

ABSTRAK

Chandra Wahyudi, Made (2026) Penerapan *Root Cause Analysis* dan *Analytical Hierarchy Process* dalam Mengidentifikasi Kegagalan Uji Fungsional *Origination Pinjaman* pada *Quality Assurance Engineer*.
Tesis, Ilmu Komputer, Program Pascasarjana, Universitas Pendidikan Ganesha.

Kata Kunci : *RCA, AHP*, Uji Fungsional, Perbankan Digital

Kegagalan uji fungsional yang berulang pada sistem *origination* pinjaman perusahaan *DJOIN* (2023–2025), terutama pada modul *Dashboard* validasi saldo dan transfer antar rekening, berdampak pada gangguan operasional dan penurunan kepercayaan nasabah. Penelitian ini menerapkan *Root Cause Analysis (RCA)* untuk mengidentifikasi akar penyebab kegagalan dan *Analytical Hierarchy Process (AHP)* untuk memprioritaskan solusi perbaikan secara objektif. *RCA* dilaksanakan menggunakan *Fishbone Diagram* (kerangka 6M), *5 Why Analysis*, dan *Cyber-Physical Co-Mutation Analysis*, didukung data dari *Bug Tracking System*, *System Logs*, dan wawancara dengan tim *QA, Software Engineer, Product*, serta *DevOps*. Hasil *RCA* kemudian ditransformasi menjadi 5 kriteria *AHP*, yaitu dampak bisnis, biaya, waktu, efektivitas jangka panjang, dan kompleksitas teknis, untuk mengevaluasi 12 alternatif solusi dari empat kategori: *Human Factor*, sistem & alat, proses & metode, serta komunikasi & dokumentasi. Penelitian ini menghasilkan tiga luaran utama: (1) *Framework* terintegrasi *RCA-AHP* untuk konteks *QA* perbankan digital, (2) *Strategi* mitigasi teknis (*corrective Action*) berdasarkan prioritas tertinggi, dan (3) rekomendasi perbaikan *SOP Testing Life Cycle* sebagai langkah preventif berkelanjutan. Hasil penelitian menunjukkan bahwa kedua rumusan masalah telah terjawab dan tujuan penelitian telah tercapai. Penerapan *RCA* yang berhasil mengidentifikasi 12 *root cause* dari 1.759 tiket *bug*, dikategorikan ke dalam enam dimensi *Fishbone 6M* dengan tiga *root cause* berkeparahan tertinggi: *hardcoded Product type assumption* pada *Dashboard Validasi Saldo* (skor 4,67), ketiadaan *regression test suite* (skor 4,33), dan *Log error* yang tersebar (skor 4,33). Penerapan *AHP* yang menghasilkan ranking prioritas solusi dengan Consistency Ratio < 0,10: *Automated Testing Framework* (skor 0,1742) sebagai prioritas pertama, *CI/CD Implementation* (skor 0,1346) sebagai prioritas kedua, dan *Test-Driven Development* (skor 0,1270) sebagai prioritas ketiga. Ketiga solusi teratas berasal dari kategori teknis-sistemik, memvalidasi temuan *RCA* bahwa akar masalah bersifat struktural pada arsitektur sistem dan proses, bukan semata faktor manusia.

ABSTRACT

Chandra Wahyudi, Made (2026), Application of *Root Cause Analysis* and *Analytical Hierarchy Process* in Identifying Functional Testing Failures of Loan Origination Systems for Quality Assurance Engineers. Thesis, Computer Science, Postgraduate Program, Universitas Pendidikan Ganesha.

Keywords: RCA, AHP, Functional *Testing*, Loan Origination

Recurring functional testing Failures in DJOIN's loan origination system (2023-2025), particularly in the balance validation dashboard and inter-account transfer modules, resulted in operational disruptions and diminished customer trust. This study applies Root Cause Analysis (RCA) to identify the underlying causes of Failures and the Analytical Hierarchy Process (AHP) to objectively prioritize corrective solutions. RCA was conducted using a Fishbone Diagram (6M framework), 5 Why Analysis, and Cyber-Physical Co-Mutation Analysis, supported by data from the bug Tracking System, system Logs, and structured interviews with QA, Software Engineering, Product, and DevOps teams. RCA outputs were subsequently transformed into five AHP criteria — business impact, implementation cost, time to implement, long-term effectiveness, and technical complexity — to evaluate 12 alternative solutions across four categories: human factors, systems and tools, processes and methods, and communication and documentation. The study produced three primary outputs: (1) an integrated RCA-AHP framework for digital banking QA contexts, (2) a technical mitigation strategy (corrective action) based on the highest-ranked priorities, and (3) SOP improvement recommendations for the Testing Life Cycle as a sustainable preventive measure. The findings demonstrate that both research questions have been answered and the research objectives have been achieved. The application of RCA successfully identified 12 root causes from 1,759 bug tickets, categorized across six Fishbone 6M dimensions, with three root causes of highest *severity*: hardcoded Product type assumption in the Balance Validation Dashboard (score 4.67), absence of a regression test suite (score 4.33), and scattered error Logs (score 4.33). The application of AHP produced a priority ranking of solutions with all Consistency Ratios below 0.10: Automated Testing Framework (score 0.1742) as the first priority, CI/CD Implementation (score 0.1346) as the second, and Test-Driven Development (score 0.1270) as the third. All three top-ranked solutions belong to the technical-systemic category, validating the RCA finding that root causes are structural in nature — rooted in system architecture and processes, rather than merely human factors.