OXFORD8

Client Advisory Note: Root Cause Analysis

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1. Introduction

Root cause analysis plays a critical role in programmes: Be it the analysis of a specific issue, or wholesale remediation (for example, under a Section 166 notice), any plan of action, irrespective of how well it is executed, will only be effective if the root causes have been accurately identified and a solution has been defined which addresses the root cause. Without precise root cause analysis, the best that any remediation effort is able to achieve is a plan, perfectly executed, to fix not-quite-the-right-thing.

2. Assessment

Oxford8 is often asked to independently assess the quality of the root cause analysis, and we do this via the acronym 'ICE' (Impact-Causation-Evidence), applying the following tests:

1. Impact
   a. Is the impact clearly stated in terms of what, who and how?
   b. Is it qualified and quantified, for example, the circumstances under which the impact is felt, how often it happens, the resulting costs, etc?
2. Causation
   a. Is the root cause clearly identified?
   b. Is it genuinely the root cause as distinct from merely being a symptom of a deeper issue? Is the causal effect clear, i.e. clarity from cause to resulting impact?
3. Evidence
   a. Is there evidence cited in support of the analysis?
   b. Does that evidence align to the cause and the impact?

It is often the case that the first-pass assurance of root cause analysis finds significant issues, and this should not raise any concerns, as root cause analysis is an iterative process anyway, so the old adage of "do a bad draft because you cannot edit a blank page" applies. Iteration should then focus on deconstructing the initial draft in line with the ICE acronym.

3. Worked Examples

3.1. First Draft

"Software Development MI is poor, resulting in failure to spot delays until after the release deadline is missed."

This is not untypical of a first pass analysis. If applied, none of the assurance tests in relation to 'Impact' would be passed for the following reasons:

1. The impacts (e.g. project slippage) are not actually identified.
2. There is no qualification. MI can be 'poor' in ways: It can be inaccurate, untimely, irrelevant, misleading, superficial or too granular – or all of the preceding. Qualification also entails stating the conditions under which the impacts occur. Is it for example, endemic throughout the software development lifecycle, or does it occur at specific points in the lifecycle?
3. There is no quantification of the impact, so in the case of project slippage, the amount and therefore the cost of it, the number of occurrences, over what time period, etc.

The assurance tests in relation to 'Causation' would not be passed at all, as the entry does not state any causation.

Similarly, the assurance tests in relation to 'Evidence' would not be passed at all, as the entry makes no reference to any causation.

3.2. Fully Developed

Impact:

Software Development MI lacks reliable fixing and testing estimates for defects arising during system integration testing, preventing corrective action to avoid slippage. This has occurred on three separate occasions in the past 12 months, resulting in cumulative slippage of 12 weeks at a critical path cost of £1.2M.

Causation:

The deficiencies in MI are due to a combination of factors:

1. The instance of Jira (the defect management system) has not been configured to enable its use for system integration testing, so systematised Software Development MI does not currently cover system integration testing at all. Consequently, MI for system integration testing is compiled manually via verbal and email reports, leading to inconsistencies, misunderstandings and transcription errors.
2. The system integration testing team have not been trained in the use of Jira.
3. No Jira licences have been provided for the system integration testing team.
4. The system integration testing team are unfamiliar with the architecture of the client's existing platform and are therefore basing their estimates on assumptions which have consistently proven not to be true.
5. The system integration testing team have had to make assumptions because there was no architectural documentation.
6. There was no architectural documentation because during the original implementation, budget to cover the production of documentation was reallocated to the development of additional functionality to ensure that the overall business

case was met. Note that it had been expected that documentation would be addressed post-launch, but this activity was again de-prioritised to focus on fixing defects which only surfaced immediately following the launch.

7. The defects only surfaced immediately following the launch because they had not been correctly identified during the test phase due to decision to limit the scope of User Acceptance Testing due to time pressures.

Evidence:

a. The SteerCo decks and minutes detailing/quantifying the three instances of schedule slippage.
b. The MI specifically for the most recent round of system integration testing.
c. The emails from which item a) was compiled.
d. An email from the procurement team declining the request for Jira licences and training for the system integration testing team, citing a company-wide management instruction to minimise spending due to poor financial results in the preceding quarter.
e. An email exchange between the solutions architecture lead and the system integration testing team lead confirming the absence of architectural documentation and the underlying reasons.
f. A report compiled by the system integration testing team lead confirming the list of incorrect assumptions which led to mistakes in system integration testing.
g. A minute of the steering committee decision to de-prioritise documentation in favour of additional functionality in the launch release.
h. The Post-Incident Review Report compiled in the aftermath of the issues encountered following the original launch of the platform.

4. Additional Points

1. It is vital that everyone involved in root cause analysis understands the true purpose of it, specifically the 1-10-100 rule. We also recommend that everyone involved is exposed to a case-study such as HMS Queen Elizabeth: Four keystrokes in Excel was infinitely preferable to a £20M dry-dock, expensive repairs, extensive downtime, and adverse publicity, and the latter was only avoided because of rigorous root cause analysis.

2. Note that root cause analysis does not include solution design. That is a separate activity which is purposefully firewalled from root cause analysis to prevent any tendency to cut to solutionising prematurely, i.e. before the real root causes have been properly surfaced.

3. Note that root cause analysis does directly enable solution design. The normal technique within solution design is to take the causal chain and devise permanent solutions to each of the causal factors, working upwards from the bottom of the stack. In the worked example, the solution design would start with measures to address Causation Point 8 (the decision to limit the scope of User Acceptance Testing), which would normally be addressed via amendments to the Steering Committee's Terms of Reference and a clear instruction to the PMO to enforce the governance accordingly in the light of past experiences. The solution design process would them move on to address Causation Point 7, and so on, moving methodically up the causal chain to the top.

4. For more complex causal chains, techniques such as fishbone analyses should be considered as they enable more effective analysis, and also enable clearer articulation to solution designers and decision-makers.

5. Evidence plays a dual role in root cause analysis: It provides context, which in turn aids understanding, but it also provides objectivity which avoids conflict in the form of assertion and counter-assertion which would otherwise slow the pace of remediation due to a lack of consensus re root causes. By contrast, evidence enables the parties to coalesce around the agreed root cause and make it the common enemy, which contributes significantly to the ethos of teamwork typically required to deliver remediation successfully.

6. Whilst the good example above clearly requires more effort than the bad example, the trade-off between effort and value is significant, specifically:

    a. The identification of the true root causes as distinct from mere symptoms.

    b. The identification of contributory factors, the impact of which should not be underestimated.

    c. The surfacing of evidence, reducing conflict which would otherwise impede remediation.

    d. A complete causal chain, which makes solution design considerably more time-efficient (because much of the groundwork has already been done) and more effective (because the targeting of solution to root causes is highly accurate).

7. There's an old adage that root causes don't carry passports: They are no respecters of an individual's job description, a function's remit or even the borders that exist between supplier and customer organisations. So, similarly, root cause analysis has to be a cross-border activity that considers the whole chain, throughout both the customer and the supplier organisation, and sometimes even through to third parties in the supply chain. In other words, be prepared (and authorised) to go wherever the analysis leads you.

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