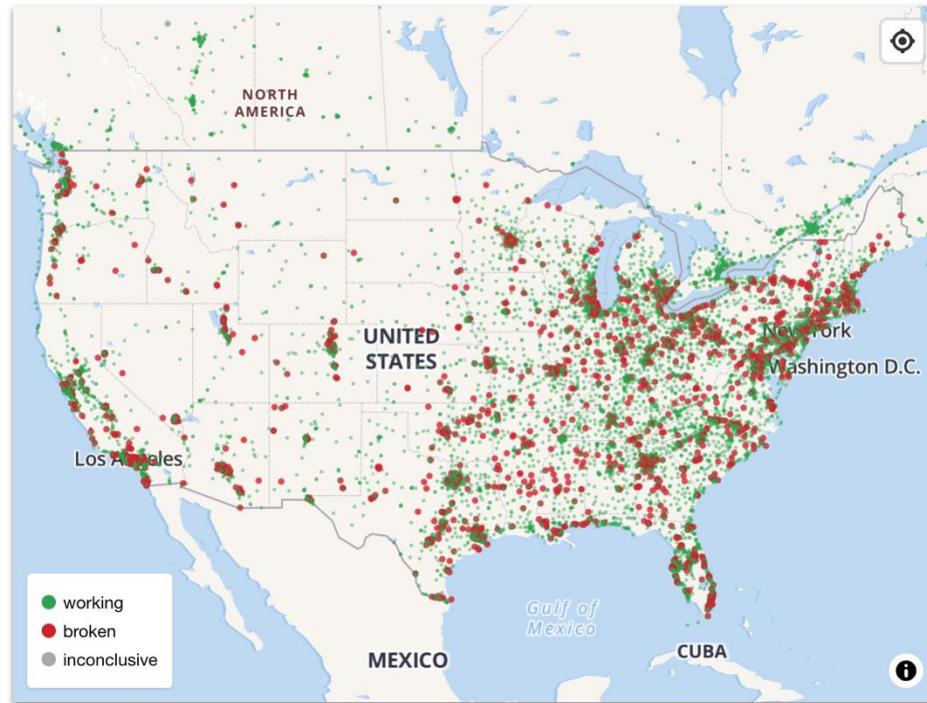




Why should we care about quality management?



● 410 S Greeley Hwy Cheyenne
● 1201 Gaarder Rd Holmen
● 11002 22nd Ave E Tacoma
● 140 4th Ave N, Suite 130 Seattle
● 400 Vista Grande Way Grandview
● 29360 Sr 410 E Buckley



10.46% Currently Broken
45.45% in Riverside, CA
41.67% in Washington, DC
38.24% in Oklahoma City, OK
36.36% in Tempe, AZ
35.42% in Brooklyn, NY
33.33% in ...



Why should we care about quality management?



← Post

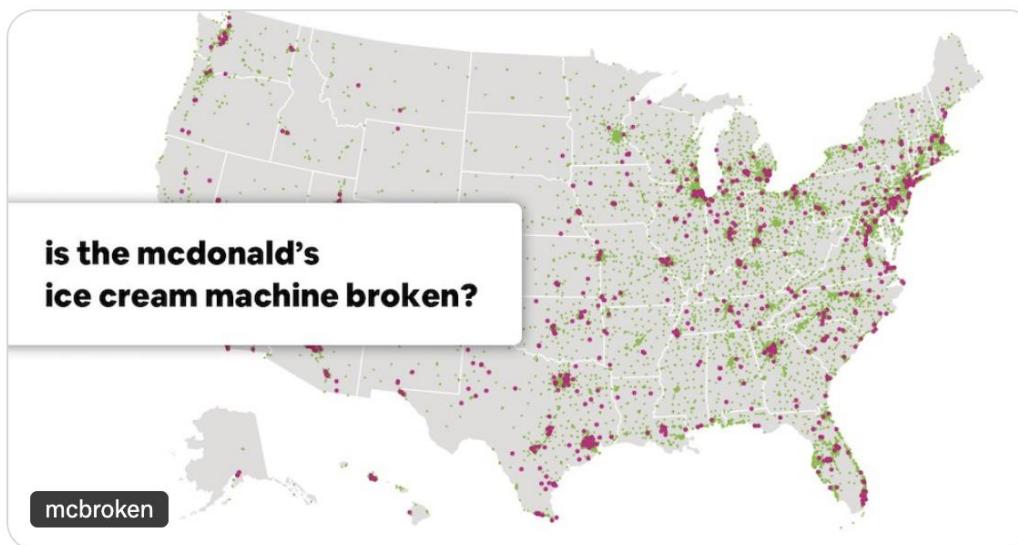


rashiq

@rashiq

...

I reverse engineered mcdonald's internal api and I'm currently placing an order worth \$18,752 every minute at every mcdonald's in the US to figure out which locations have a broken ice cream machine



From mcbroken.com

8:33 pm · 22 Oct 2020



Why should we care about quality management?



Tesla Autopilot Recall (2023)

McDonald's Ice Cream Machines

	What happened?	Quality Issue?	So what?
	2M cars recalled due to Autopilot not preventing misuse (drivers sleeping, distracted). Fixed with a software update.	System design & safety — didn't account for real human behavior.	Quality today is about more than parts; it's about safe, reliable systems that work in the real world.
	Machines often "broken," became a global meme, even tracked by McBroken.com.	Process reliability — machines too complex to clean/maintain, hurting consistency.	Quality isn't always dramatic. Even small, recurring issues can damage brand trust.



Stats don't lie.



52%



Fortune 500



What is a Fortune 500 company?

The Fortune 500 is an annual list of 500 of the largest US

com
fiscal
mag
prest
qualit

Fortune 500 list

From sources across the web

 Walmart
CEO: Doug McMillon (01 Fe...

 CVS Health
CEO: Karen S. Lynch (01 Fe...

 Chevron
CEO: Mike Wirth (01 Feb 20...

 Microsoft
CEO: Satya Nadella (04 Feb...

 Marathon Petroleum
CEO: Michael J. Hennigan (...

 Ford Motor
CEO: Jim Farley (01 Oct 202...

 Amazon
CEO: Andy Jassy (05 Jul 20...

 Berkshire Hathaway
CEO: Warren Buffett (1970–)

 AmerisourceBergen
CEO: Steven H. Collis (01 J...

 McKesson
CEO: Brian S. Tyler (01 Apr ...

 Phillips 66
CEO: Mark Lashier (01 Jul 2...

 Home Depot
CEO: Edward Decker (01 M...

 Apple
CEO: Tim Cook (24 Aug 201...

 Alphabet
CEO: Sundar Pichai (03 Dec...)

 Costco Wholesale
CEO: Ron Vachris (01 Jan 2...

 Cigna
CEO: David Cordani (2009–)

 Valero Energy
CEO: R. Lane Riggs (30 Jun...



Stats don't lie.



86%



Stats don't lie.



12%



Stats don't lie.



1958 – 61 years

2013 – 18 years

“

CHANGE BEFORE
YOU HAVE TO.

Jack Welch (CEO General Electric)



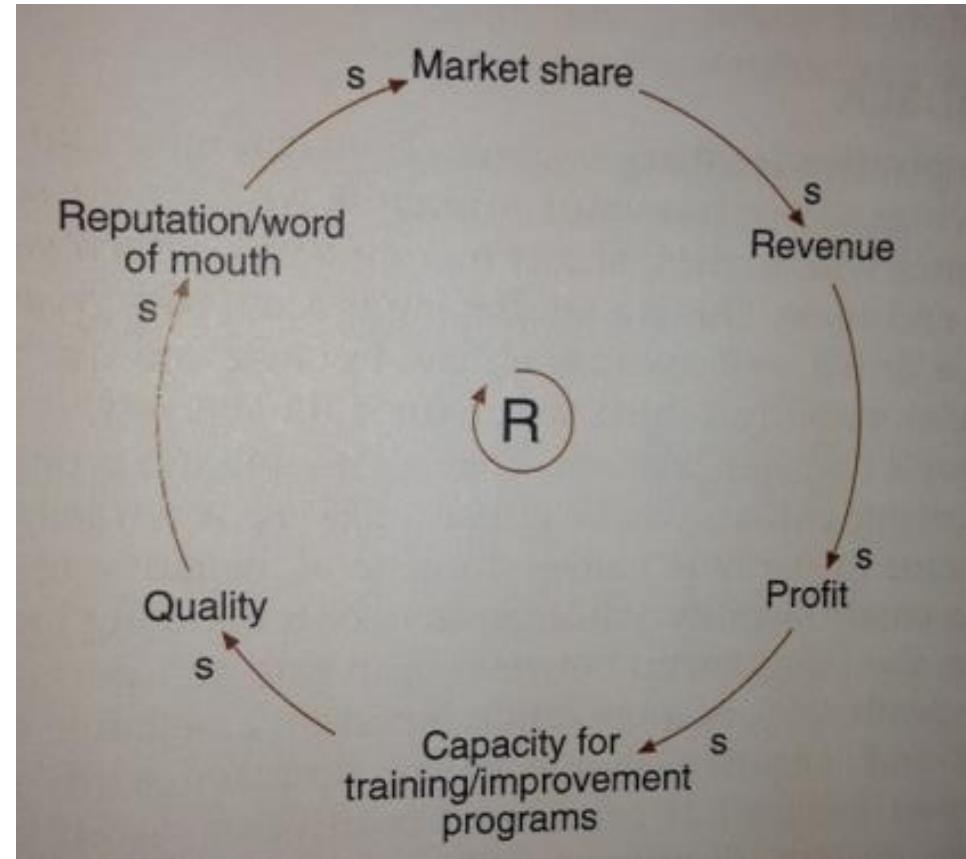
Importance of quality



S = Δ in same direction

O = Δ in opposite direction

R = Reinforcing loop





What is quality management?



?



What is quality management?



Quality management is the act of overseeing all activities and tasks needed to maintain a **desired level of excellence**.

This includes the determination of a **quality policy**, creating and implementing **quality planning and assurance**, and **quality control and quality improvement**.

In general, **quality management focuses on long-term goals** through the **implementation of short-term initiatives**.



Why Quality Management?



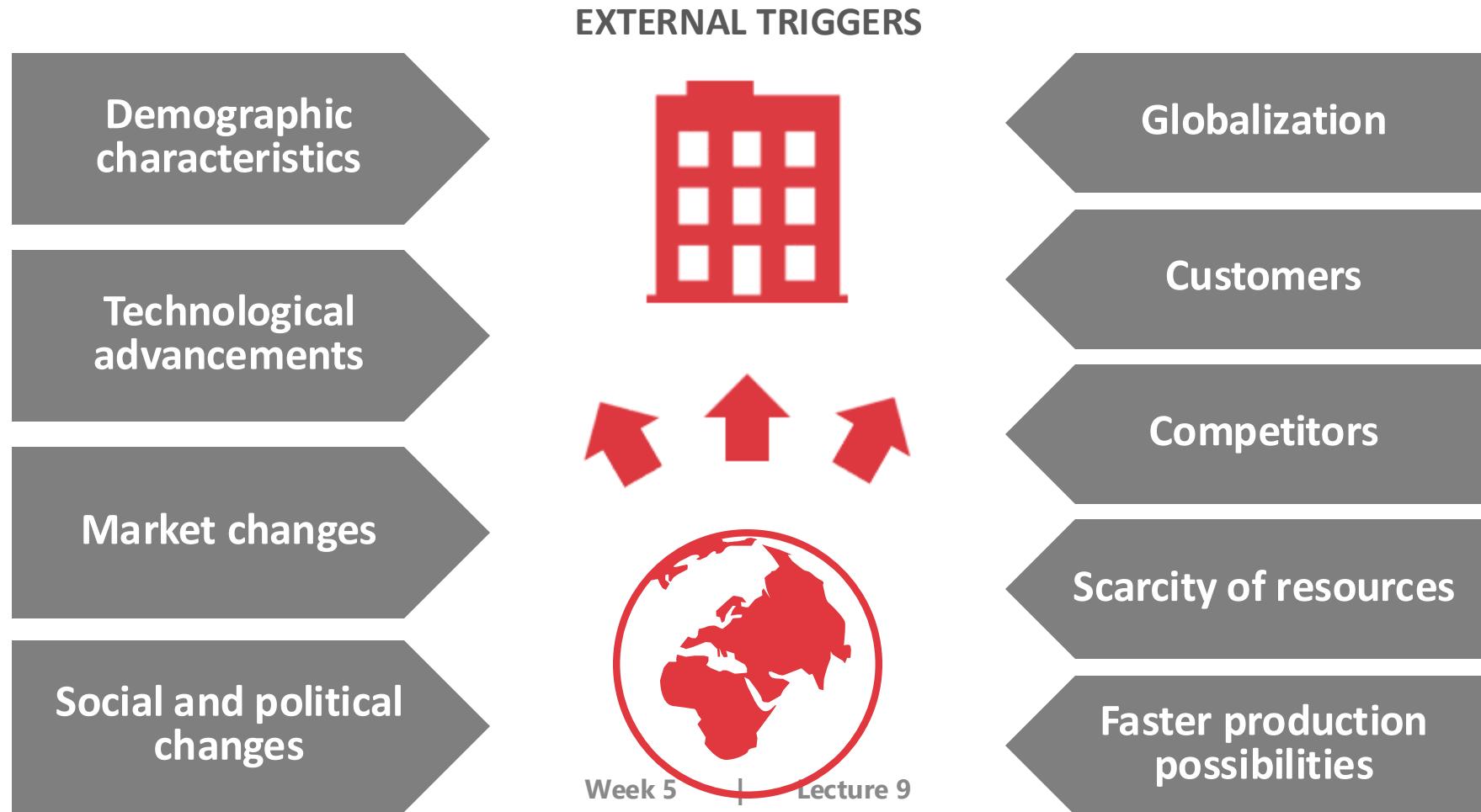
- ◎ **The only constant is 'change'**
 - ◎ Push and pull drivers



Why Quality Management?



- ◎ The only constant is 'change'
 - ◎ Push and pull drivers

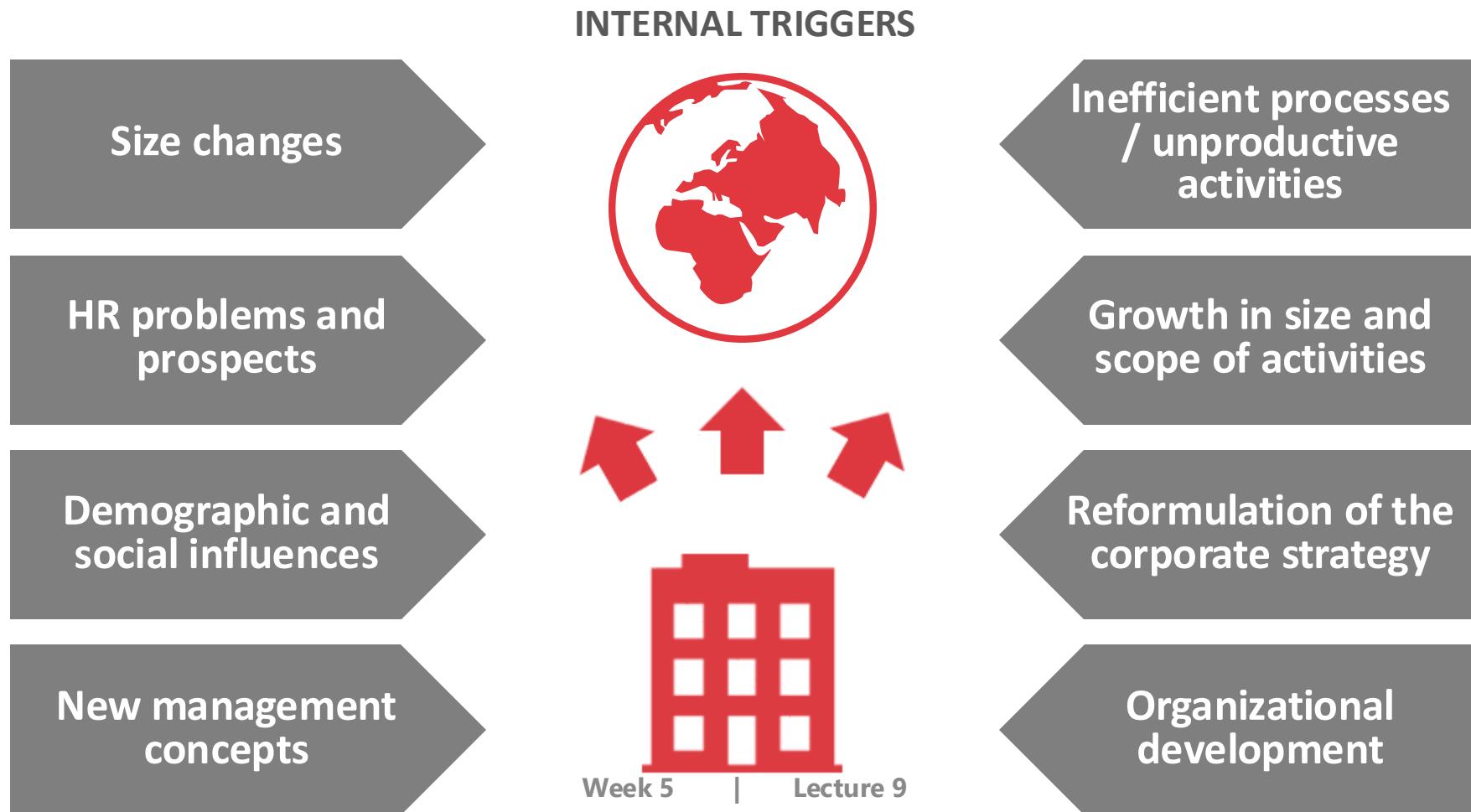




Why Quality Management?



- ◎ The only constant is 'change'
 - ◎ Push and pull drivers





Why Quality Management?



- ◎ The only constant is 'change'
 - ◎ Push and pull drivers
 - ◎ Major forces that affected had / have a profound impact on quality
 - ◎ Rate and pace of change



Stats don't lie.



1958 – 61 years

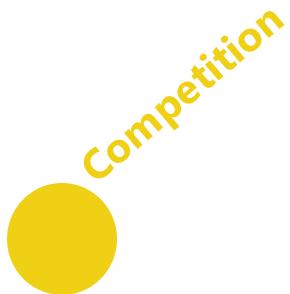
2013 – 18 years



Why Quality Management?



- **The only constant is 'change'**
- **Then and now? Changing business conditions**





Google



Google products

YouTube	Android	Chrome
Google AdSense	Google Analytics	Google Maps
Gmail	Google Assistant	AdMob
Google Calendar	Google Custom Search	Google Drive
Google Photos	Android Pay	Blogger
Google Chat	Google Chromecast	Google Sites Product Logo
Search	Ads	Android TV
Book search	Google Offers	Google Play

...what will Google do next?



Why Quality Management?



- **The only constant is 'change'**
- **Then and now? Changing business conditions**





Changing workforce



Statistically, generation-y accounts for 1.7 billion people, representing **25.5 percent** of the world's population. Millennials, who are already emerging as leaders in technology and other industries, will make up **75 percent** of the global workforce by 2025.

Understanding Y: Global Millennials – UYD Media

www.uymedia.com/who-are-global-millennials/

About this result

Feedback

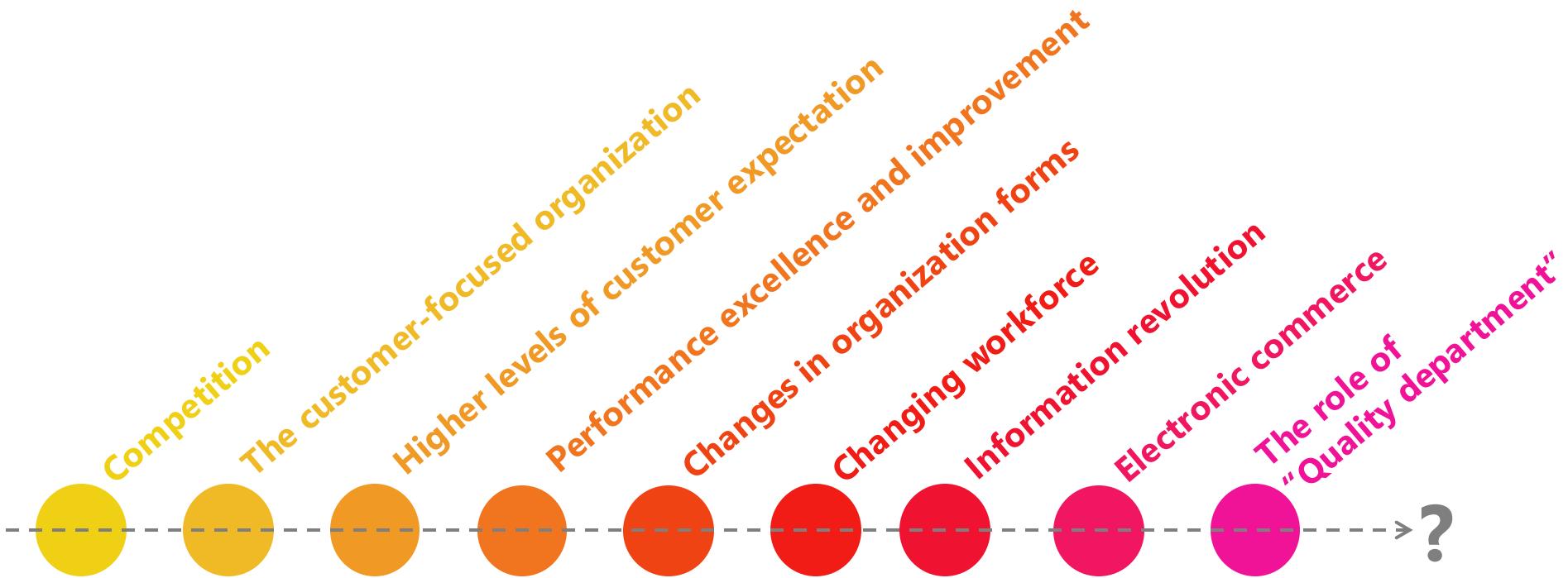
Their emphasis on work-life balance and continuous learning is prompting employers to offer more flexible work environments and professional development opportunities. Zurich Insurance reports that Gen Z currently makes up 30% of the world's population and is expected to account for **27% of the workforce by 2025.** 24 Jul 2024



Why Quality Management?



- The only constant is 'change'
- Then and now? Changing business conditions





"But, we don't need to change..."



<https://youtu.be/l1vnsqbnAkk?si=PCCX6eWC5lGefcp0>

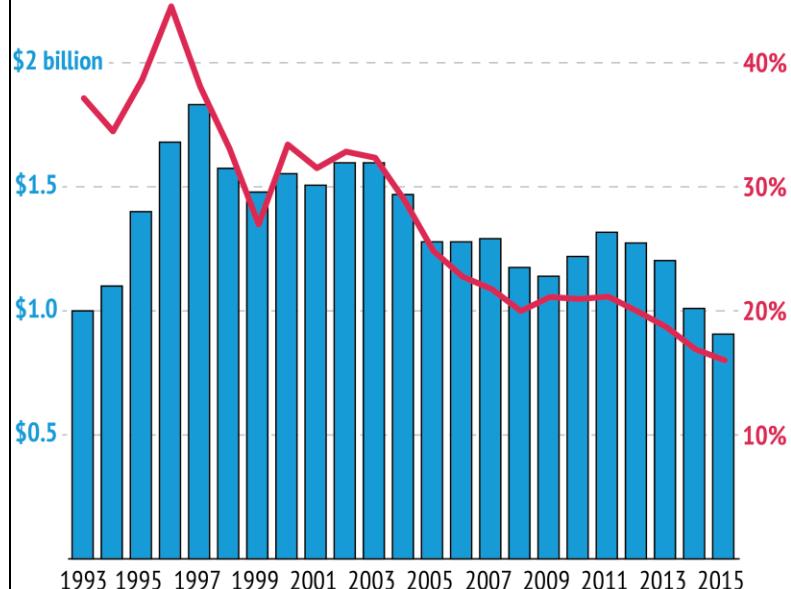


“But, we don’t need to change...”



Barbie shows her age

Barbie brand sales in current dollars are at their lowest in at least 23 years. The doll brand also represents a much lower percentage of overall sales for Mattel.



Sources: Barbie brand sales were pulled from company 10-K filings, when brand sales numbers were not reported they were calculated from sales change percentages; Total revenue from FactSet, CNBC calculations.



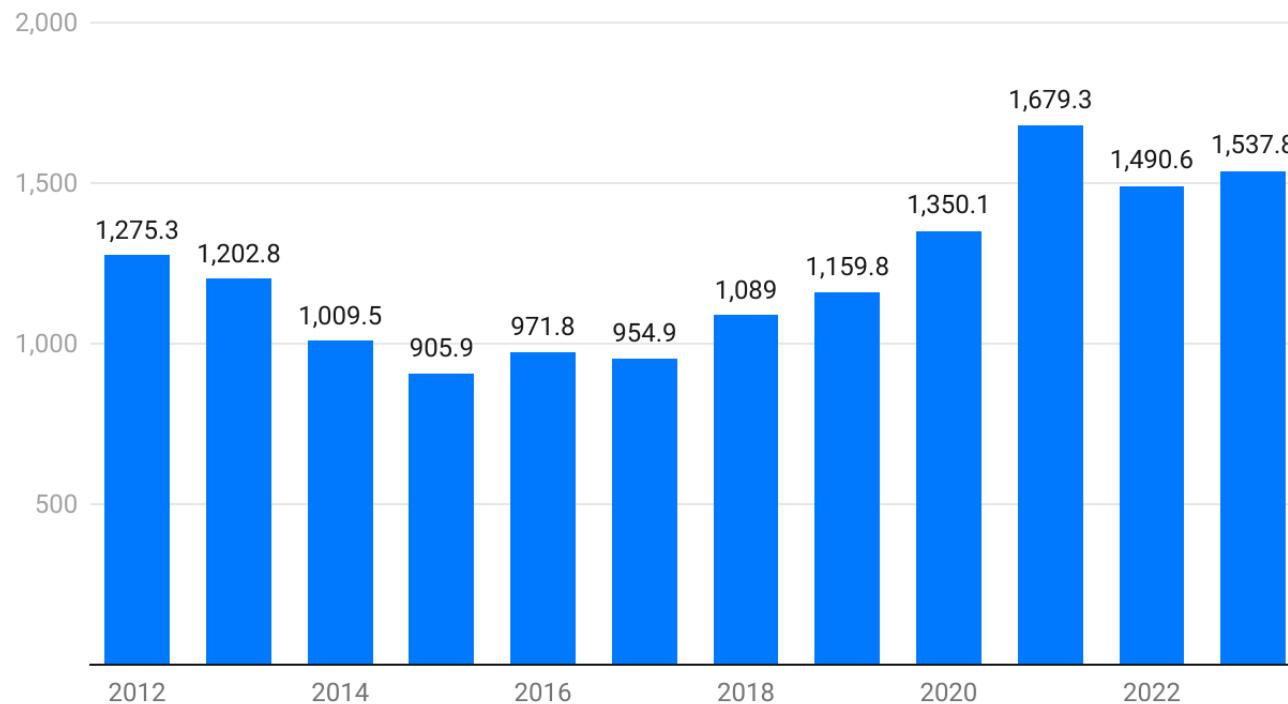


...need to change...



Gross Sales of Mattel's Barbie Brand Worldwide from 2012 to 2023

(in million U.S. dollars)



Source: Coolest Gadgets

COOLEST-GADGETS



...need to change...



WOMEN

Barbie's Surprising Comeback Has Everything To Do With Race

How diversity saved Mattel's iconic doll.

⌚ 02/03/2017 11:02 SAST | Updated 03/03/2017 23:00 SAST





...some weren't that lucky



Blockbuster



Borders Group



Compaq



Enron



Kodak



General Motors



Polaroid



Sears Holdings Corp



Radio Shack



Why Quality Management?



- The only constant is 'change'
- Then and now? Changing business conditions
- Expect the unexpected
 - 'Sustainability' from a business perspective



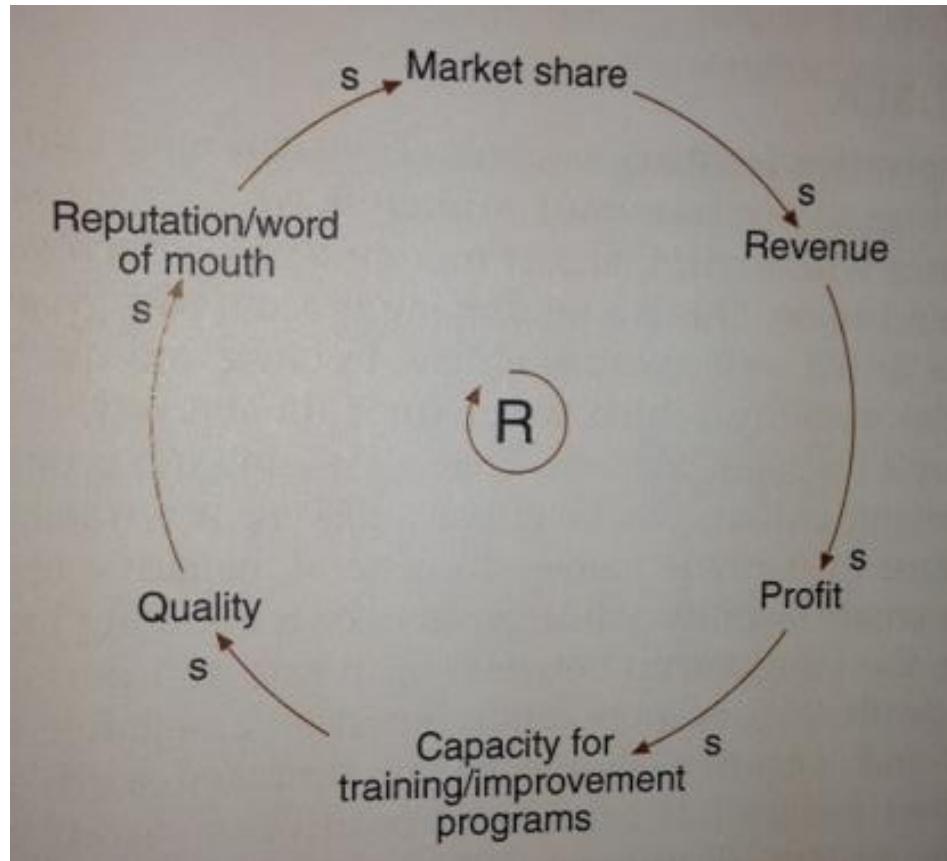
...A NEED TO CHANGE

Global Sustainability Megaforces

Climate Change
Energy & Fuel
Material Resource Scarcity
Water Scarcity
Population Growth
Wealth
Urbanization
Food Security



Importance of quality





Dimensions of quality



Table 1.1 The Meaning of Quality

Features Which Meet Customer Needs	Freedom from Failures
<i>Higher quality enables organizations to</i>	<i>Higher quality enables organizations to</i>
Increase customer satisfaction	Reduce error rates
Meet societal needs	Reduce rework, waste
Make products and services salable	Reduce failures, warranty charges
Exceed competition	Reduce customer dissatisfaction
Increase market share	Reduce inspection, test, and audits
Provide salesrevenue	Shorten time to develop new products
Secure premium prices	Increase yields, capacity
	Improve delivery performance
<i>The major effect is on revenue</i>	<i>The major effect is on costs</i>
Usually higher quality costs more.	Usually higher quality costs less.

Source: Juran Institute, Inc., 2009.



Does quality always come at a higher price?



?



Does quality always come at a higher price?



U B E R





Does quality always come at a higher price?



CAPITEC
BANK



Quality, cost & time – pick 2





Dimensions of quality



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Source: Juran Institute, Inc., 2009.



Effect on revenue, income and cost



- Features effect on Revenue
- Failures effect on Income
- Failures effect on Cost



Universal principles for managing for quality: Juran's trilogy



Table 1.2 Managing for Quality

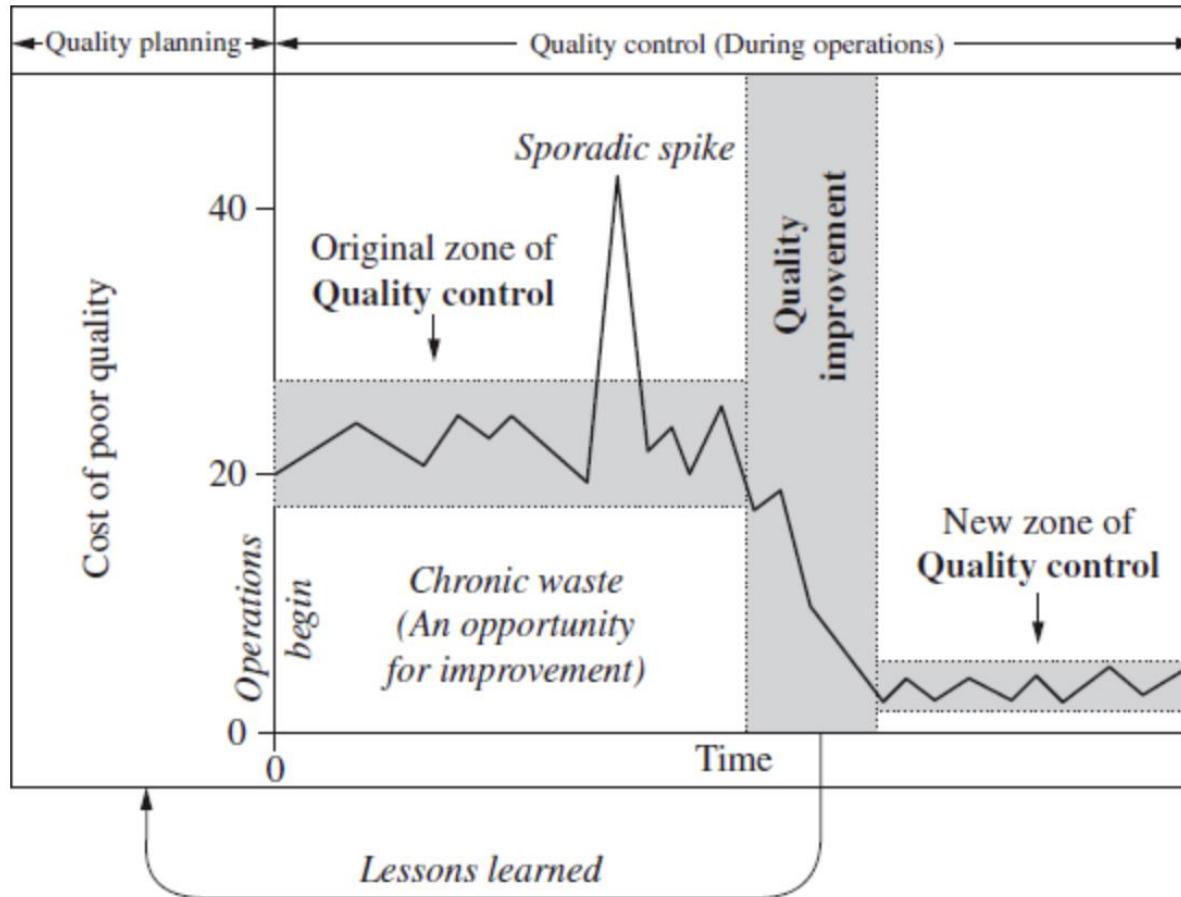
Quality Planning	Quality Control	Quality Improvement
Establish goals	Determine the control subjects	Prove the need with a business case
Identify who are the customers	Measure actual performance	Establish a project infrastructure
Determine the needs of the customers	Compare actual performance to the targets and goals	Identify the improvement projects
Develop features which respond to customers' needs		Establish project teams
Develop processes able to produce the products	Take action on the difference	Provide the teams with resources, training, and motivation to: Diagnose the causes Stimulate remedies
Establish process controls transfer the plans to the operating forces	Continue to measure and maintain performance	Establish controls to hold the gains



Universal principles for managing for quality: Juran's trilogy



Figure 1.1 Juran Trilogy.



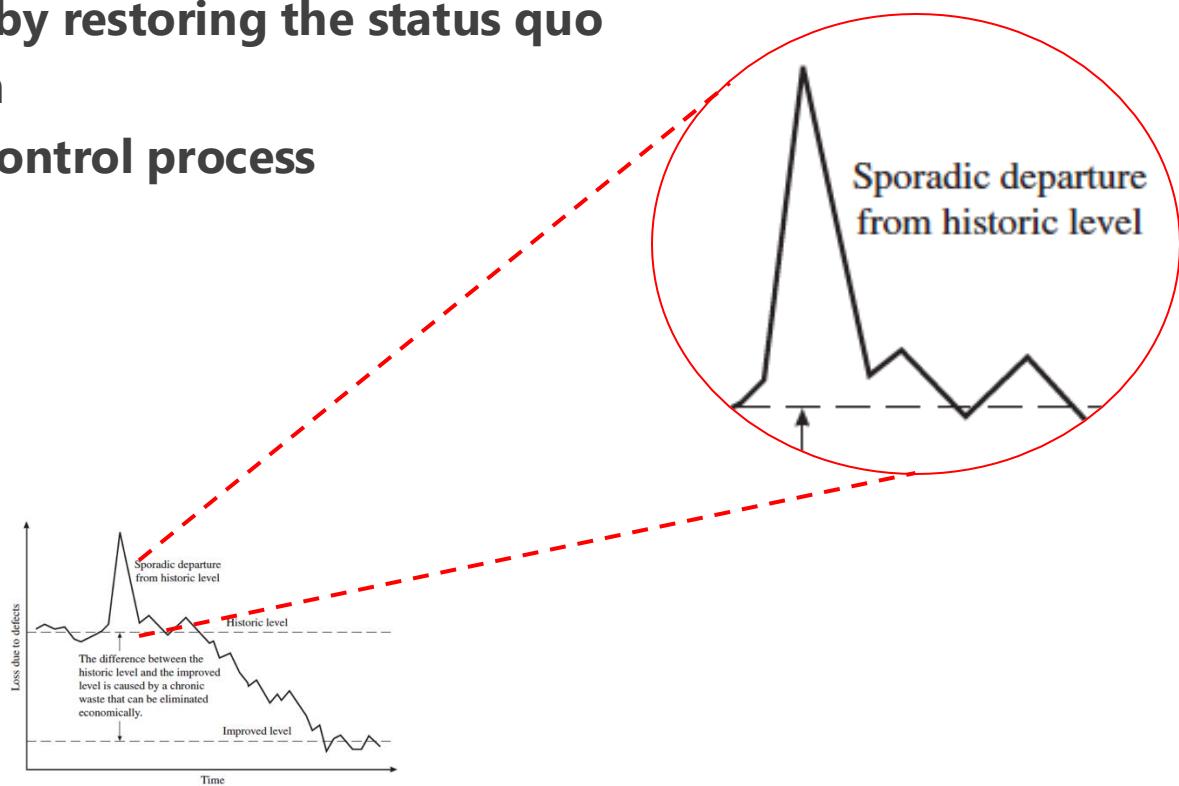


Sporadic quality problems



- **Sudden, adverse change in the status quo**

- Dramatic
- Requires remedy by restoring the status quo
- Once-off problem
- Attacked by the control process





Chronic quality problems



- Long-standing adverse situation
 - ◎ Requires remedy by changing the status quo
 - ◎ Difficult to solve, accepted as inevitable
 - ◎ Chronic problems are accepted as inevitable
 - ◎ Continuous improvement addresses chronic problems, involving the whole organisation
 - ◎ Kaizen
 - ◎ http://www.thetoyotasystem.com/lean_concepts/kaizen.php

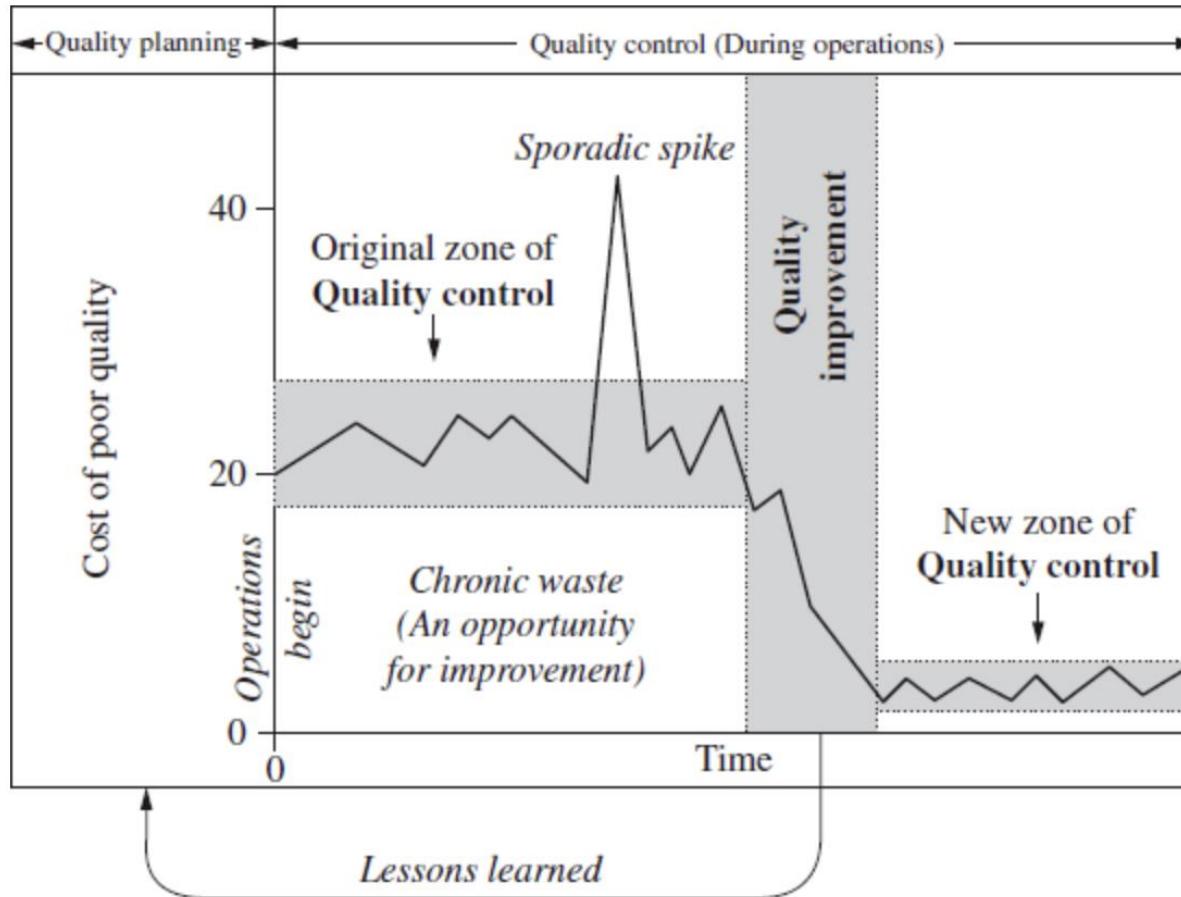




Universal principles for managing for quality: Juran's trilogy



Figure 1.1 Juran Trilogy.





QUALITY MANAGEMENT 444

WEEK 5
LECTURE 10

Chapter 25 - Organizationwide Assessment of Quality

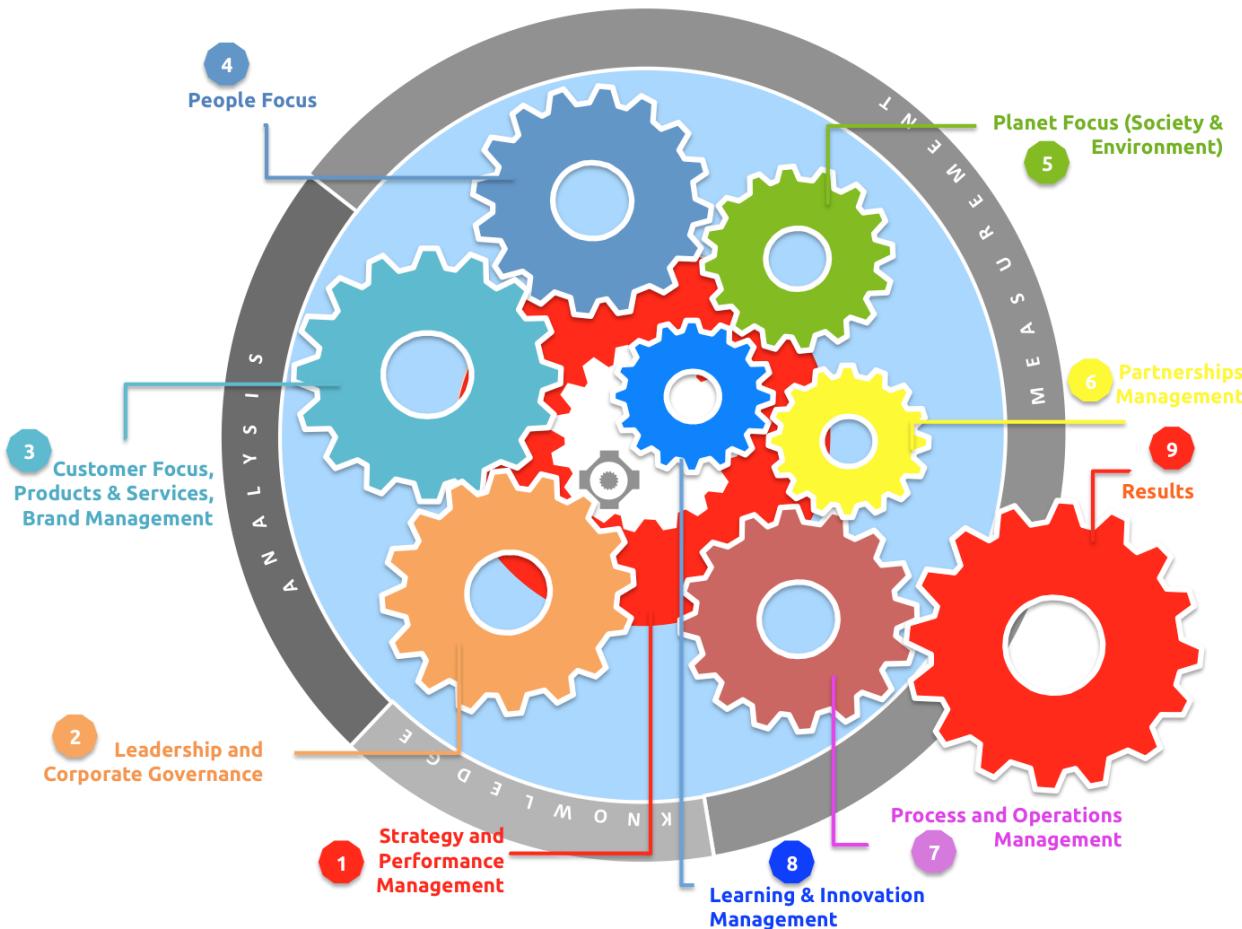
Prof Imke de Kock

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Why (organisation-wide) assess (quality) performance?





Why assess (quality) performance?



- Understand the baseline of your culture, system, processes, people and cost
- Understand what needs to be changed or improved

Many organizational assessments that can be used. Six examples:

- Quality risk
- Cost of poor quality
- Performance and standing in the marketplace
- Assessing using national performance standards and awards
- Assessing to the international system standards
- Competitive benchmarking best practices



Why organization-wide assessment?



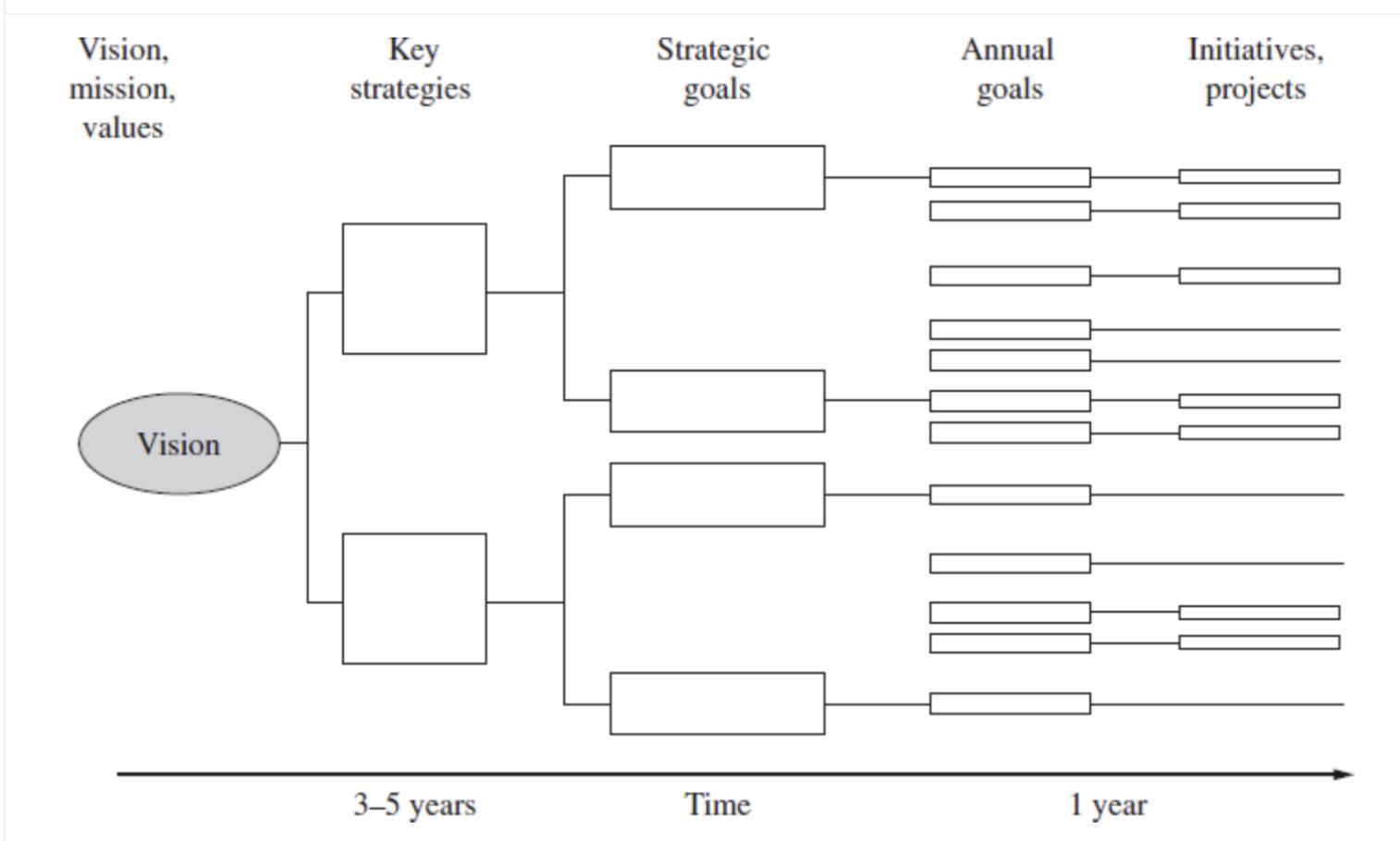
- Systems perspective
- Internal and external customers
- Avoid displacing problems
- The whole is bigger than the sum of its parts
- You'll find the problem wherever you go looking for it



Strategic alignment, deployment and assessment



Figure 25.4 Deploying the vision. (Juran Institute Inc., Southbury, CT.)





Assessment elements



- ⌘ COST OF POOR QUALITY (COPQ)
- ⌘ STANDING IN THE MARKETPLACE
- ⌘ EMPLOYEE CULTURE
- ⌘ OVERALL HEALTH OF THE OPERATING AND QUALITY SYSTEMS



Plan the assessment



- ⌘ Aim / what to plan for: organization-side assessment in sufficient detail to meet the needs of the overall quality assessment

Planning requires that the organization:

- Define the team.
- Define objectives.
- Define scope and criteria.
- Establish a communication plan between the team and leadership.
- Complete the pre-assessment



Plan the assessment



Table 25.1 Juran's Organization Health Check Scoring Guide

Categories and Items (Point Values)
1. Strategic alignment and deployment (100) 1.1 Strategic planning (30) 1.2 Strategic deployment (45) 1.3 Stakeholder (executive point of view) (15) 1.4 Key support systems (10)
2. Quality management system (100) 2.1 Quality system (40) 2.2 Quality control (10) 2.3 Continuous improvement (50)
3. Measurement and analysis capabilities (75) 3.1 Measurement systems (25) 3.2 Customer relationship and requirements (25) 3.3 Competitors (5) 3.4 Product and service quality (5) 3.5 Support processes (5)
4. Effectiveness and efficiency of business processes (100) 4.1 Core business processes (30) 4.2 Voice of the customer (20) 4.3 Product and service creation (20) 4.4 Service and order fulfillment (10) 4.5 Key support processes (10) 4.6 Process efficiency and cost (10)
5. Employee engagement and culture (100) 5.1 Human resource structure (30) 5.2 Talent development (40) 5.3 Culture (30)
6. Supplier management (75) 6.1 Supply chain policy (25) 6.2 Supplier procedures (50)
7. Scorecard and results (450) 7.1 Customer (80) 7.2 Product and service (80) 7.3 Culture (80) 7.4 Supplier performance (80) 7.5 Financial results (130)
Total points = 1,000



Assessment elements



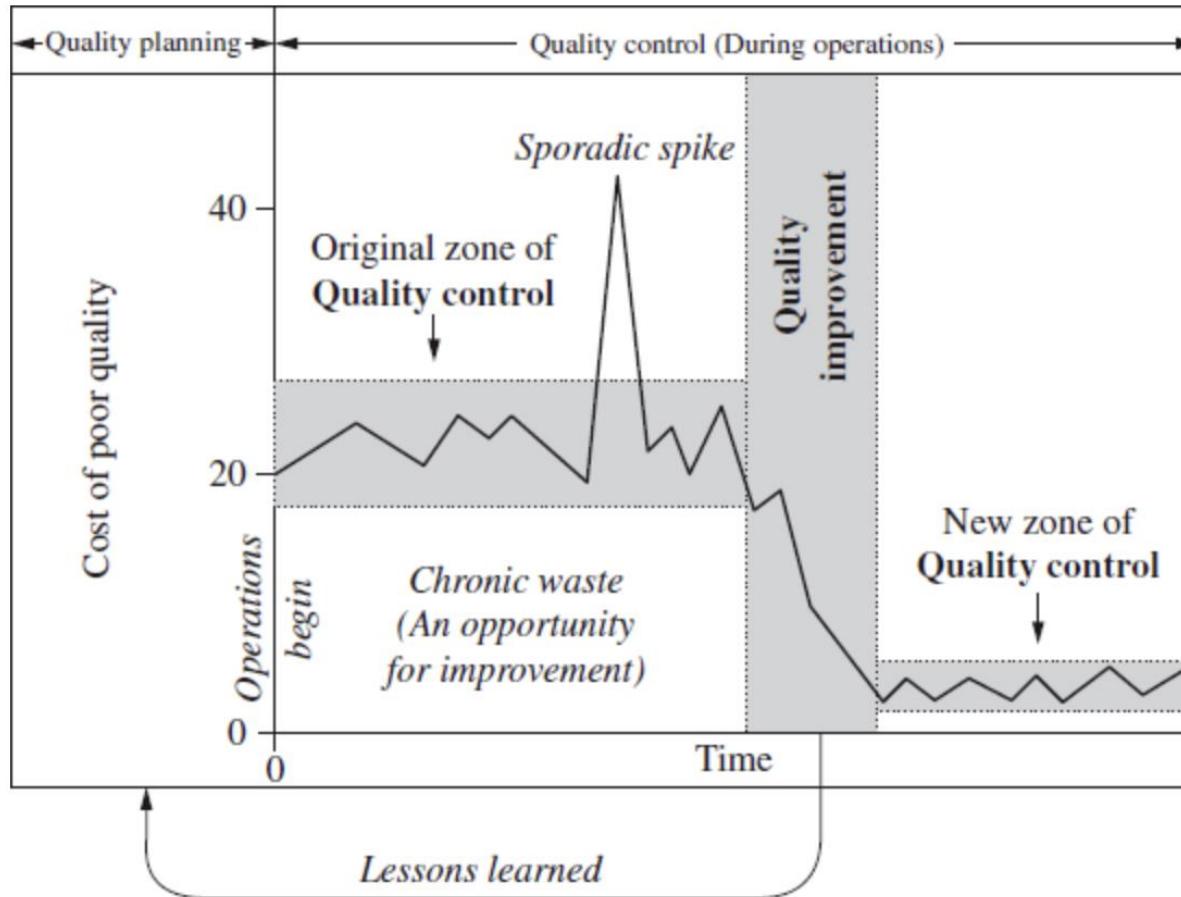
- ⌘ COST OF POOR QUALITY (COPQ)
- ⌘ STANDING IN THE MARKETPLACE
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Universal principles for managing for quality: Juran's trilogy



Figure 1.1 Juran Trilogy.





Cost of poor quality



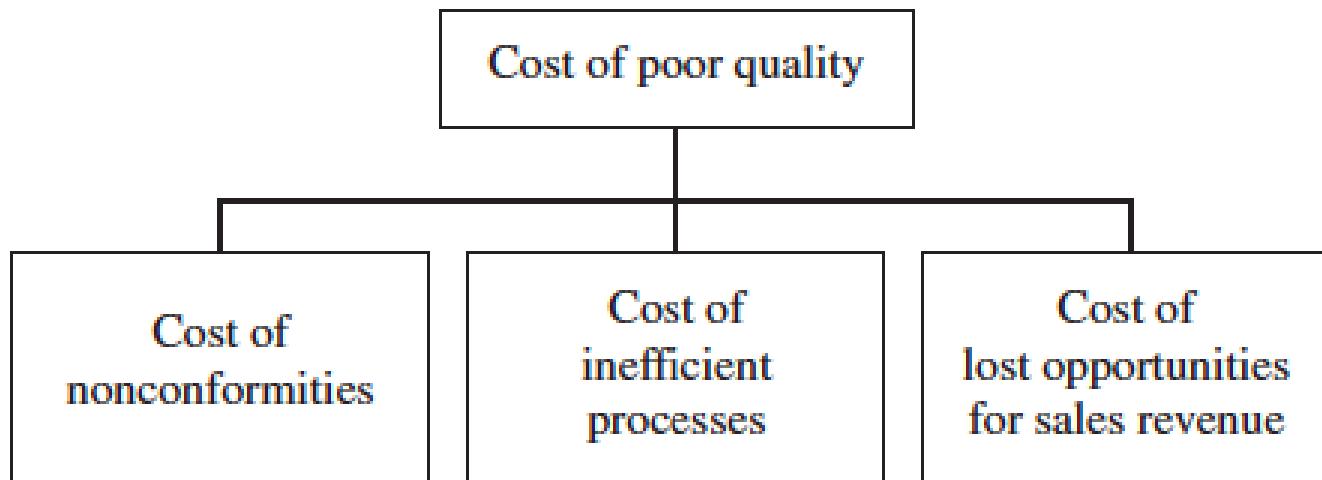
- ⌘ It is the annual monetary loss of products and processes that are not achieving their quality objectives
- ⌘ Cost of poorly performing processes
- ⌘ Why would you want to calculate the COPQ?
 - ◎ Quantify the size of the quality problem in monetary value (a way of communicating?)
 - ◎ Identify opportunities for cost reduction
 - ◎ Opportunities for reducing customer dissatisfaction and associated threats to product salability can be identified
 - ◎ Provides a means of evaluating the progress of quality improvement initiatives
 - ◎ Supports the development of a strategic plan



Cost of poor quality



Figure 25.5 Cost of poor quality.





Cost of poor quality



PREVENTION COSTS

The cost incurred in the process to reduce potential defects and errors (quality improvement costs, quality training, planning).

APPRAISAL COSTS

The cost of determining the current quality of the production process or service. (inspection costs).

INTERNAL FAILURE COSTS

The cost incurred when defects and errors are found before delivery to the customer.

EXTERNAL FAILURE COSTS

The cost of trying to correct defects and errors after the product or service is delivered to the customer.





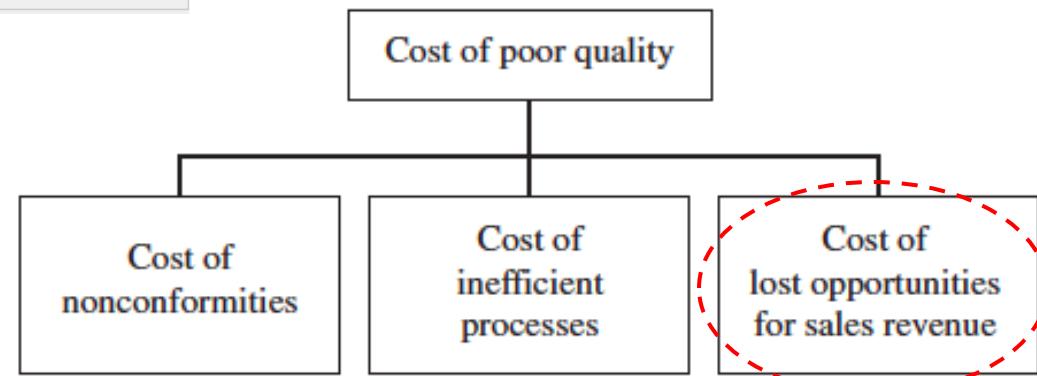
Categories of quality costs



Table 25.3 Revenue Lost Through Poor Quality

\$10,000,000	Annual customer service revenue
1,000	Number of customers
× 25%	Percent dissatisfied
250	Number of dissatisfied
× 75%	Percent of switchers (60–90% of dissatisfied)
188	Number of switchers
× \$10,000	Average revenue per customer
\$1,880,000	Revenue lost through poor quality

Source: The University of Tampa.





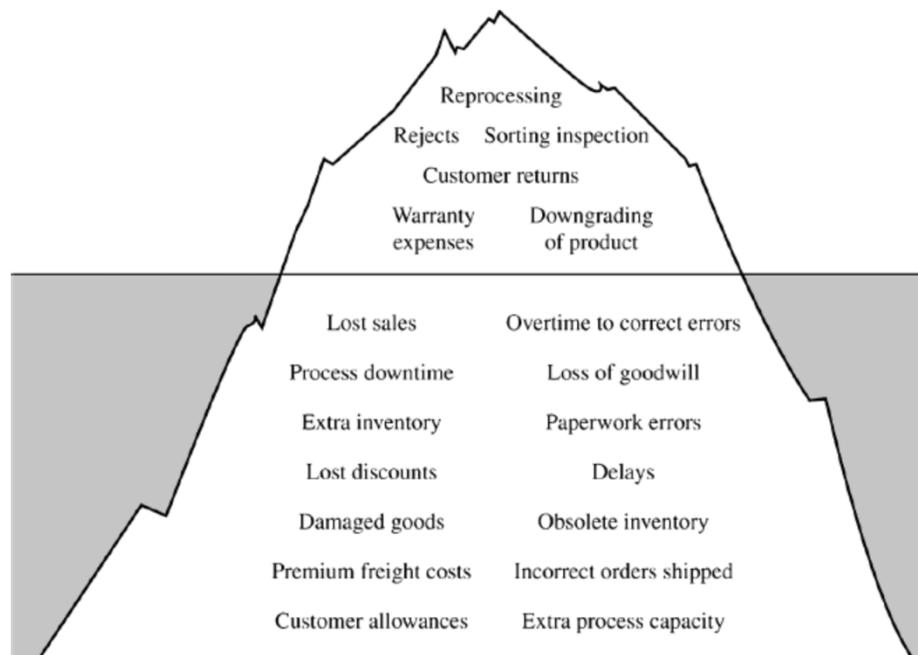
Categories of quality costs



◎ Hidden costs

◎ Quantification of non-events

Figure 25.6 Hidden costs of poor quality.





Relating COPQ to business measures





Relating COPQ to business measures



◎ Languages of management / communicating the challenges

Table 25.4 Languages of Management

Money (annual cost of poor quality)
24% of sales revenue
15% of manufacturing cost
13 cents per share of common stock
\$7.5 million per year for scrap and rework compared to a profit of \$1.5 million per year
\$176 million per year
40% of the operating cost of a department
Other languages
The equivalent of one plant in the company making 100% defective work all year
32% of engineering resources spent in finding and correcting design weaknesses
25% of manufacturing capacity devoted to correcting quality problems
13% of sales orders canceled
70% of inventory carried attributed to poor quality levels
25% of manufacturing personnel assigned to correcting quality problems



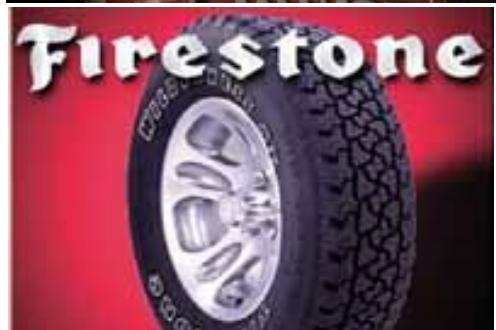
Recalls: COPQ



Ford recalled more than 1.5 million Pintos in 1978 due to the faulty position of fuel tanks. In some cases, the fuel tank burst into flames after a rear-end collisions. At least 27 people died as a result.



About 35 years ago, Johnson & Johnson recalled more than 20 million bottles of Tylenol capsules after someone laced the painkillers with cyanide and put them in store shelves in the Chicago area. Seven people were killed.



About 6.5 million Firestone tires were recalled in 2000 because the tires could shred, blow out or fail. Most of the tires were used in Ford SUVs and light pickup trucks.



SOME OF OUR CANS ARE NOT WORTHY OF OUR NAME.

Tiger Brands recalls SOME KOO and Hugo's defective cans due to a side weld seam issue that may cause the cans to leak. All products listed below manufactured from 1 May 2019 to 5 May 2021 are affected.



Recall of pilchards at Shoprite, Checkers: 'Bloated' cans could make consumers sick

Business Insider SA
Feb 23, 2020, 05:10 PM



South Africa's 320,000 driver's licence backlog is hurting car sales

Staff Writer 19 November 2020



Your email address

Subscribe

The National Automobile Dealers' Association (NADA) says that extensive administrative delays in document turnaround times and vital operational systems are drastically impacting motor vehicle sales in South Africa.



Recalls: COPQ



“Tylenol’s market share almost fully recovered in a year.”



Assessment elements



- ⌘ COST OF POOR QUALITY (COPQ)
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- ⌘ OVERALL HEALTH OF THE OPERATING AND QUALITY SYSTEMS



QUALITY?



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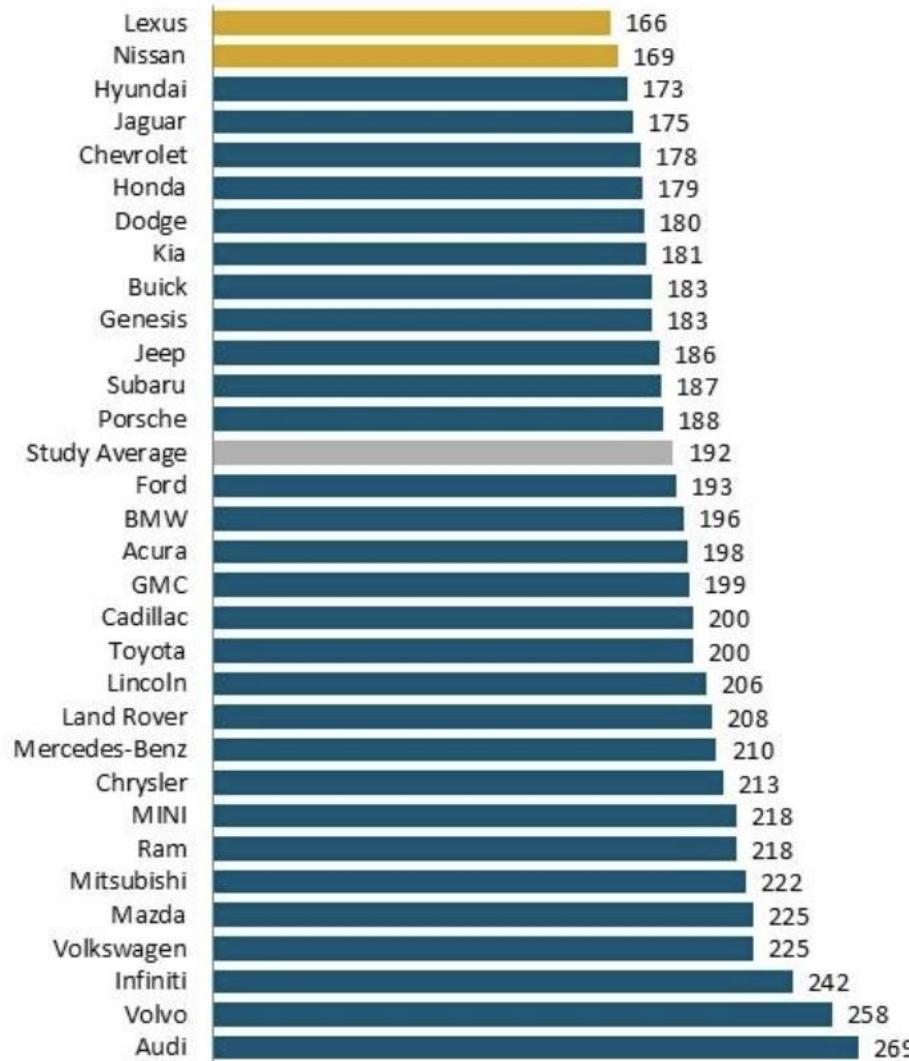
J.D. Power

2025 U.S. Initial Quality StudySM(IQS)



Brand Ranking

Problems per 100 Vehicles (PP100)





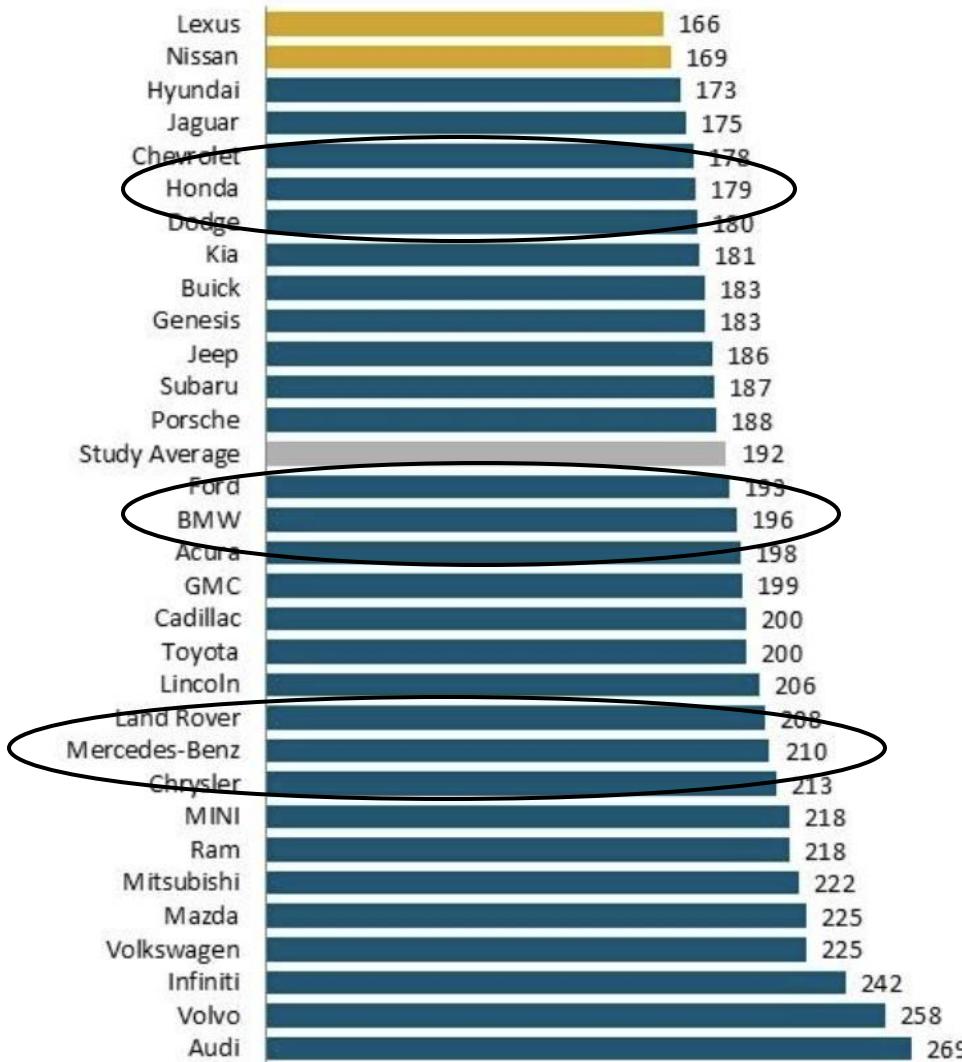
J.D. Power

2025 U.S. Initial Quality StudySM(IQS)



Brand Ranking

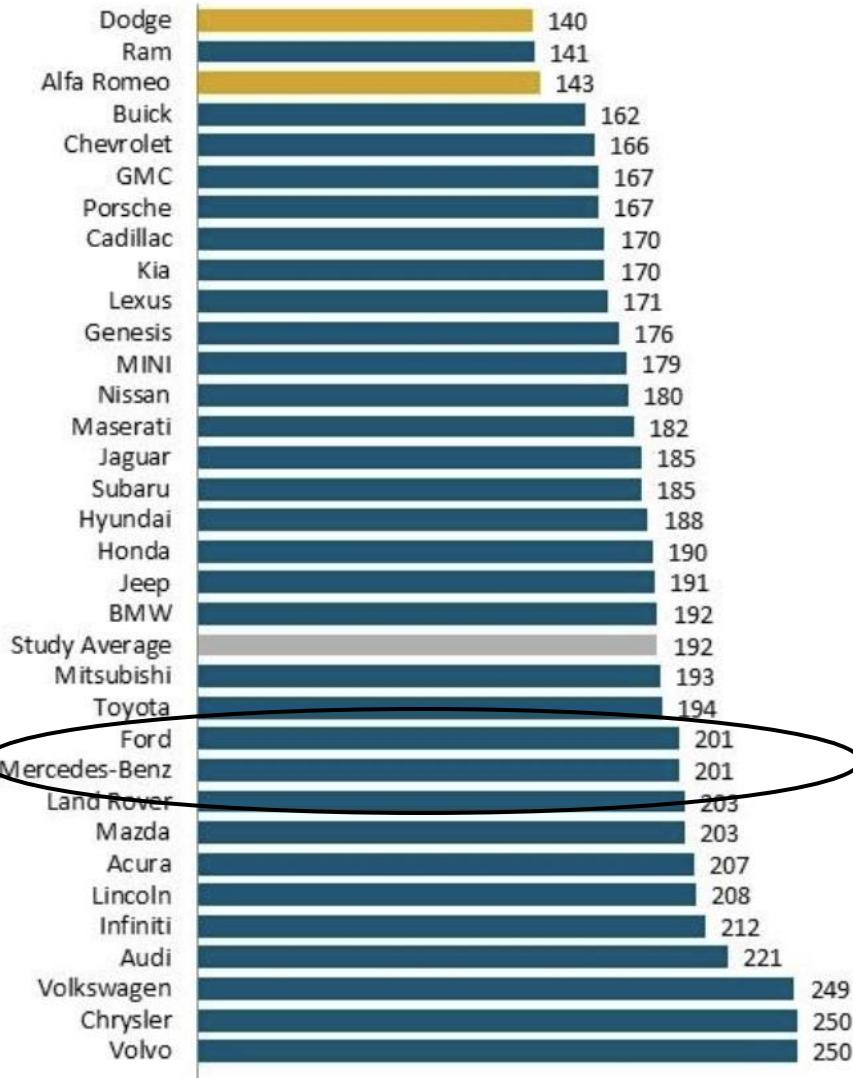
Problems per 100 Vehicles (PP100)



J.D. Power 2023 U.S. Initial Quality StudySM

Brand Ranking

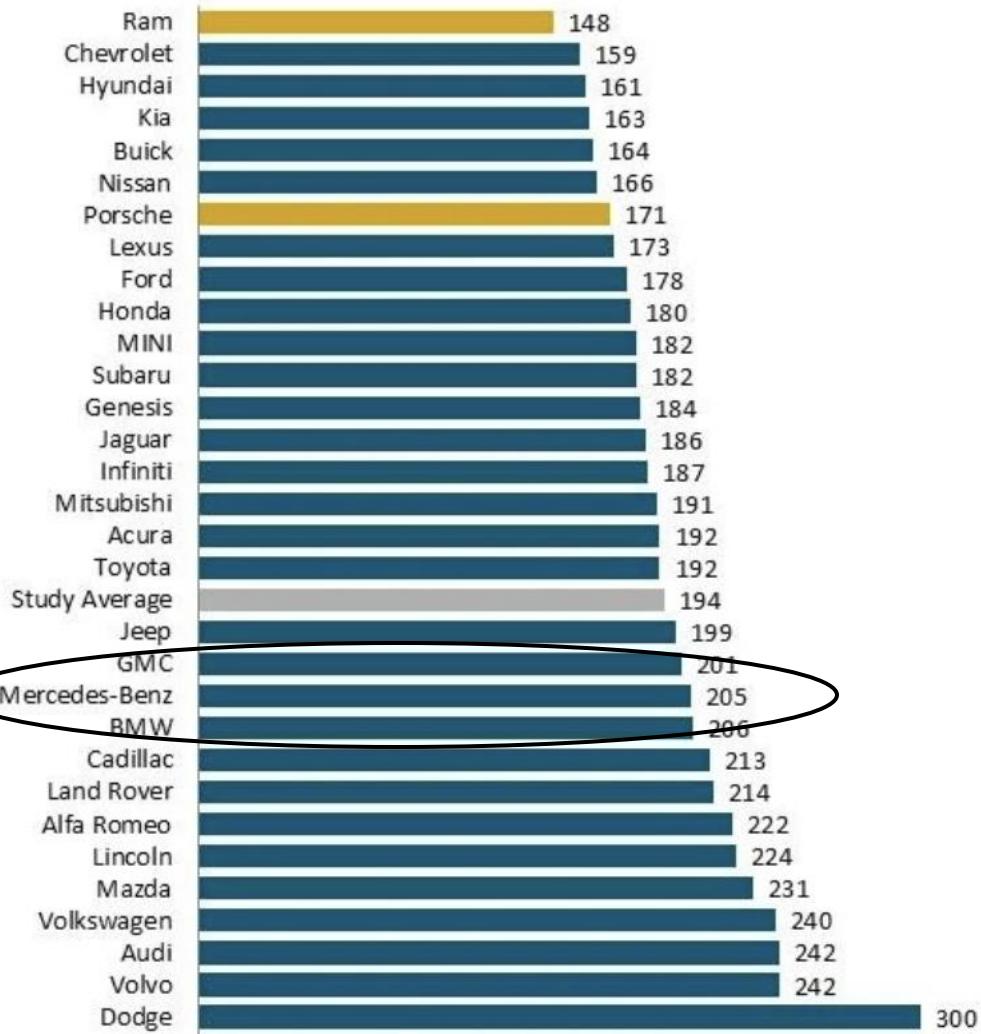
Problems per 100 Vehicles (PP100)



J.D. Power 2024 U.S. Initial Quality StudySM(IQS)

Brand Ranking

Problems per 100 Vehicles (PP100)

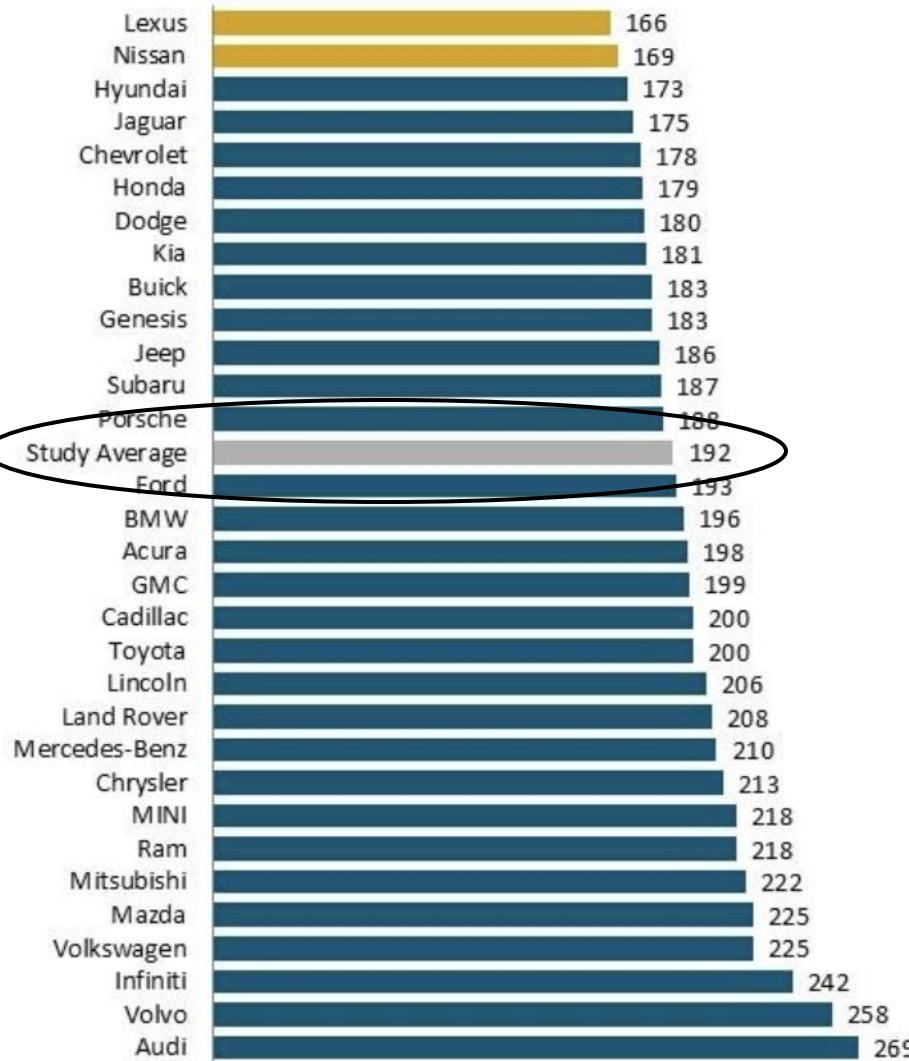


J.D. Power
2025 U.S. Initial Quality StudySM(IQS)



Brand Ranking

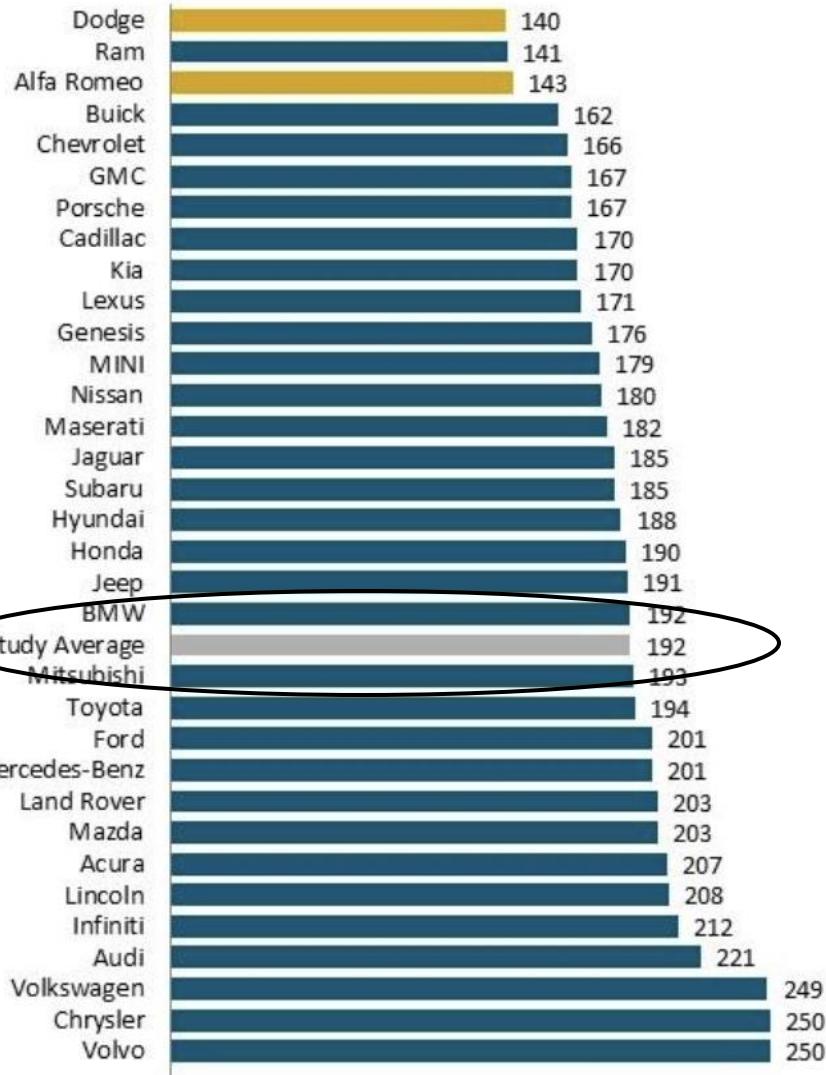
Problems per 100 Vehicles (PP100)



J.D. Power 2023 U.S. Initial Quality StudySM

Brand Ranking

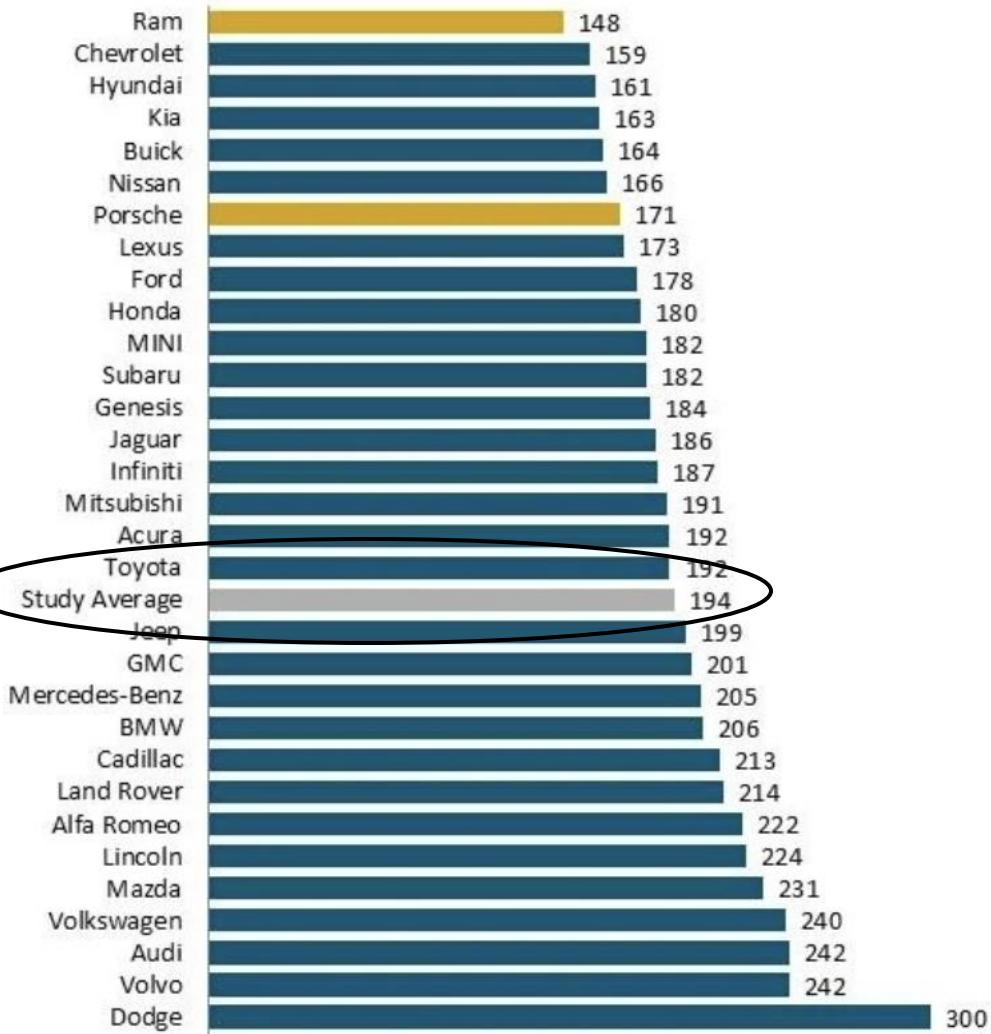
Problems per 100 Vehicles (PP100)



J.D. Power 2024 U.S. Initial Quality StudySM(IQS)

Brand Ranking

Problems per 100 Vehicles (PP100)





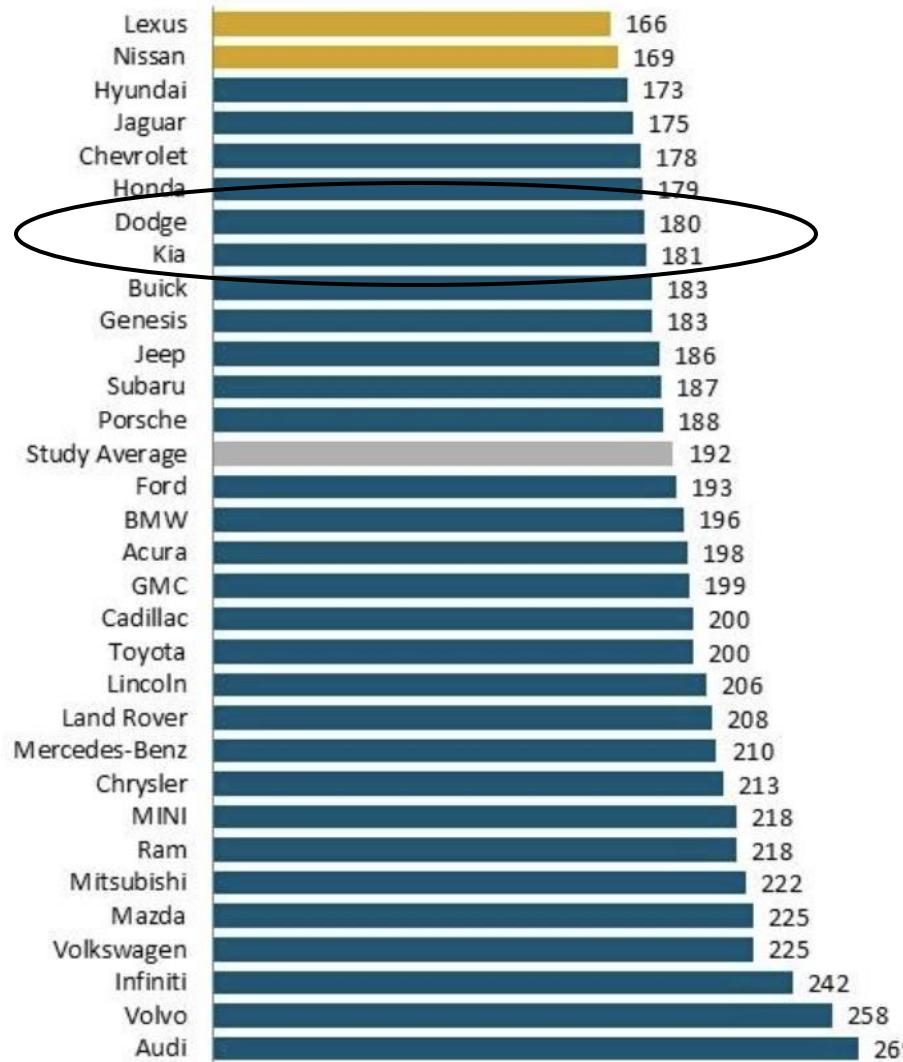
J.D. Power

2025 U.S. Initial Quality StudySM(IQS)



Brand Ranking

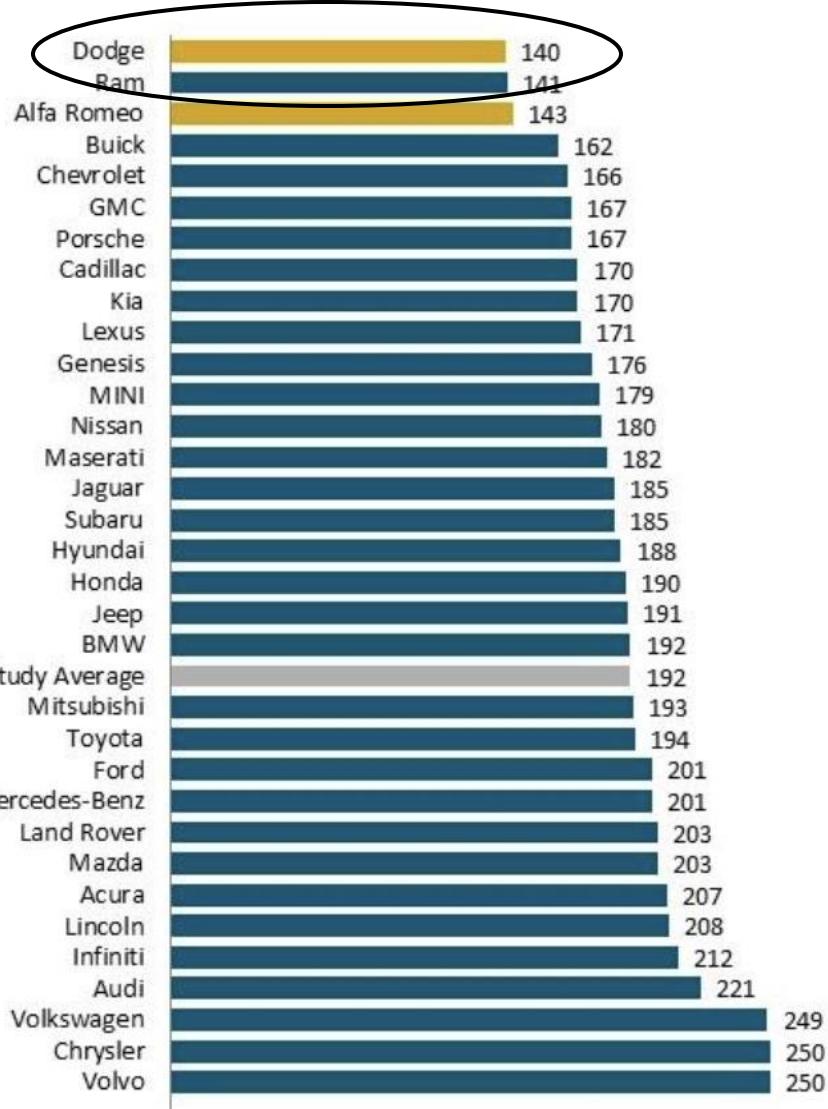
Problems per 100 Vehicles (PP100)



J.D. Power 2023 U.S. Initial Quality StudySM

Brand Ranking

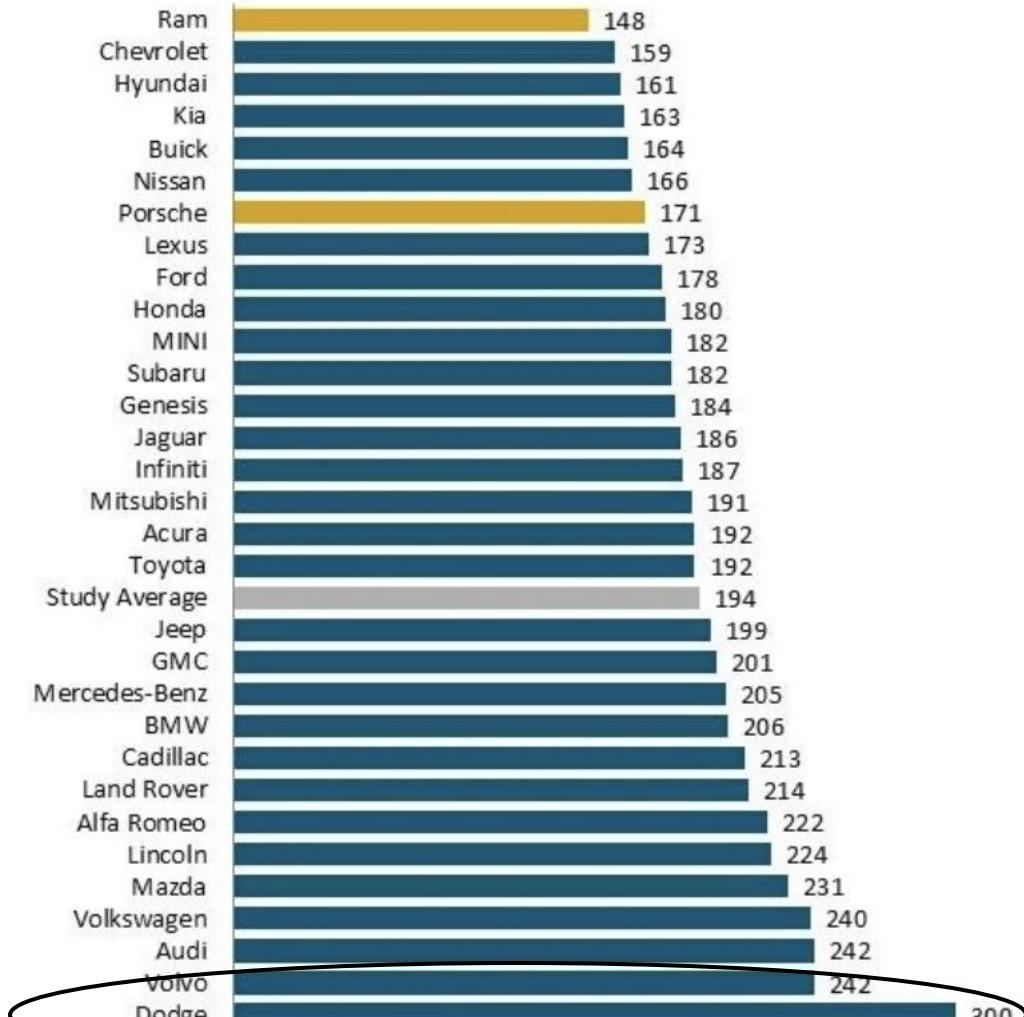
Problems per 100 Vehicles (PP100)



J.D. Power 2024 U.S. Initial Quality StudySM(IQS)

Brand Ranking

Problems per 100 Vehicles (PP100)





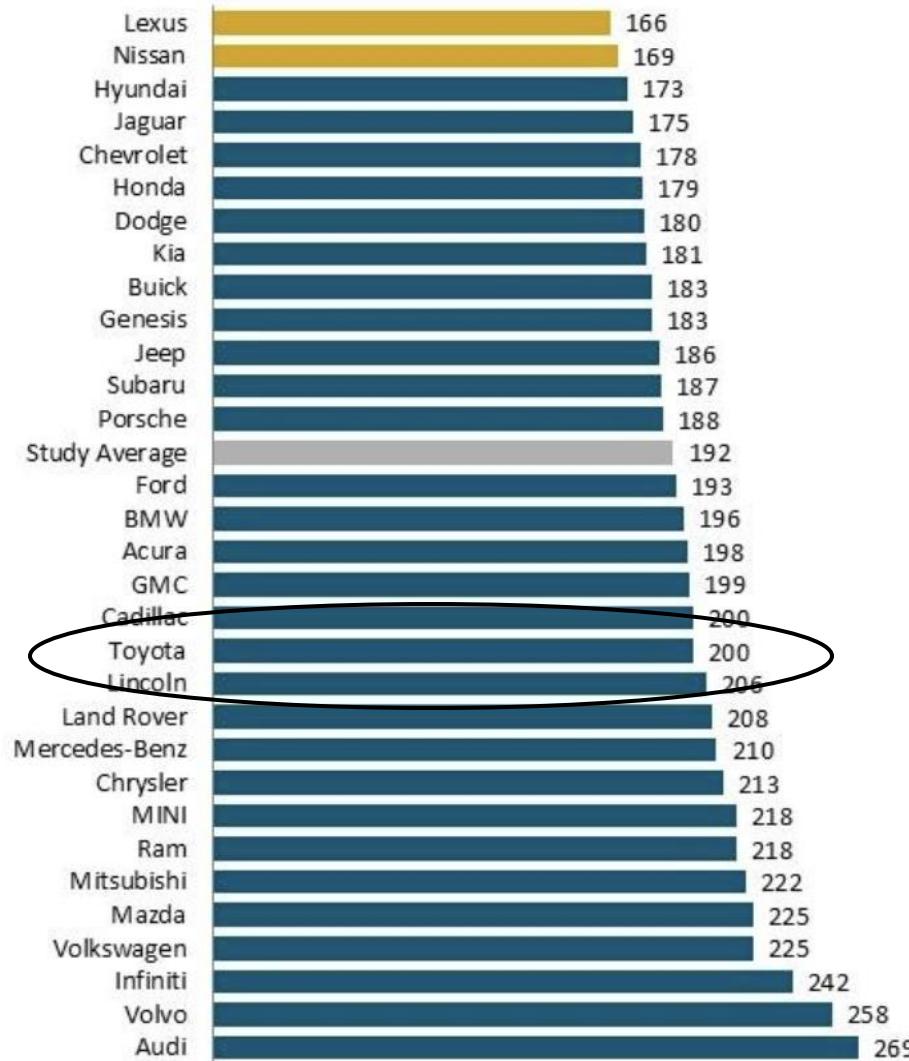
J.D. Power

2025 U.S. Initial Quality StudySM(IQS)



Brand Ranking

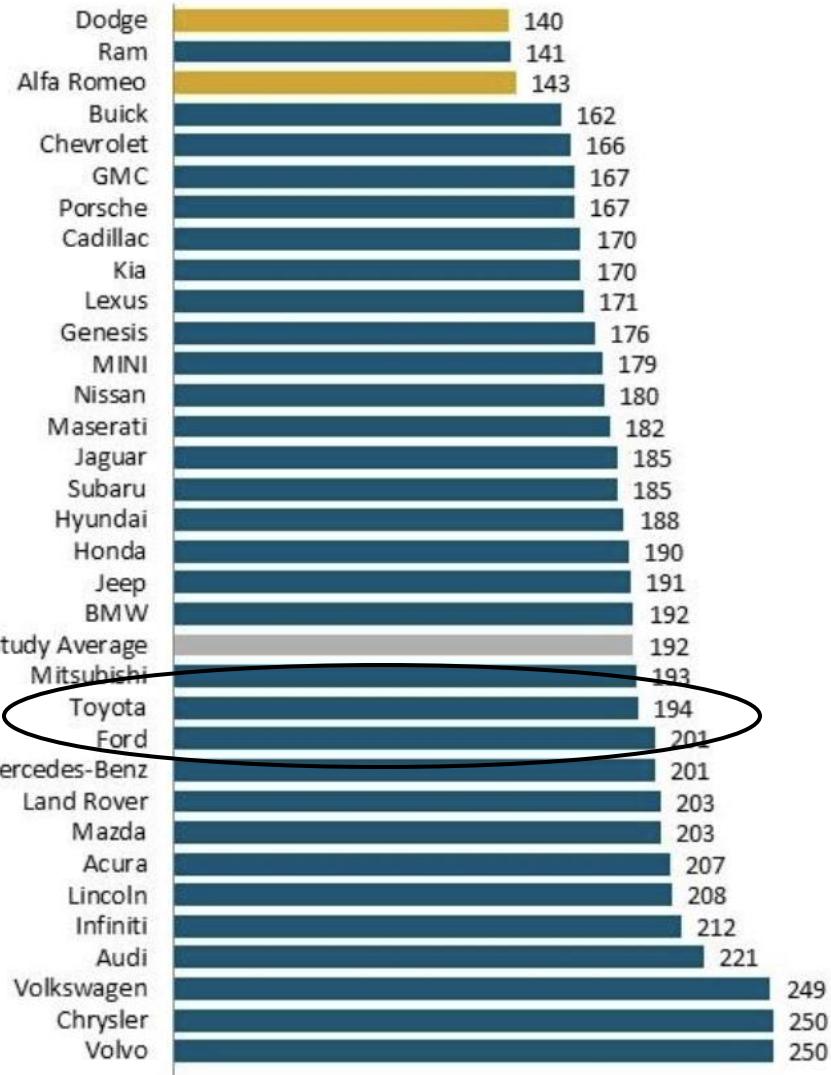
Problems per 100 Vehicles (PP100)



J.D. Power 2023 U.S. Initial Quality StudySM

Brand Ranking

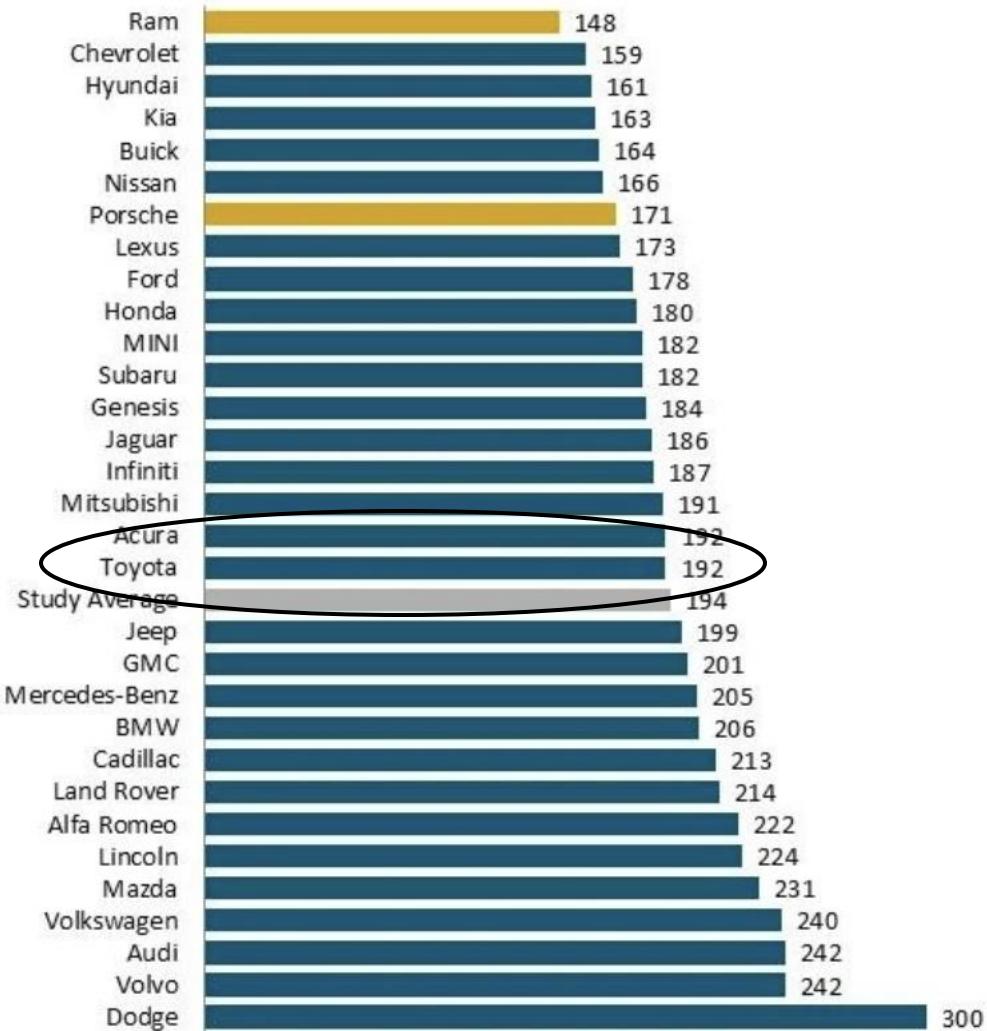
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J.D. Power 2024 U.S. Initial Quality StudySM(IQS)

Brand Ranking

Problems per 100 Vehicles (PP100)

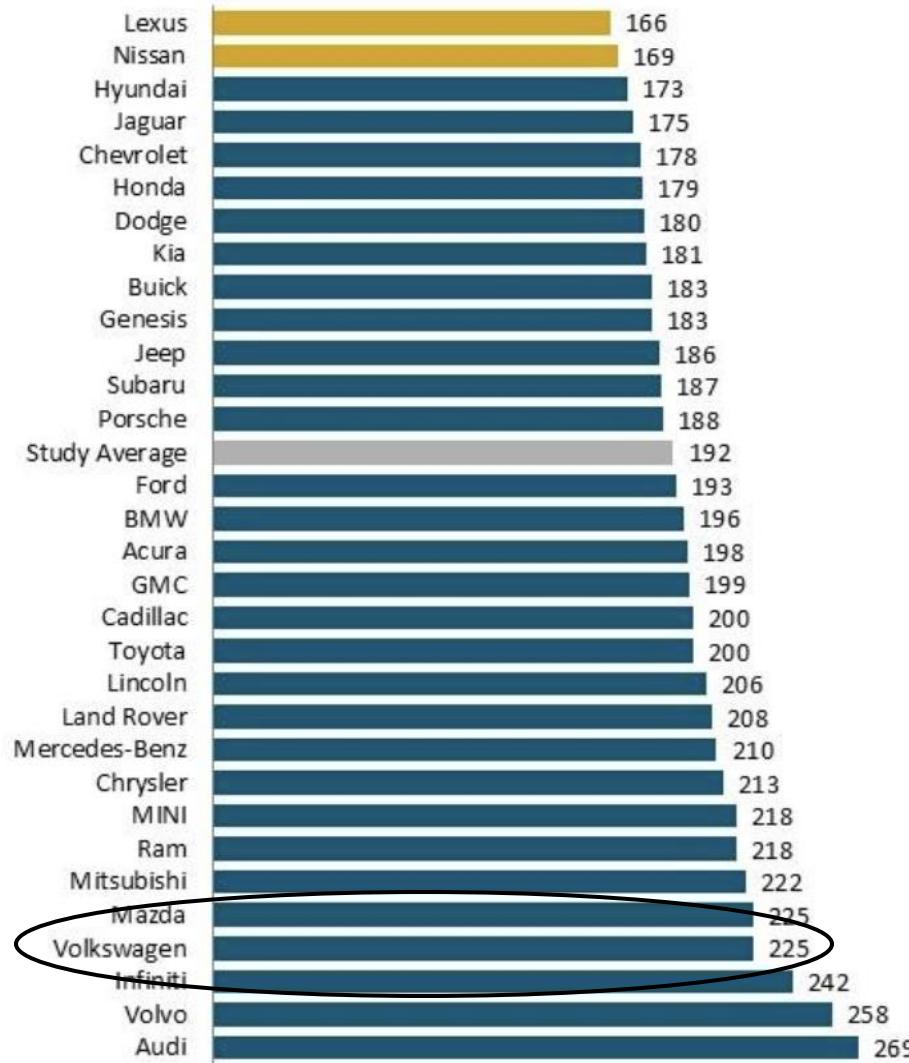


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2025 U.S. Initial Quality StudySM(IQS)



Brand Ranking

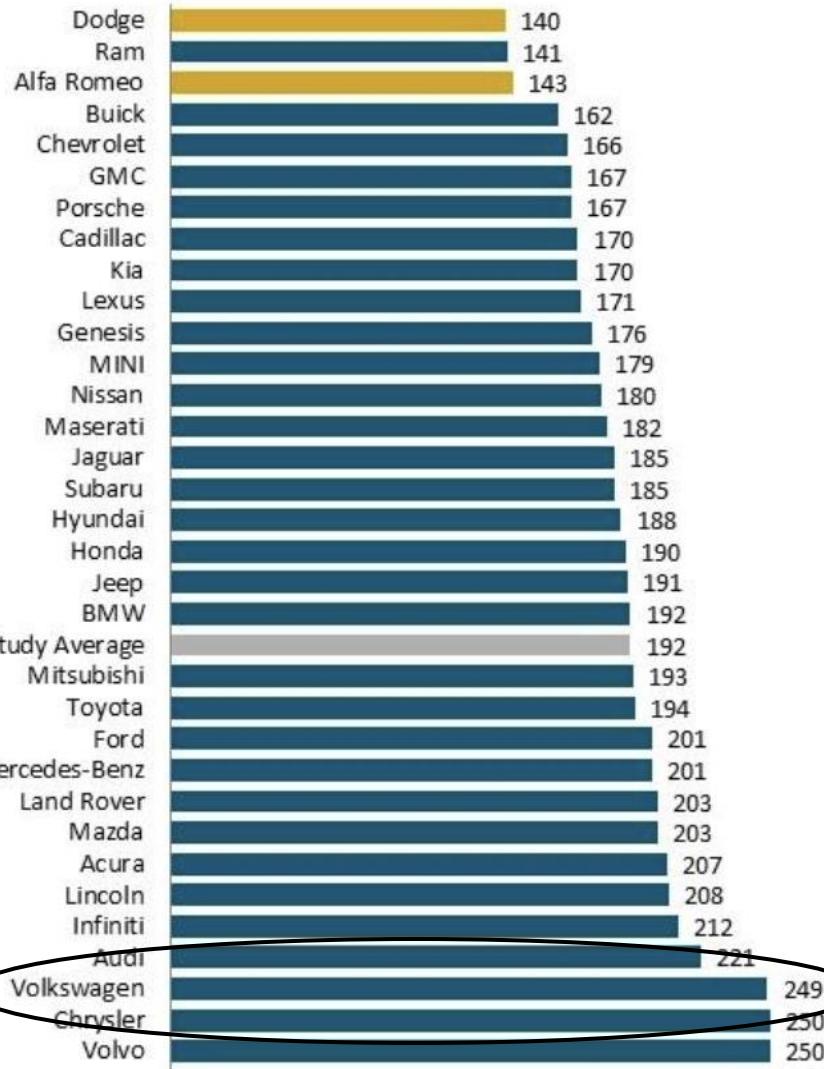
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J.D. Power 2023 U.S. Initial Quality StudySM

Brand Ranking

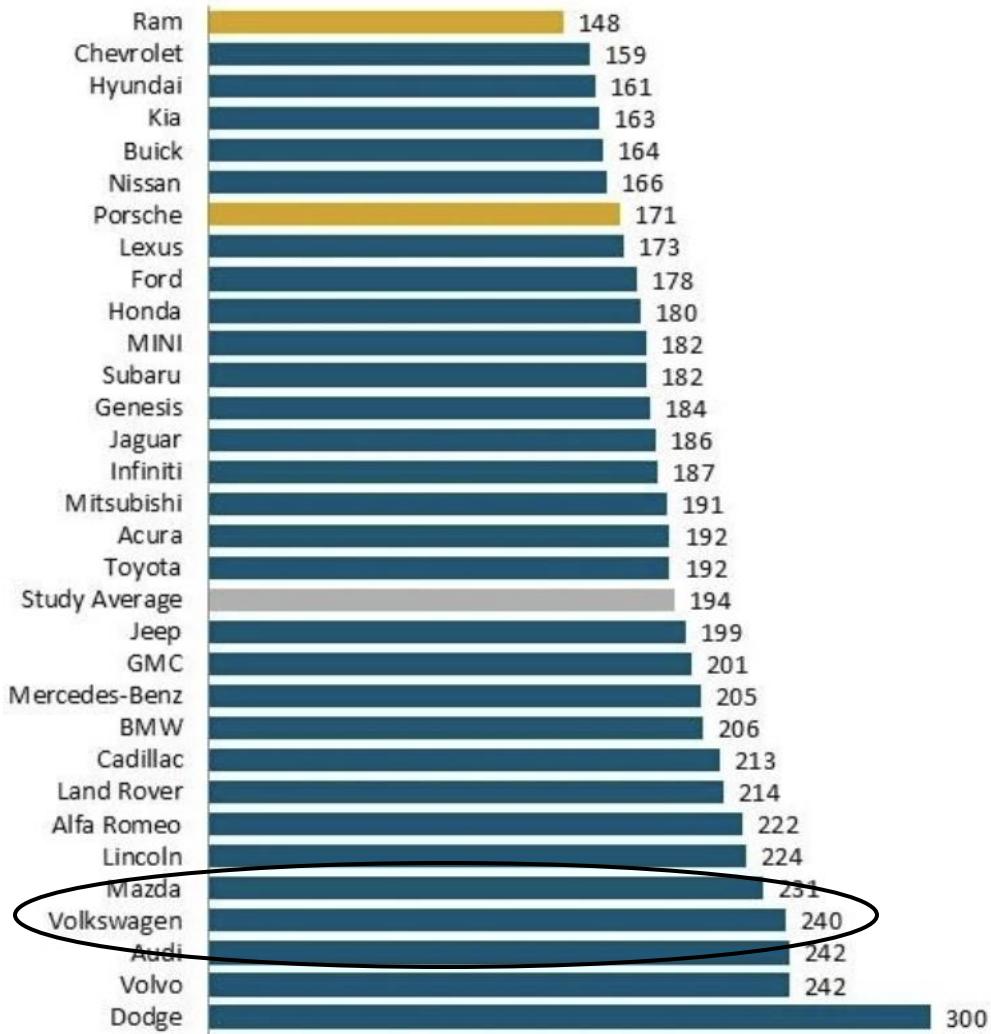
Problems per 100 Vehicles (PP100)



J.D. Power 2024 U.S. Initial Quality StudySM(IQS)

Brand Ranking

Problems per 100 Vehicles (PP100)





Standing in the marketplace



- Gives a snapshot of standing relative to competition
- Identifies opportunities and threats
- Market research studies



Assessment tools & techniques



- National performance standards and awards

- ✓ Malcolm Bladridge National Quality Award
- ✓ ISO Standards
- ✓ Regulatory standards (FDA or Sarbarnes-Oxley)
- ✓ EFQM Excellence Model
- ✓ Benchmarking



Importance of good quality



Good quality leads to higher customer satisfaction and is rewarded with increased profits





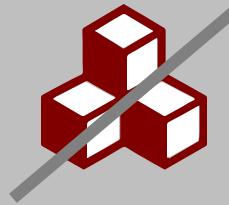
Consequences of poor quality



Products of poor quality may disappoint the buyer and lead to product failure

LOSS OF BUSINESS

The customer will not buy the product or any other product again.



LOSS OF REPUTATION

Customers complain about their bad experience to friends and relatives.



HIGHER COSTS

Poor quality costs money and reduces profitability. (Cost of poor quality)

