Experiences using Root Cause Analysis for Product & Process Improvement

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Overview

- Need for Root Cause Analysis
- Root Cause Analysis in Quality Systems
- Investigation of business results
- Conclusions, future direction
Ericsson EuroLab Netherlands

- Worldwide Ericsson R&D company
- Wide product range:
  - Base stations, UMTS
  - Internet Applications
  - Intelligent Networks and Services, Announcements
  - Bluetooth, Business Cordless
- 950 employees, in the south (Rijen) and the east (Enschede, Emmen)

Root Cause Analysis is done at:
- Local design centre: Development Projects
- Ericsson Corporate: Crash Commission for Outages
Need for Root Cause Analysis

• Product Quality
  – In Service Performance
  – Customer Satisfaction

• Process Performance
  – Cost and lead-time reduction
  – Efficiency

Combination of Product and Process focus
Customer Focus: Product Quality

Issues like
– outages and downtime of telephone exchanges
– loss or duplication of Billing Data
are costly and highly undesired!

First criteria for improvement: A problem!
Bottom Line Focus: Process Performance

Budget overdrawn, insufficient quality, and missed deadlines, cannot be eliminated, but:

An organisation should at least learn from its mistakes!
(and don’t make the same mistakes again…)
There is a Need for RCA

Product quality and process performance are both good reasons to prevent problems from happening again, at the customer and in projects.

Best way to save money is to prevent problems!

Root Cause Analysis identifies basic/most effective actions
Root Cause Analysis in Quality Systems

Total Quality Management (TQM)

Capability Maturity Model - Integration (CMM-I)

International Telecommunication Union (ITU)

ISO 9001

Can models help us?
TQM

Overall philosophy to continually improve processes, activities, and operations to better meet customers expectations
Focus on achieving Customer Satisfaction
Key is management support, direction & commitment

RCA is performed:
• reactively on problems that have already occurred or
• proactively to anticipate on potential problems in the future (risk analysis).
CMM-I

Level 5 Process Area: Causal Analysis and Resolution (CAR)

- Select problems to investigate, based on quantitative criteria
- Analyse problem and determine the most basic causes
- Define corrective actions, and implement in the organisation
- Measure effect of improvements

RCA is done based on quantitative data (outliers), using available capability of an organisation to improve.
ITU

Recommendation E.436 Customer Affecting Incidents and Blocking Defects

• RCA is mandatory if failure occurs more than N times
• RCA is encouraged for failures that affect specific customers and are triggered by chronic customer complaints.
• RCA is also encouraged if process failures occur less than N times: could mask an underlying problem that could potentially have had a much larger impact.

Criteria when RCA is to be performed are to be specified in a company policy
ISO 9001

Root Cause Analysis is part of corrective action process, done to improve the effectiveness and efficiency of the processes.

Multiple sources of information are used, including:
- Customer complaints
- Process measurements
- Audits and assessments

RCA is used to define improvement actions based on actual/potential problems
Conclusions Quality Systems

Root Cause Analysis is a quality management approach, and as a set of techniques for finding basic causes of problems and defining actions to prevent them from happening again.

- Either pro-active or reactive
- Best if based on quantitative data
Investigation of RCA Business Results

By student of Industrial Engineering and Management of the University of Twente, Enschede

Research approach:
- RCA according to literature
- Investigate how RCA has contributed to goals
- Look for potential future application of RCA
- Recommendations for further implementation of RCA
Actions & Cost/Benefit

12 RCA sessions done in a year within one unit
Resulted: 190 Root Causes and 135 Preventive Actions
60% of actions done, average cost/benefit of 1:2
Future Potential of RCA

Potential for improving customer satisfaction

Preventing problems iso solving them, but with process improvement

RCA as a means to come to product innovations
Lessons Learned:
- CAR is a support area: Guidance on application needed
- Description of CAR in CMMI has been usable
- Possible to implement CAR in a non level 5 organisation
Recommendations Investigation

RCA processes are **sufficiently defined** at Ericsson

Insufficient institutionalisation of RCA, a **policy** is needed

RCA has significant positively contributed to business goals, there is a good **Business Case** to continue them
Where to Go From Here

• Solid frameworks exist for RCA
  – CMMI Causal Analysis and Resolution
  – TQM, ISO & ITU

• RCA contributes towards business goals
  – Cost and lead-time reduction
  – Potential for customer satisfaction & innovation

Policy is essential!
  Commitment and support
  Budget for countermeasure actions
  Assure that RCA is applied effectively