

5th International Conference on Engineering, Project and Production Management  
27 November 2014



# Quality Costing and Lessons Learned on Projects Port Elizabeth, South Africa

Hannelie Nel

# The BIE Group



## The BIE Value Statement

BIE is the largest non-listed quality management company in the world. It's an international and independent third-party company that has the capability and highly-skilled resources to provide Project Management and Quality Services from project design to commissioning. BIE also provides Quality Assurance on manufacturing and installation during project execution; and offers Quality Costing throughout the project lifecycle.



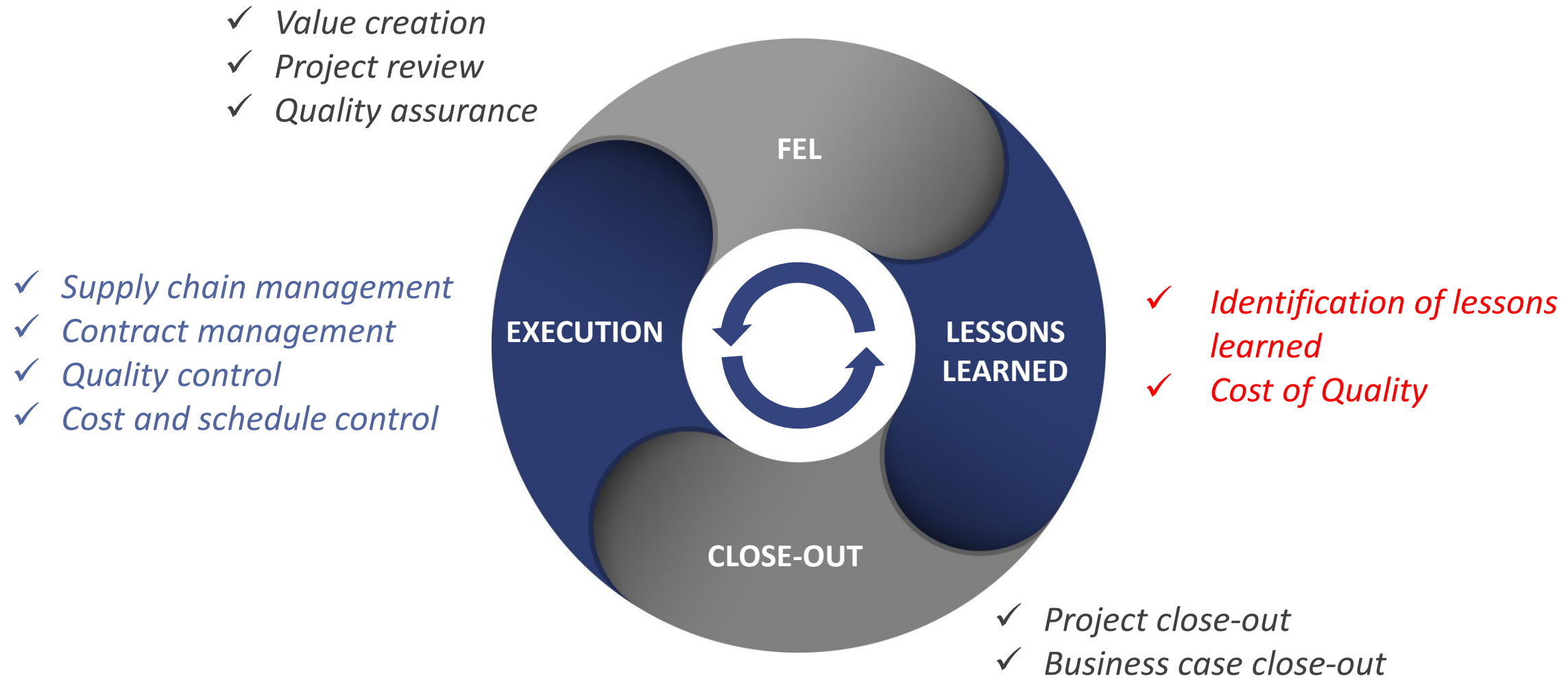
*BIE Became listed in 1994 on the UNITED Nations Approvals Scheme for the inspection of commodities and materials deployed to sensitive international regions of the world.*



# BIE Group Global Footprint



# Project Assurance



# Scope



- 1 The ASQ Global State of Quality 2013
- 2 Global Infrastructure Spending 2014 - 2025
- 3 Restructuring Activities of CEOs 2013
- 4 The Business Cost of Poor Quality
- 5 Quality Costing the PAF Model
- 6 The Cost of Quality Incidents
- 7 Project Lessons Learned
- 8 Design of a Lessons Learned System
- 9 Lessons Learned Trending
- 10 Preventive Measures

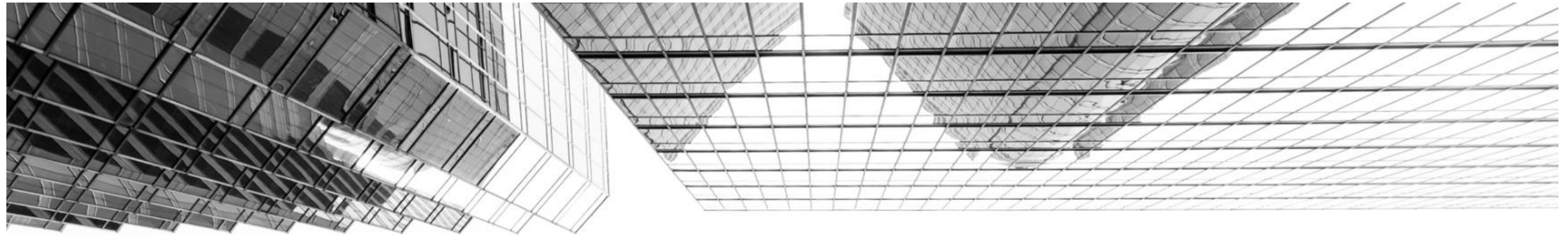




# The ASQ Global State of Quality 2013



1

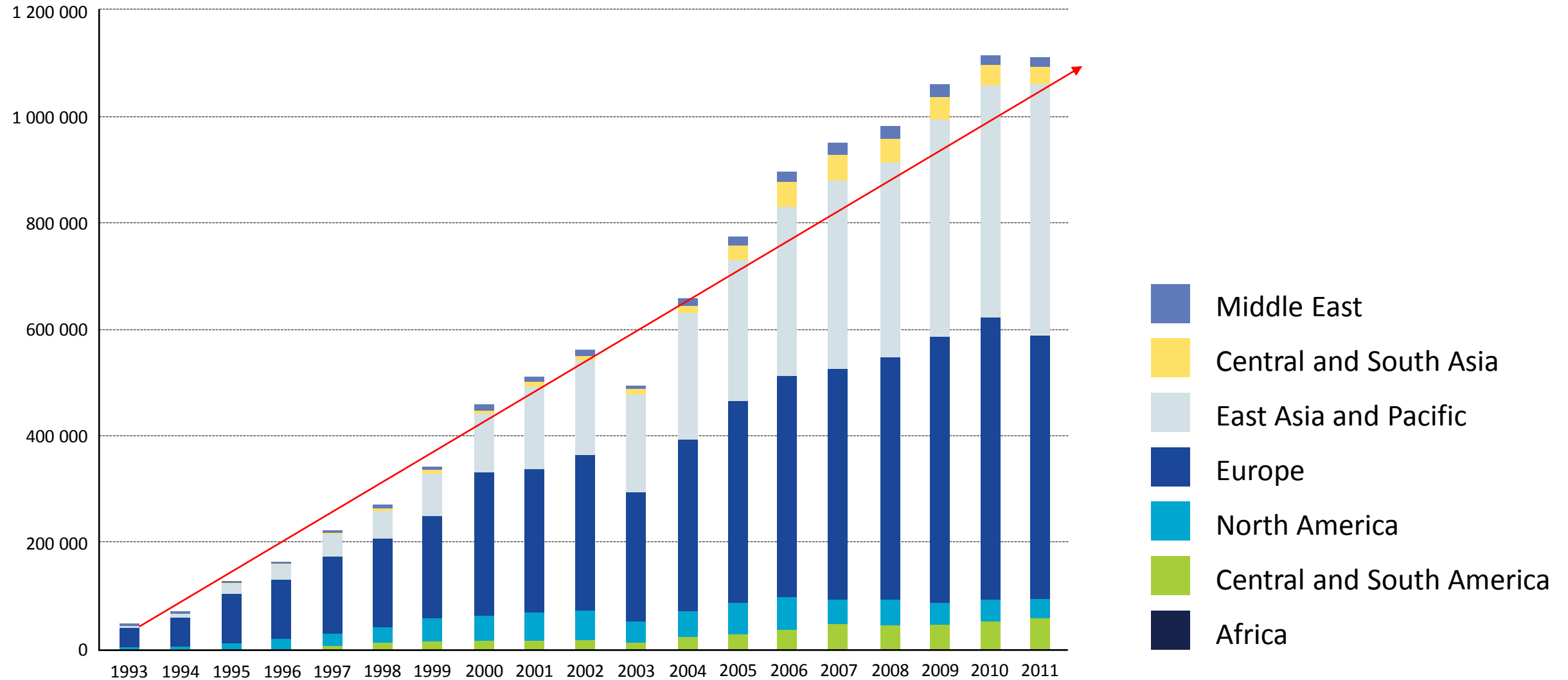


*“Quality is free. It’s not a gift, but it’s free. What costs money are the unquality things – all the actions that involve not doing jobs right the first time.” - Philip Crosby*

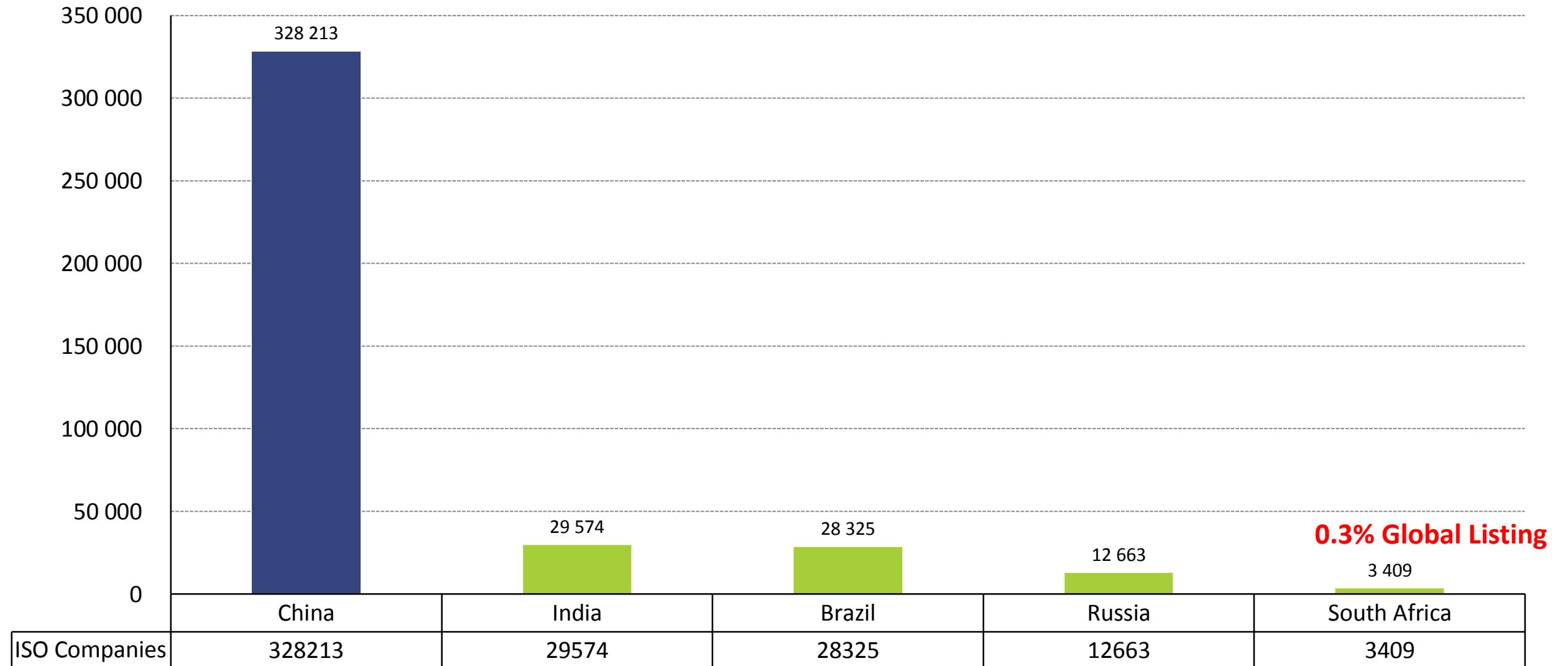
30 Global Companies benchmarked in 2011 for quality performance measures: 1991 respondents



# ISO 9001 Global Growth 1993-2011

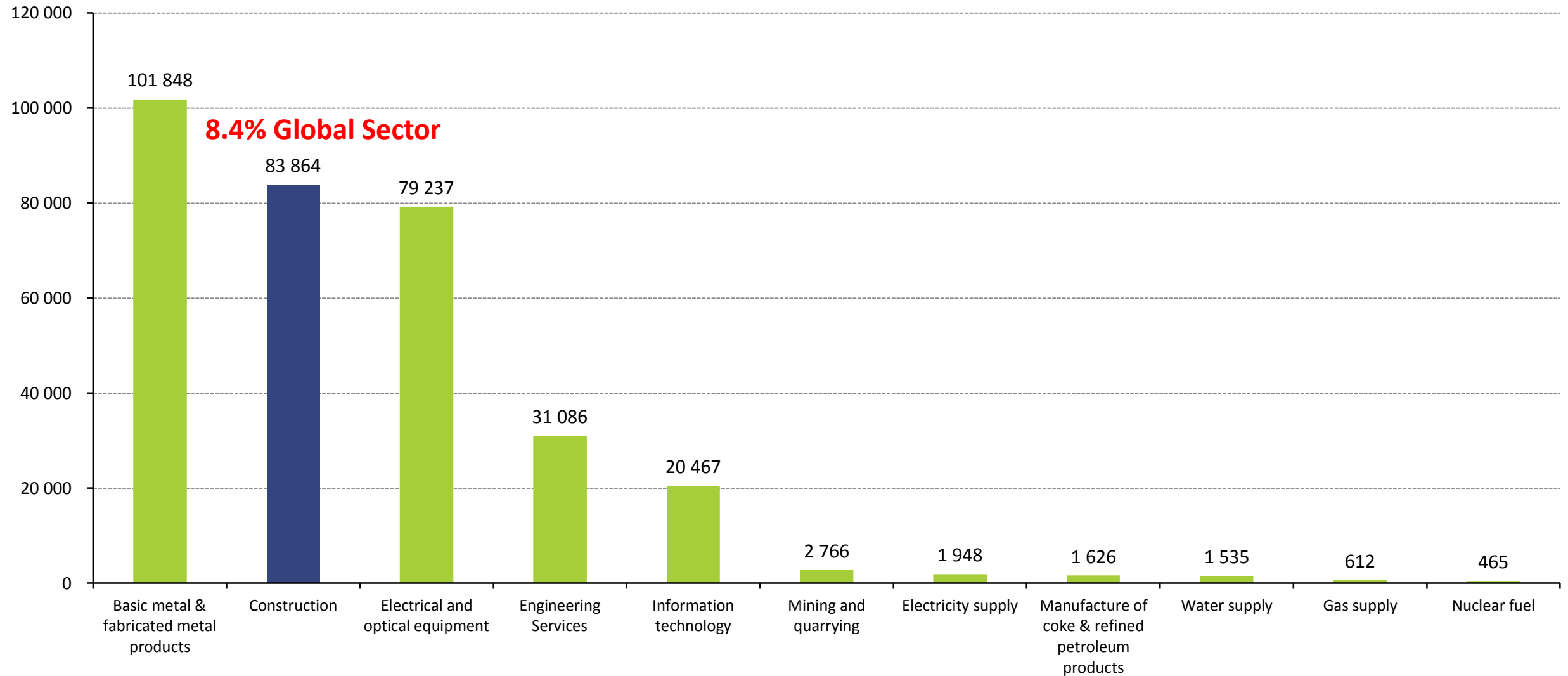


# ISO 9001 Listed Companies BRICS

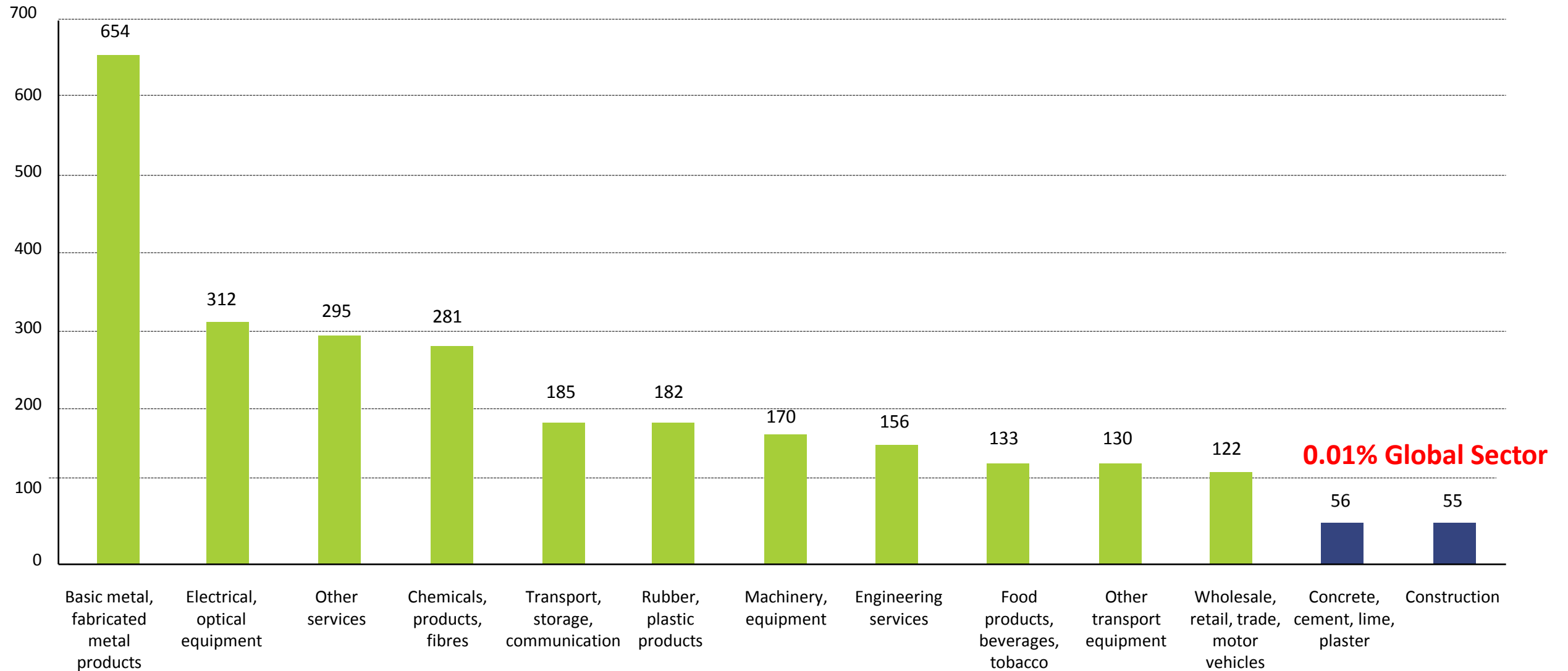




# ISO 9001 Companies per Global Sector



# ISO 9001 RSA Companies



# Global infrastructure spending to reach \$9 trillion by 2025



3



Source: Oxford Economics

Worldwide, capital project and infrastructure spending is expected to total more than \$9 trillion by 2025, up from \$4 trillion in 2012

**\$9**  
trillion

Total Quality Costs may constitute 8% - 15% of total construction costs.



Economic return generated for every dollar spent on a capital project



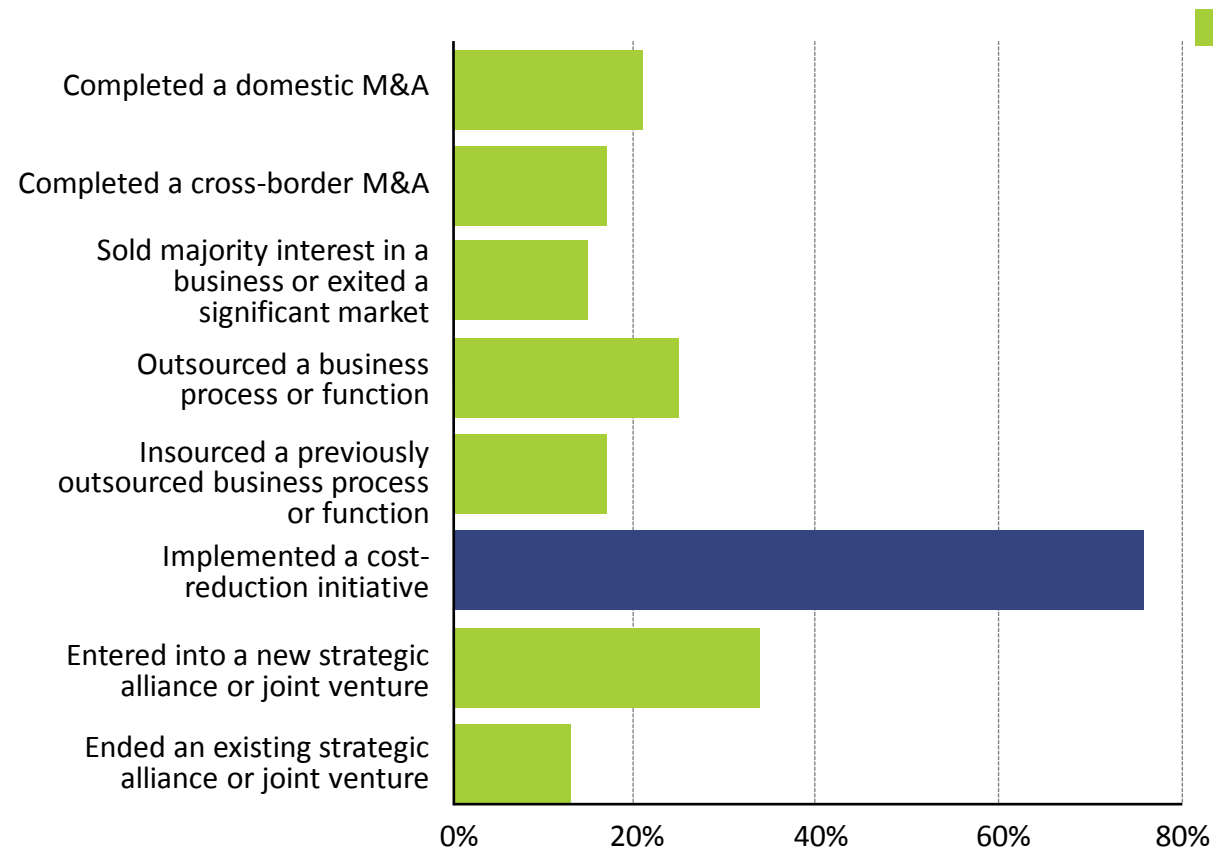


# Restructuring Activities of CEOs



3

Which of the following restructuring activities have CEOs initiated in the past 12 months?

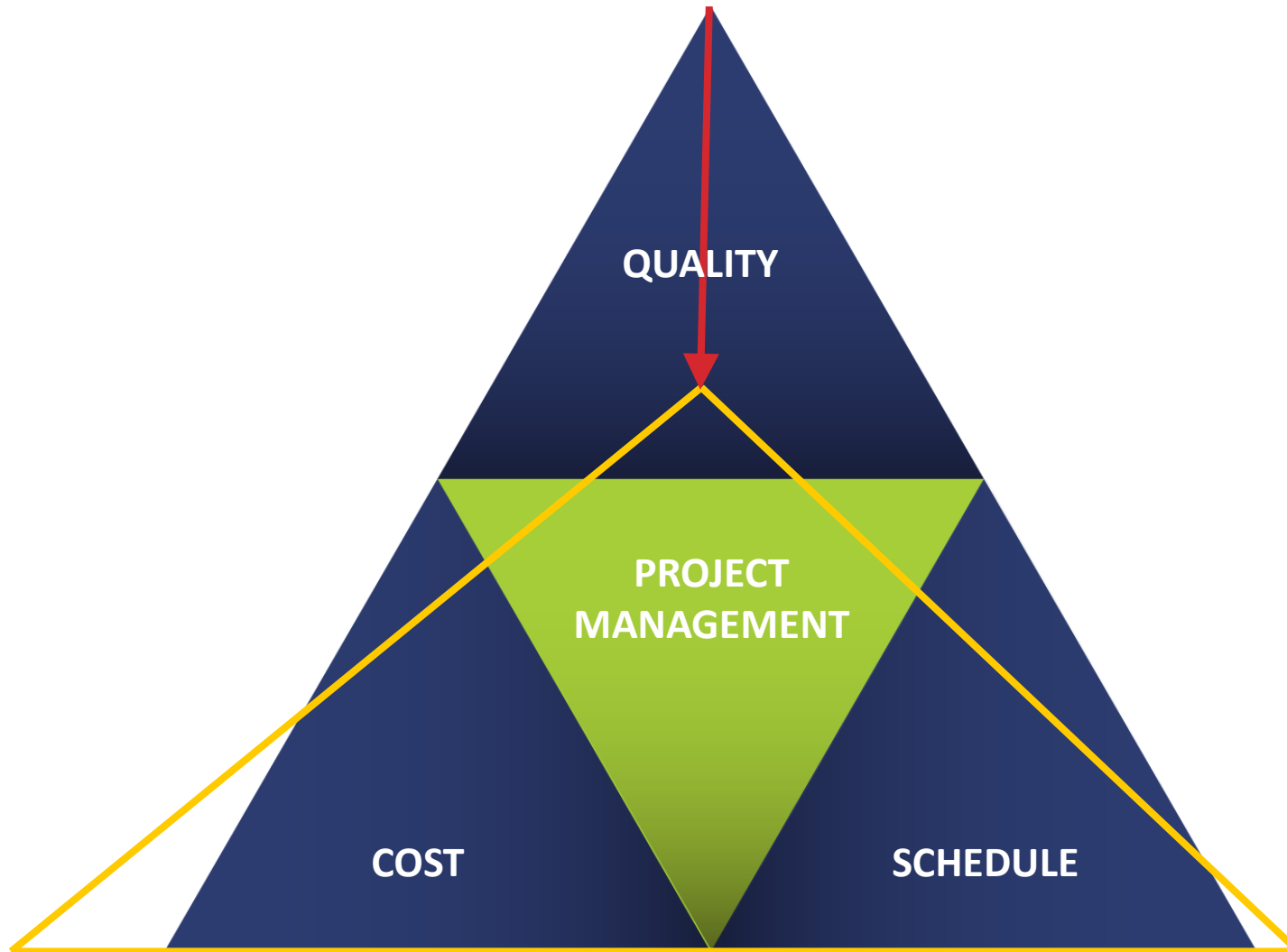


Source: [www.pwc.com](http://www.pwc.com) – Capital Projects and Infrastructure 2013

# The Business Cost of Poor Quality



4



The inter-relationship of quality, cost and schedule is likely to be unbalanced in favour of schedule and costs – and often unwittingly at the expense of quality. This imbalance will continue to exist as long as **the real cost of quality remains hidden among total costs.**

Such a condition can incur a still greater imbalance whenever the rising, but hidden true cost of quality grows to a magnitude that can significantly affect a company's competitive position.

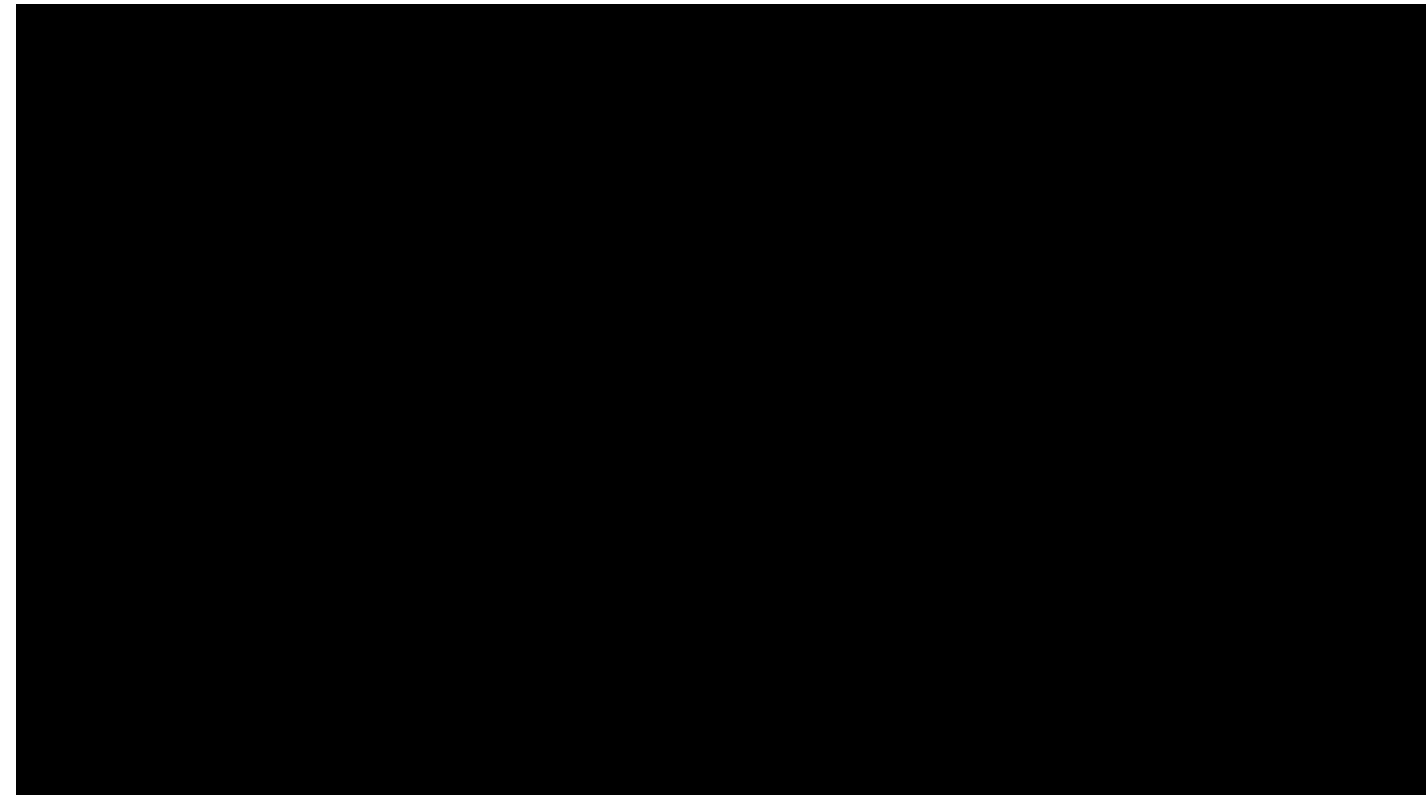
# The Business Cost of Poor Quality



4

- Safety and environmental implications due to non-compliance with statutory quality requirements.
- Non-conformance of products.
- Replacement and rework cost.
- Project delays due to non-compliance with regulations and resultant rework.
- Lack of quality management (QA & QC) on a project/service/ product.
- Lack of quality requirements in Client enquiries or final contracts with Suppliers.
- Incompetent suppliers leading to delivery of substandard products/services.
- Project delays due to replacement of suppliers.
- Additional cost and compensation claims from suppliers.
- Reduced plant availability, reliability and life.

## The Cost of Quality





# Quality Costing the PAF Model



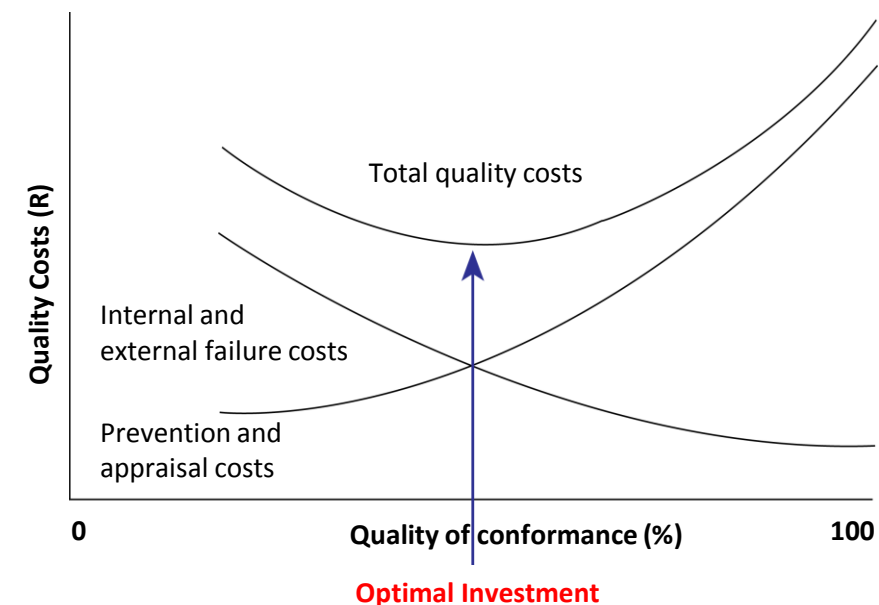
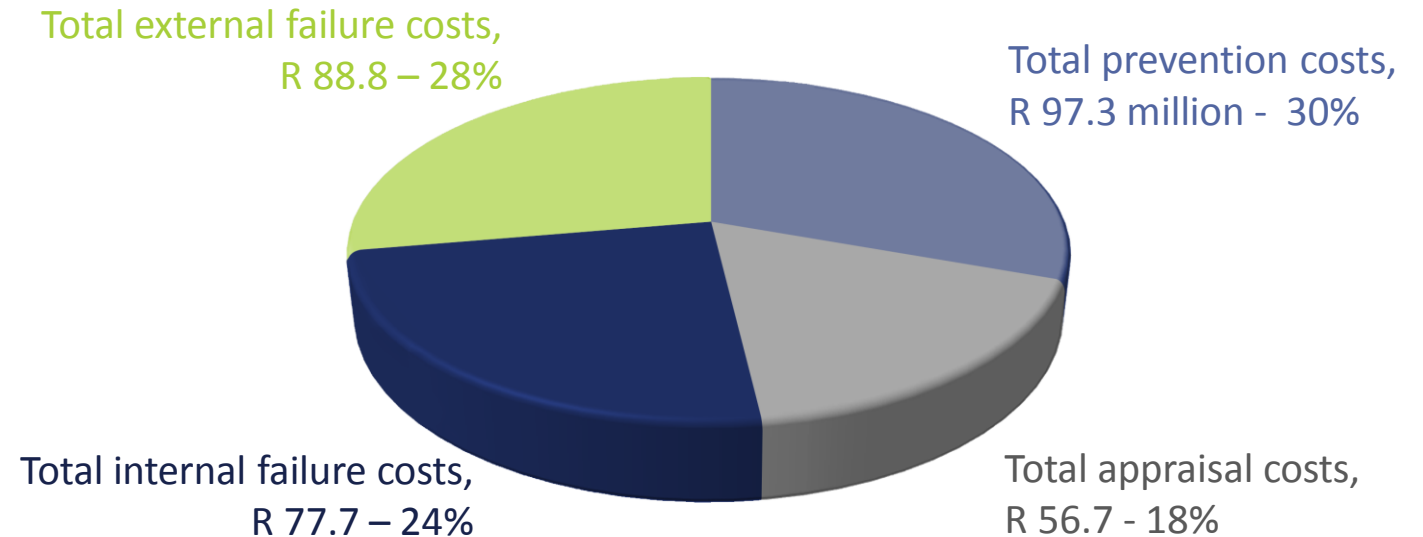
5

COST OF QUALITY SUMMARY REPORT BASED ON OPERATING EXPENDTURE	
TIME PERIOD: MARCH 2007 – JULY 2010	
Total Prevention & Appraisal Cost as % TQC	48%
Total Failure Costs as % TQC	52%
Total Quality Costs as % Operating Expenditure	27%

**Quality Costing Benchmark for an efficient QMS:**

**Failure costs as a % of TQC: 8% - 10%**

**TQC as a % of Operating Expenditure: 20%**



# The Cost of Quality Incidents



- The total number of quality incidents over a two-year period: 54
- The cost of 21 quality incidents:

**R 582.9 million**

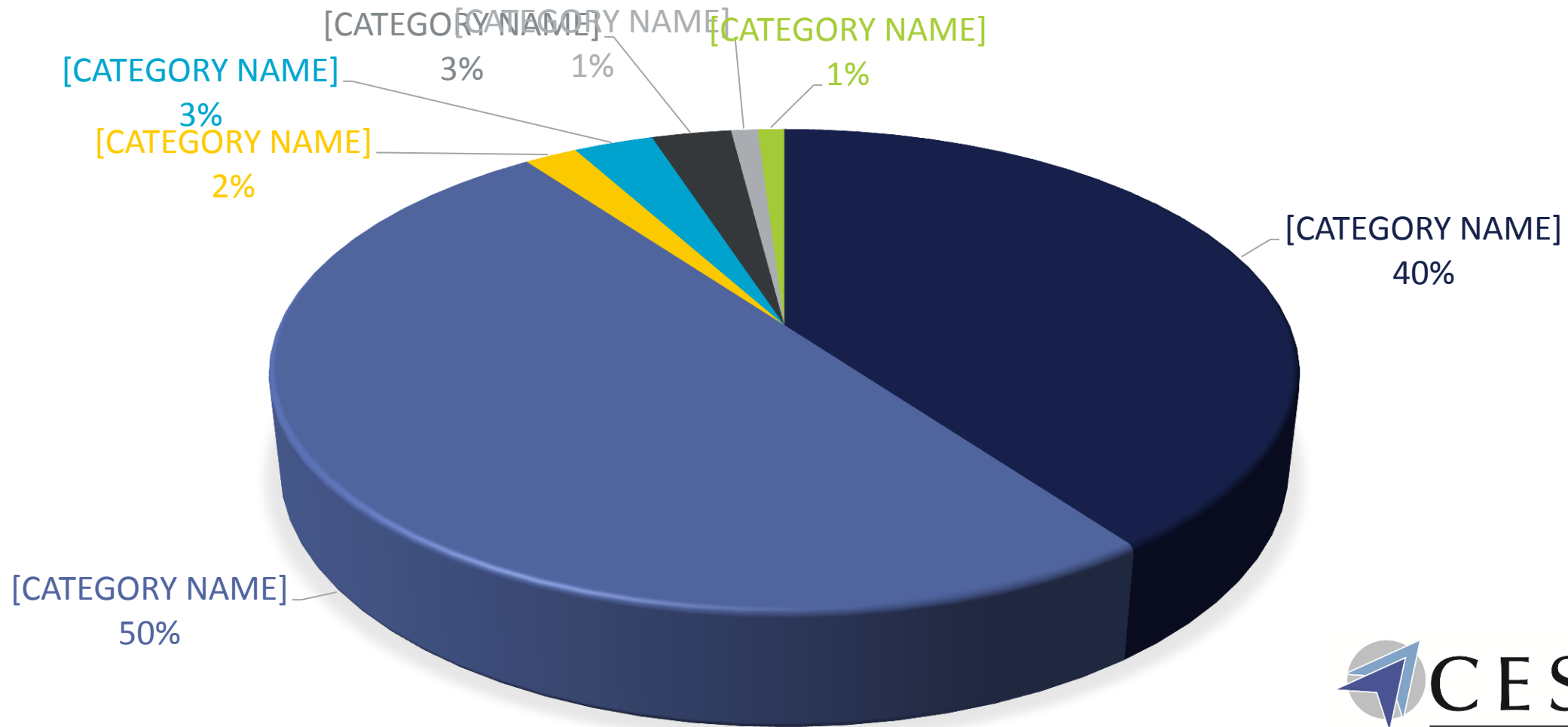
- Extrapolated quality cost for all incidents:

**R 1.5 billion**

*Marquardt, A.E.  
B Eng (Hons) Aeronautical  
Pr.Eng. (2013)*



# Claims Incurred by Disciplines

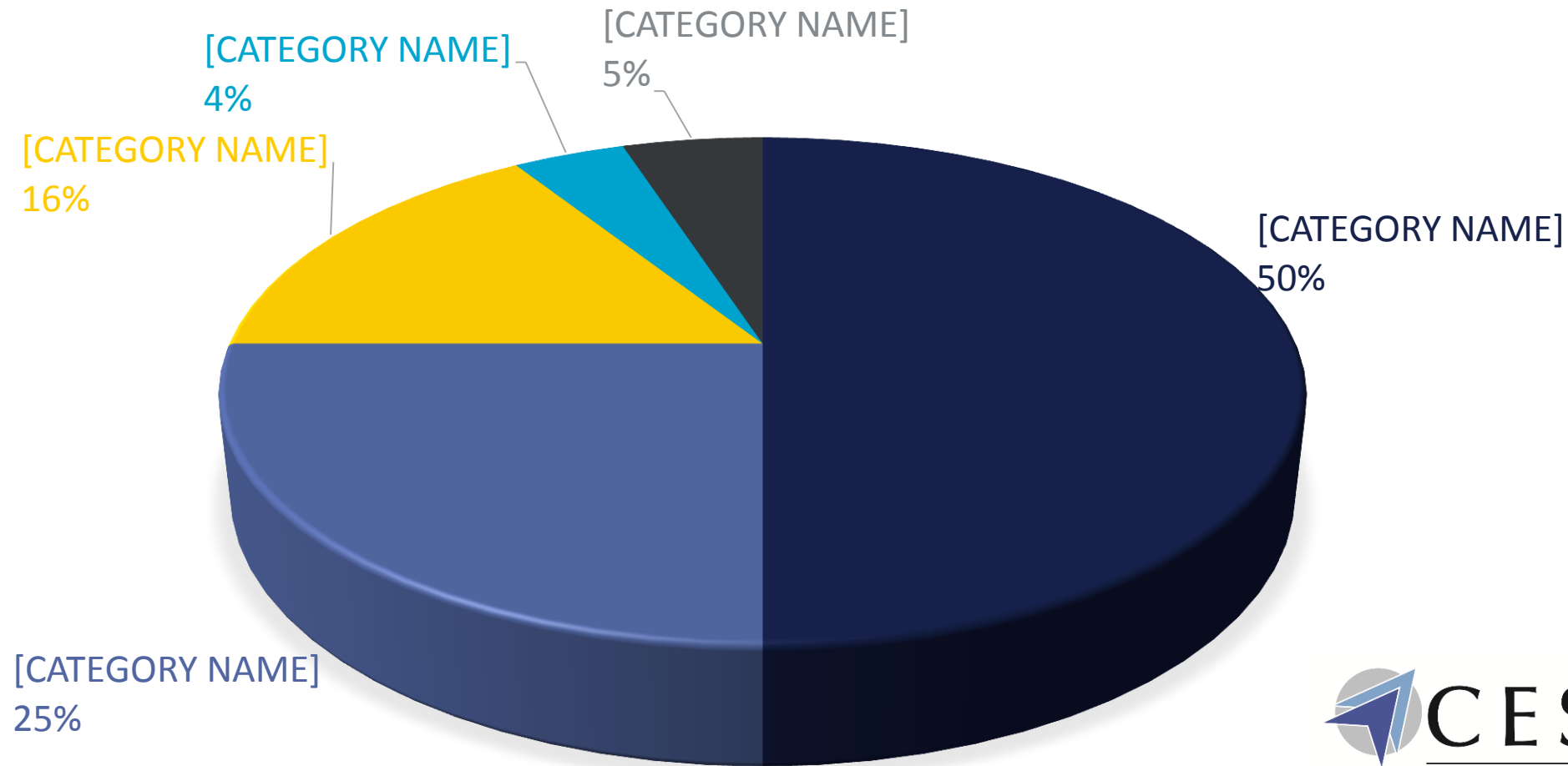


Total: R280 Million  
2005 - 2014

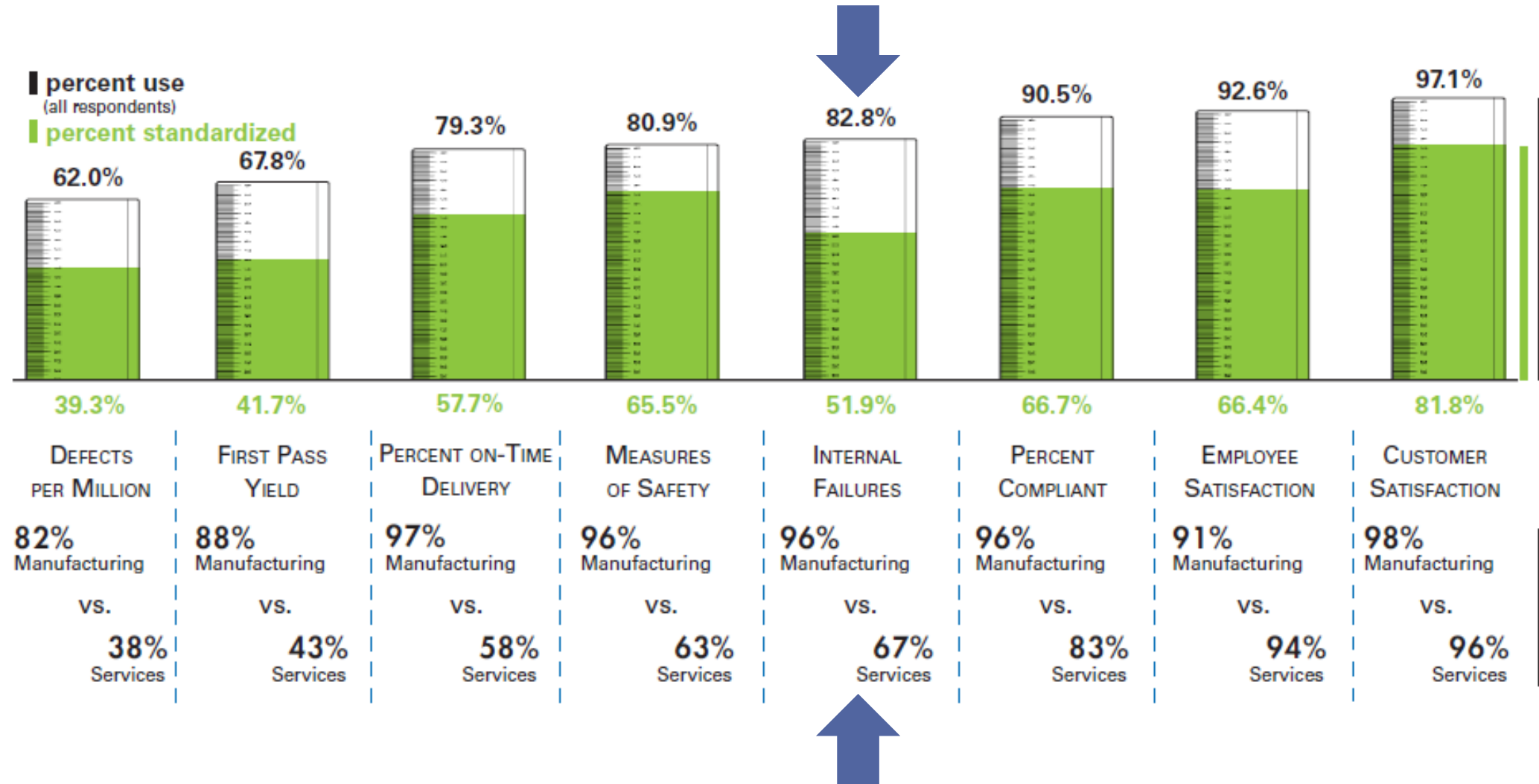




# Notifications by Stage of Project



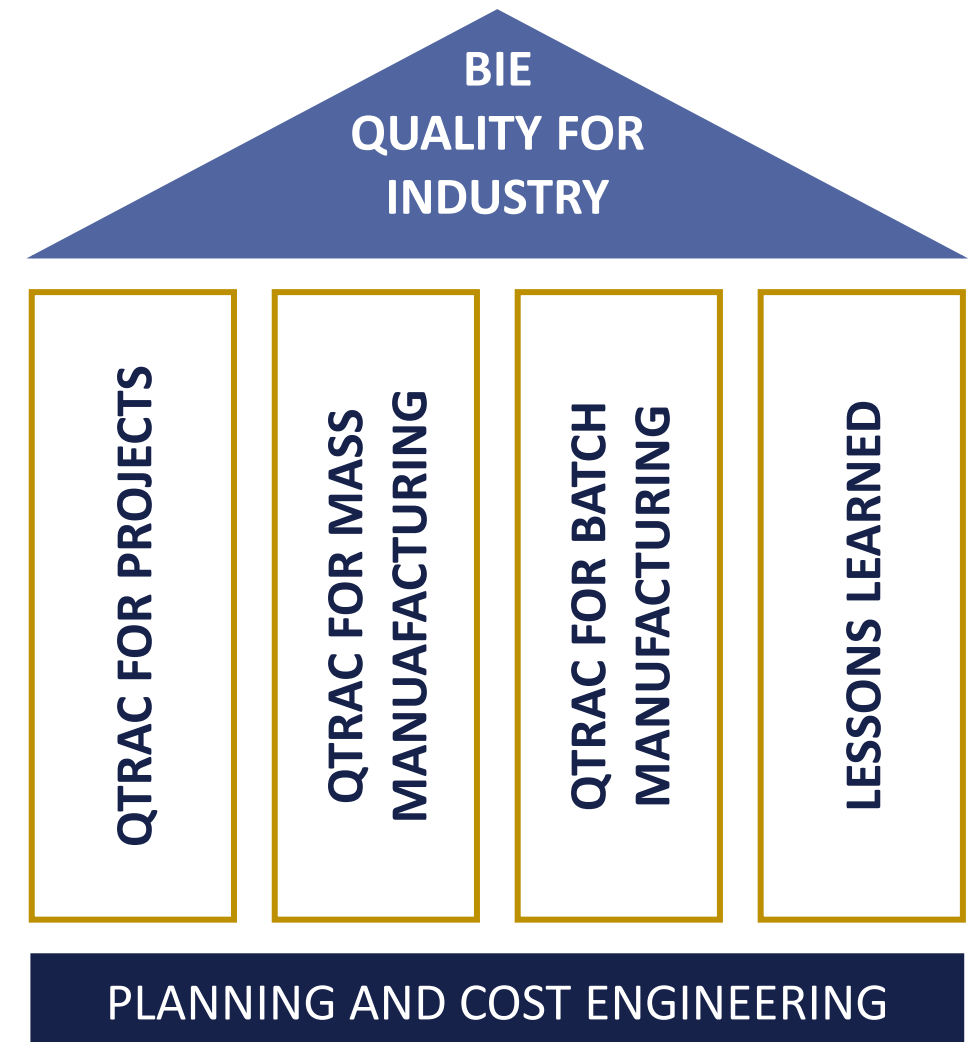
# The Use of Quality Metrics



# Quality for Industry



The ultimate value of QTrac lies in the conversion of Quality Costing to Lessons Learnt through an integrated risk management system which enables improved business and cost management for companies, waste reduction and continual improvement.

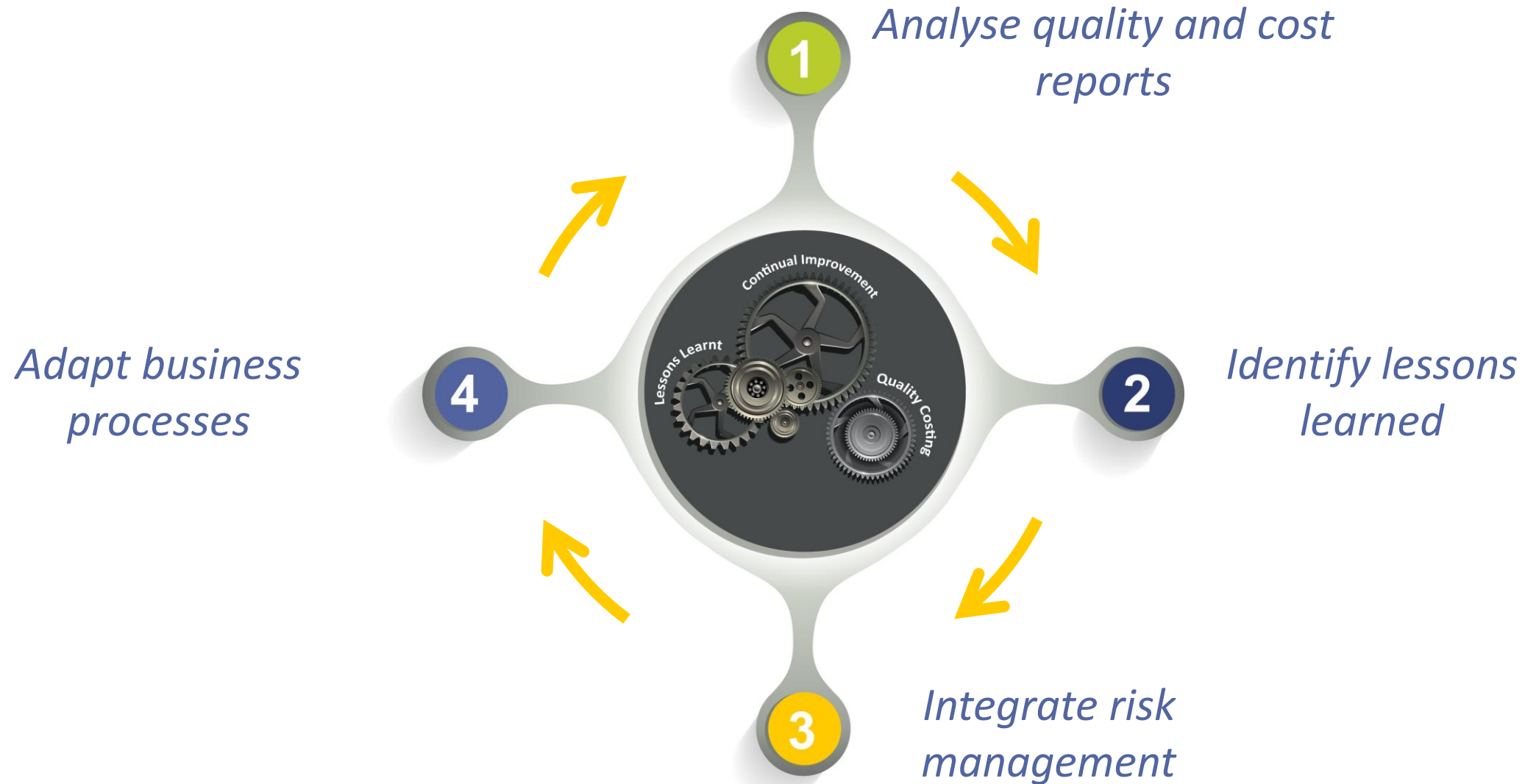




# Project Lessons Learned



7



# Category Coding: PMBoK®

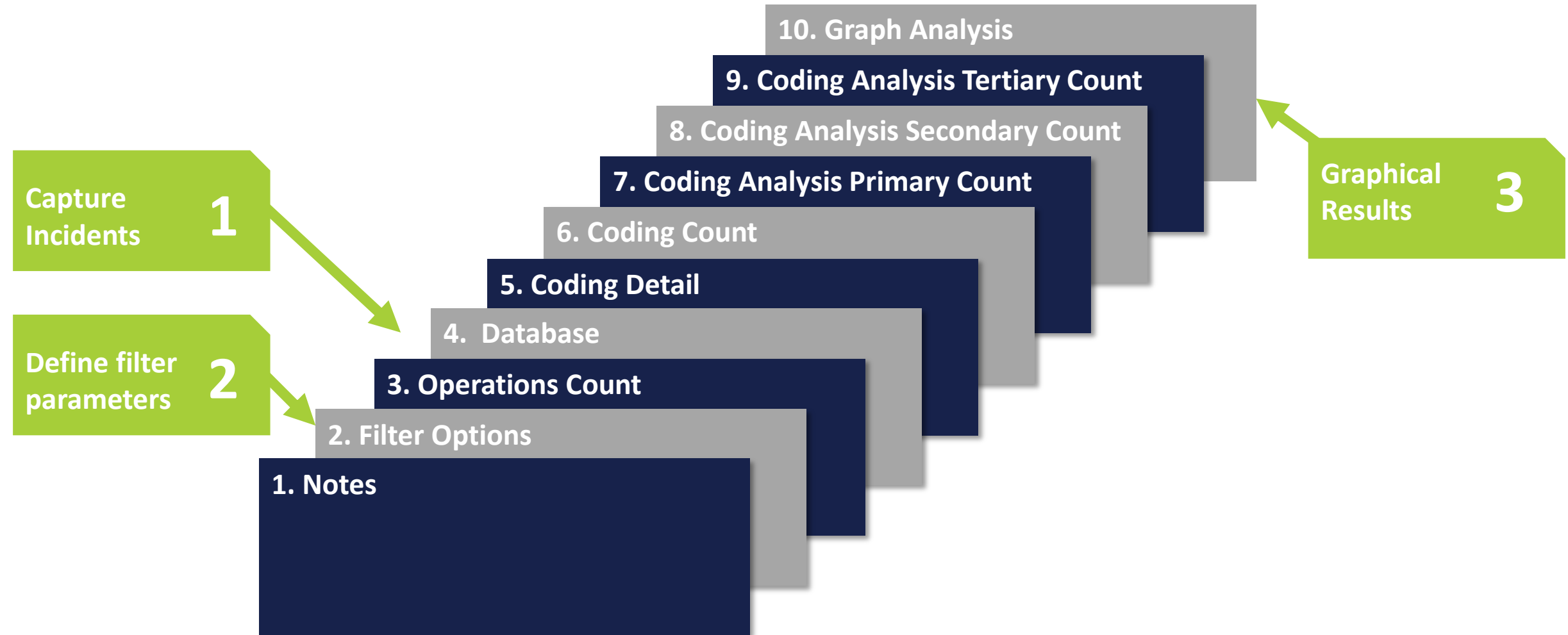


8

1. Project Integration Management
2. Project Scope Management
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management
10. Project Safety Management
11. Project Environmental Management
12. Project Financial Management
13. Project Claim Management

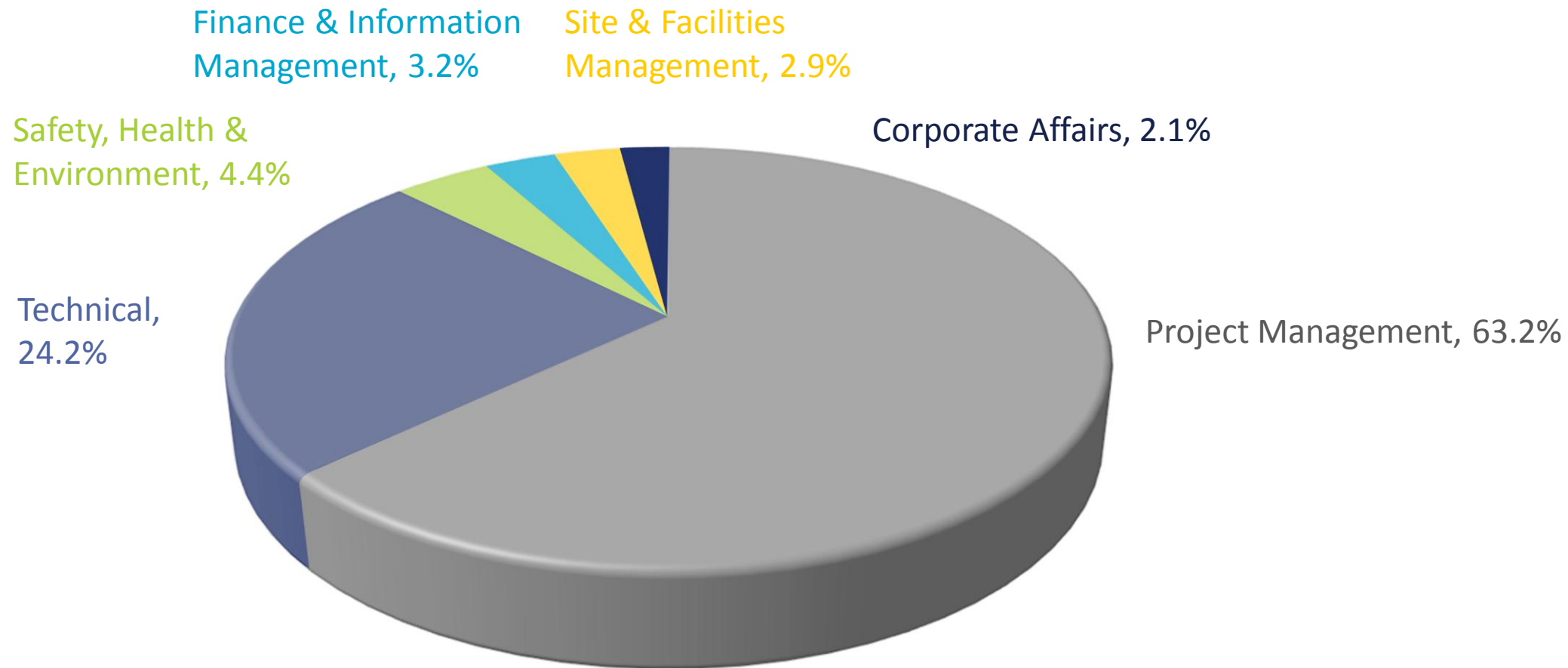
Primary Code	Secondary Code	Tertiary Code	Tertiary Code
Project Management	Project Integration Management	Project plan development	PMT-INTG-1
		Project plan execution	PMT-INTG-2
		Integrated change control	PMT-INTG-3
	Project Scope Management	Initiation	PMT-SCOPE-1
		Scope planning	PMT-SCOPE-2
		Scope definition	PMT-SCOPE-3
		Scope verification	PMT-SCOPE-4
		Scope change control	PMT-SCOPE-5

# Design of a Lessons Learned System

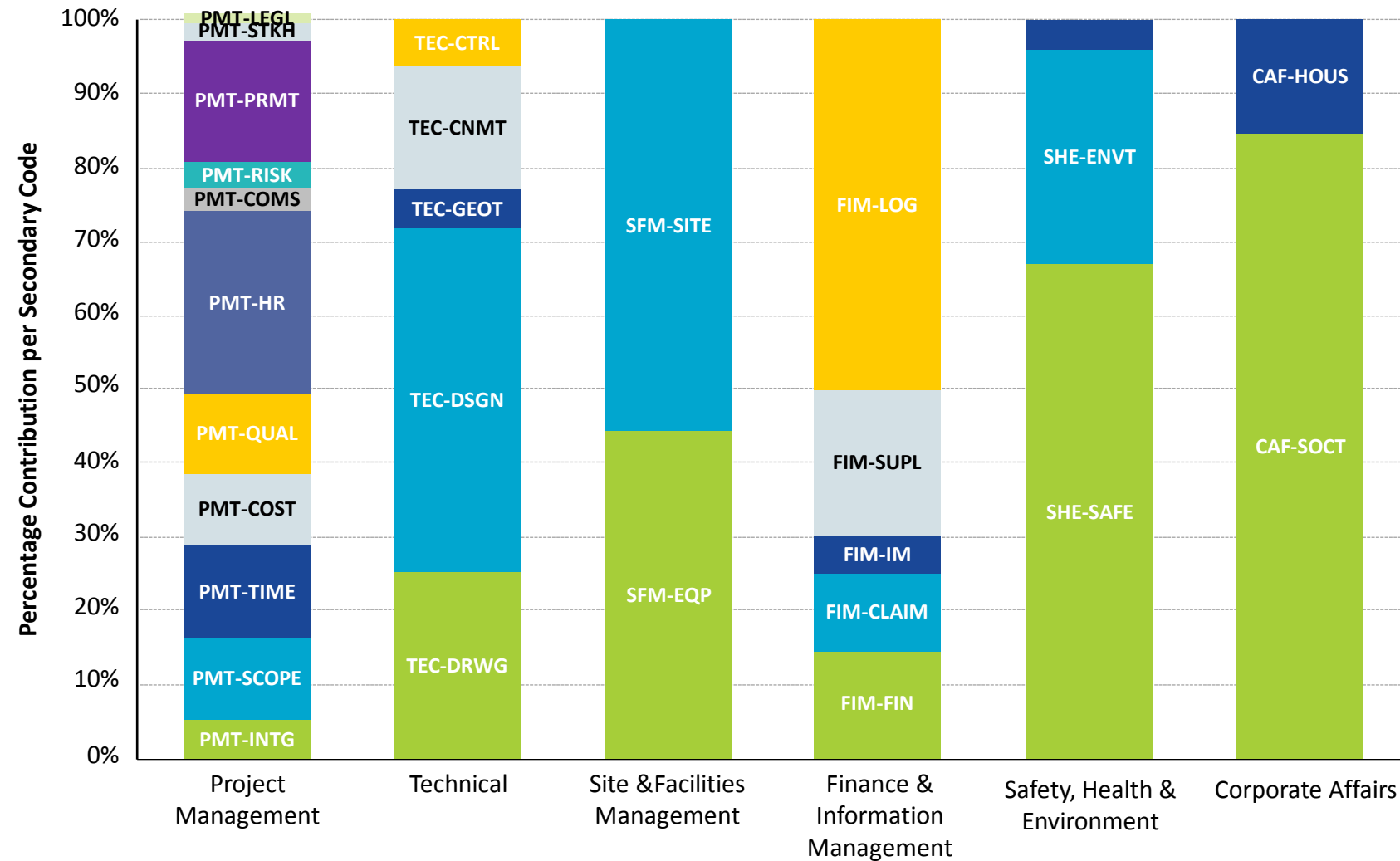


# Lessons Learned Trending Company A

## Primary Code Analysis



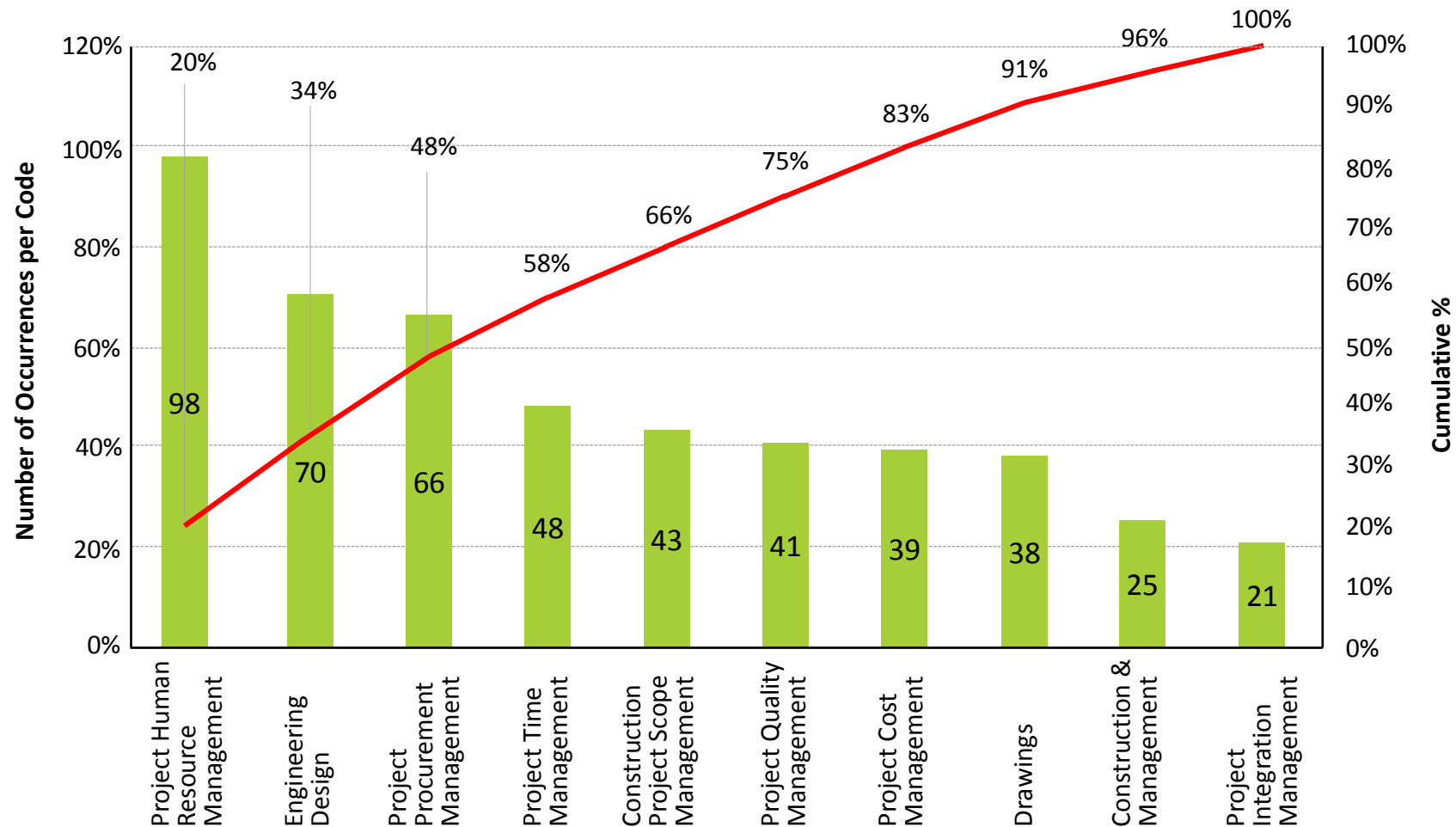
# Lessons Learned Trending Company A Breakdown of Primary into Secondary





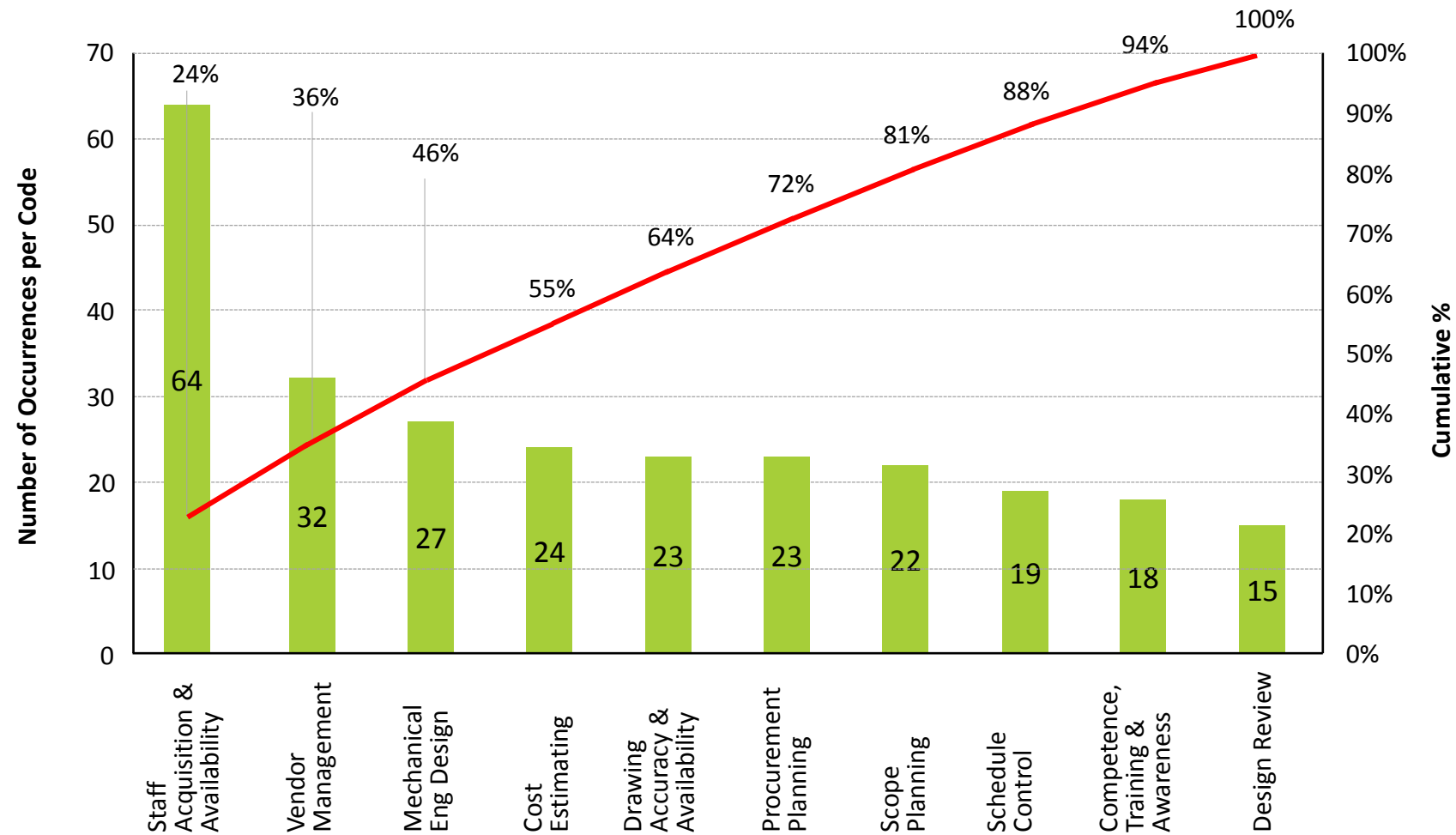
# Lessons Learned Trending Company A

## Top-10 Secondary Code Analysis



# Lessons Learned Trending Company A

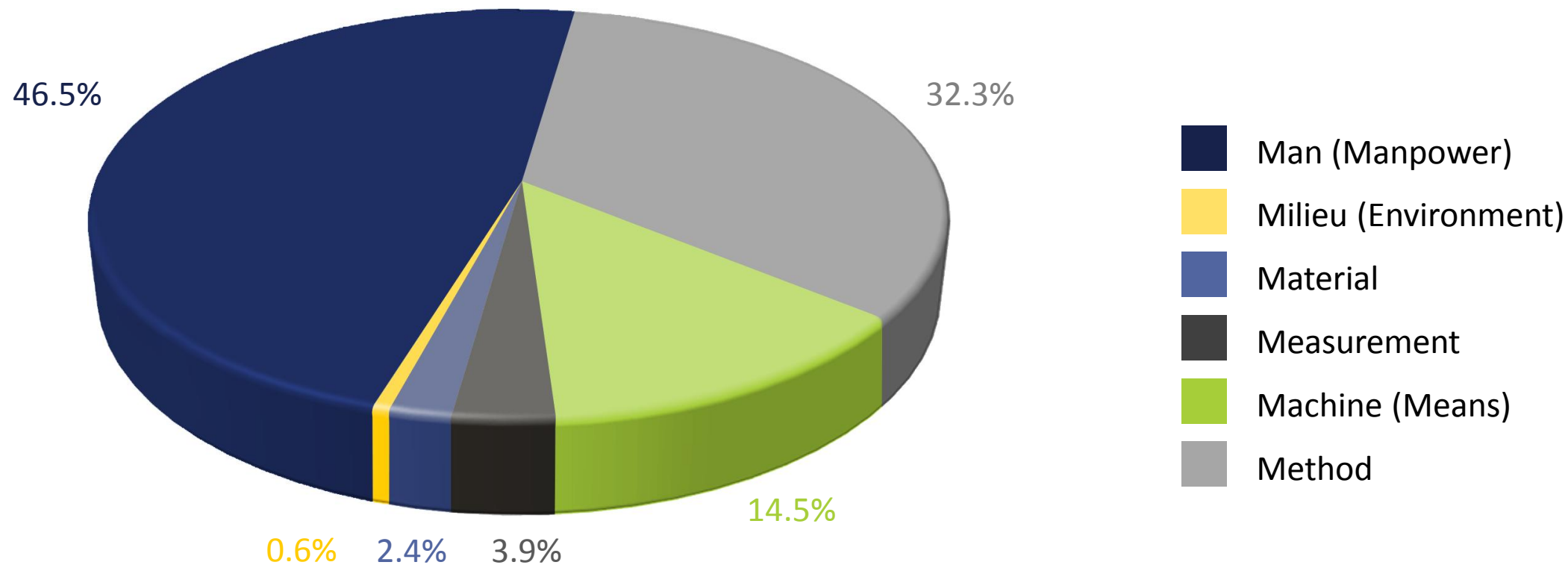
## Top-10 Tertiary Code Analysis



# Lessons Learned Trending Company B Primary (6M) Code Analysis

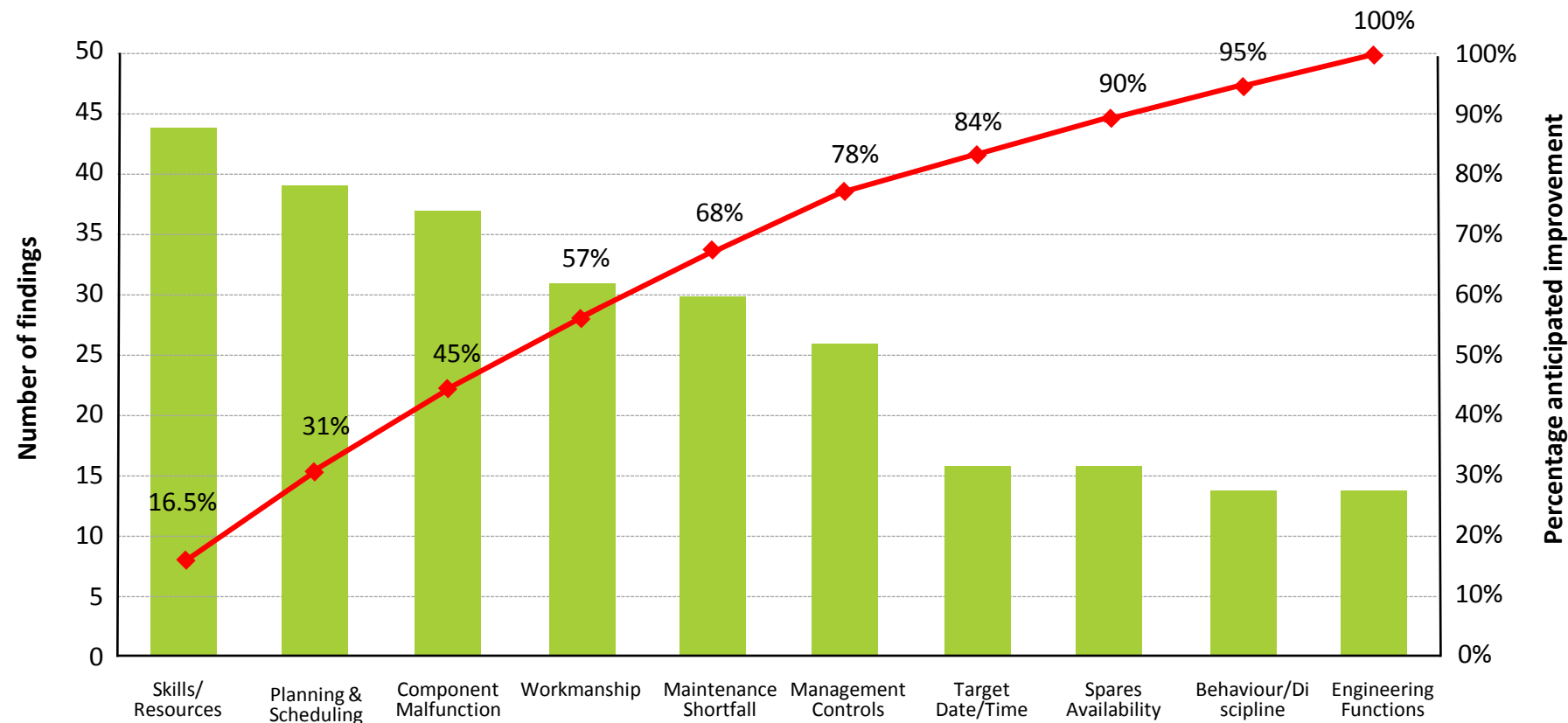


9

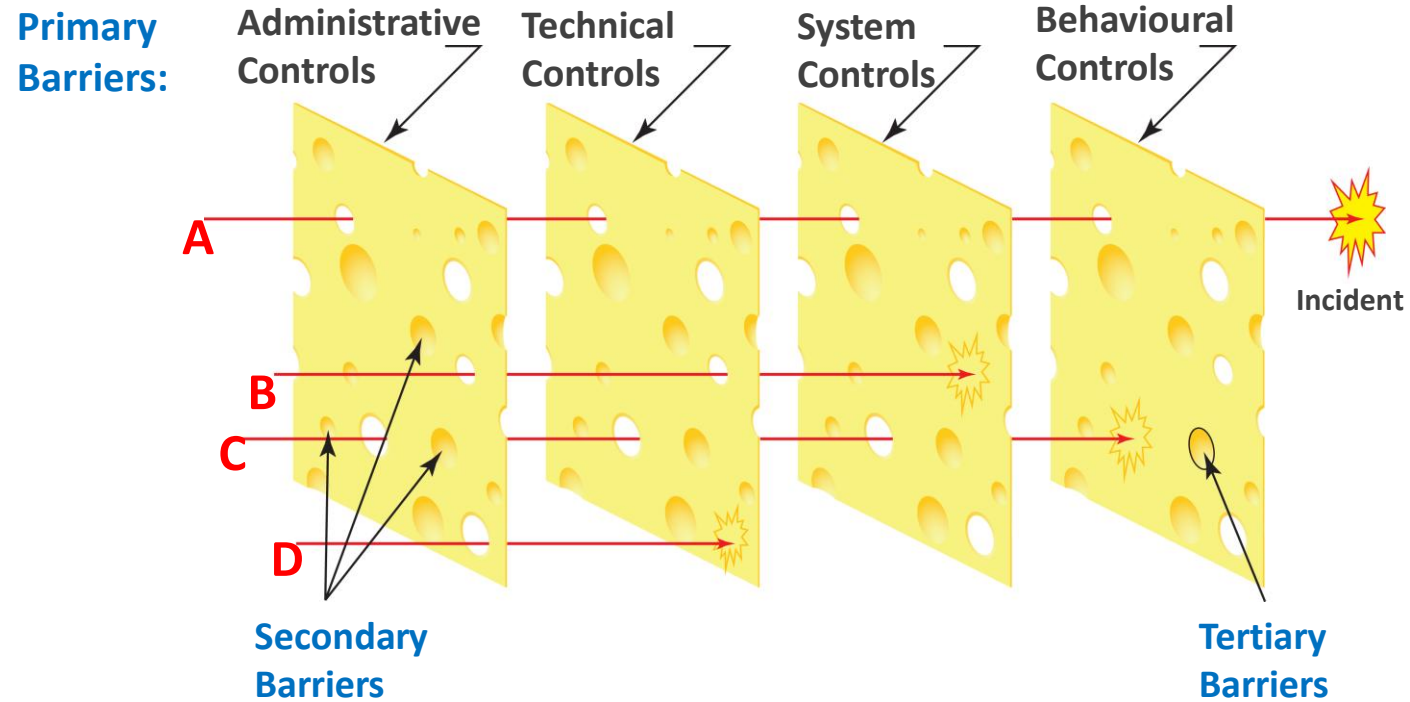


# Lessons Learned Trending Company B

## Top-10 6M Secondary Code Analysis



# Preventive Measures



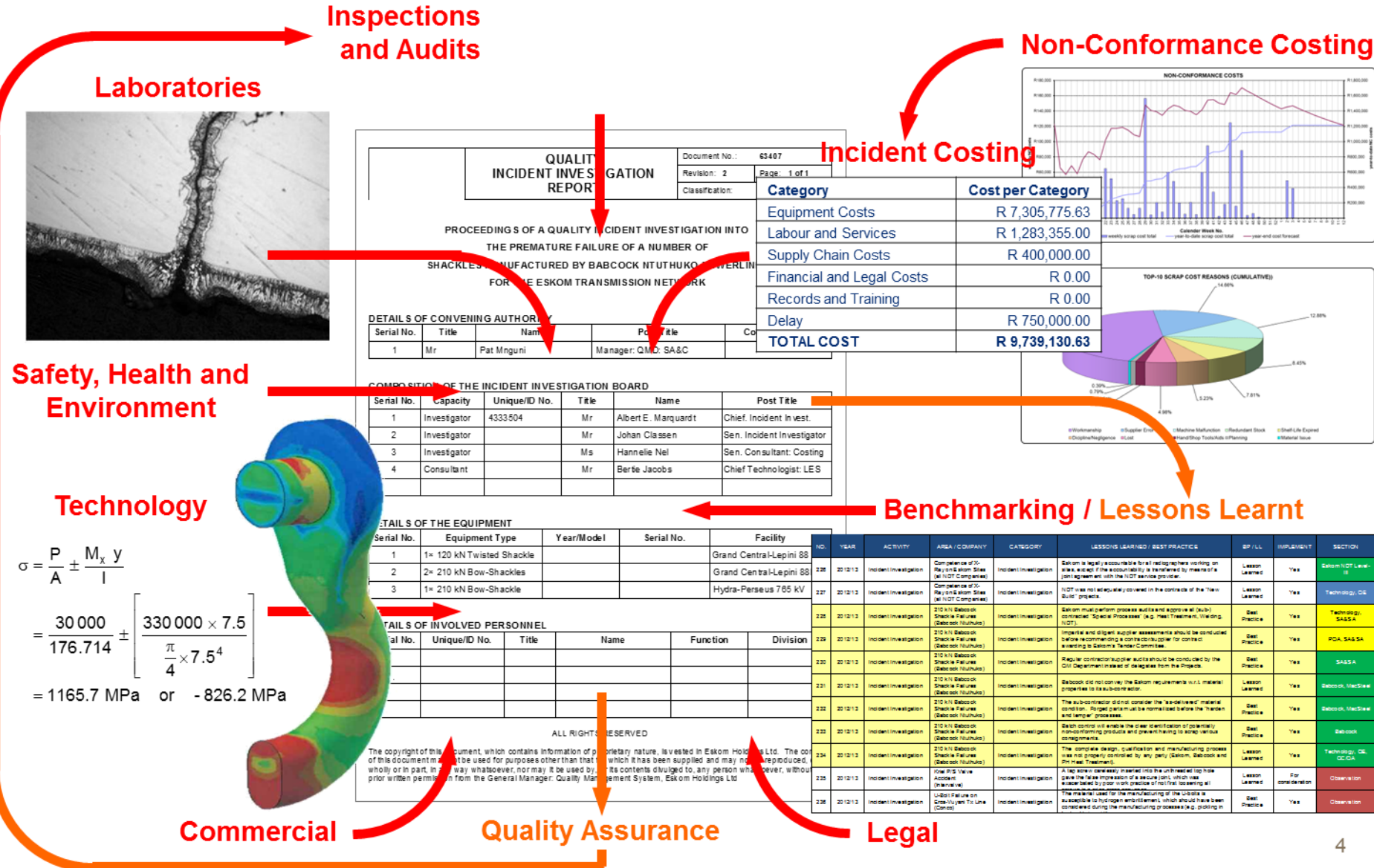
Procedure	Name/Description
PRO001	Quality System Review
PRO002	Control of Documents
PRO003	Control of Records
PRO004	Control and Disposition of Non-Conforming Product
PRO005	Corrective/Preventive Actions
PRO006	Quality Circles and Continual Improvement
PRO007	Appointment of Chief Designer
PRO008	Design Process Control
PRO009	Query Notes
PRO010	Process Planning and Approval
PRO011	Control of Identification and Certification Stamps
PRO012	First-Off Inspection
PRO013	Manufacturing Method Proving and First Article Approval
PRO014	Control of Special Processes
PRO015	Serialisation and Identification of Parts and Assemblies
PRO016	Protection and Preservation of Parts and Assemblies in Process
PRO017	Inspection and Test Status
PRO018	Rejection Note/Non-Conformance Report
PRO019	Quarantine Store/Area
PRO020	Material Review Board
PRO021	Concession and Deviation Request
PRO022	Root Cause Analysis
PRO023	Scrap Disposal
PRO024	Cost of Non-Conforming Product
PRO025	Lessons Learned and Best Practices
PRO026	Trending of Lessons Learned and Best Practices



# Quality Costing and Lessons Learned



10



*Thank you for  
your attention.  
Questions?*

