

BUSINESS CASE AI-Driven Legacy Modernization

Reverse Engineering, Documentation and Specification Generation

Prepared for Grupo GarLo

Executive Discussion Draft

Objective: establish a controlled, AI-enabled path to understand, document and modernize legacy technology while protecting business continuity and institutional knowledge.

1. Executive Summary

Grupo GarLo has an opportunity to address legacy-system complexity with a practical approach that combines Generative AI, software engineering and technology governance. The immediate challenge is not simply replacing old technology; it is understanding the business logic that has accumulated inside the current environment and converting that knowledge into reliable specifications for modernization.

The proposed capability uses AI to analyze source code, database structures, stored procedures, interfaces, configurations, batch processes and available documentation. It reconstructs architecture, dependencies, data flows and business rules, then produces structured functional and technical specifications that are reviewed by human experts before being used for modernization.

The result is a repeatable modernization method that reduces manual discovery effort, preserves institutional knowledge, improves traceability and creates a controlled bridge from legacy applications to modern architecture.

2. Business Context and Current-State Challenge

For a retail organization, core technology directly influences store operations, inventory, pricing, sales, logistics, customer experience and management reporting. Legacy applications can remain stable for many years, but their accumulated technical debt increases the cost and risk of change.

The current technology context points to legacy applications built around VB6 and SQL Server, with years of patches and accumulated modifications. In this type of environment, the actual behavior of the system is often distributed across forms, modules, stored procedures, databases, interfaces and exceptions known by individual developers. This makes modernization slower and increases key-person dependency.

The business risks are:

- High effort to understand existing functionality before changing it.
- Undocumented business rules embedded in legacy code and database logic.
- Dependency on experienced personnel who understand historical behavior.
- Difficulty estimating modernization scope and cost with confidence.
- Risk of reproducing defects or losing critical functionality during migration.
- Slow response to business requirements because every change requires legacy analysis.

3. Business Opportunity

Instead of beginning with a conventional rewrite, Grupo GarLo can first create an AI-assisted knowledge layer around its existing technology. This makes the legacy estate understandable before major investment is made in replacement technology.

The approach turns source code into a structured engineering knowledge base and then into governed specifications. Those specifications can support multiple modernization strategies - replatforming, refactoring, redevelopment, modular replacement or gradual strangler-pattern migration - without locking the business into a single technology decision at the start.

4. Proposed Solution

Phase	What AI does	Business output
1. Inventory	Ingests and classifies source code, databases, documentation, configurations and interfaces.	Trusted baseline of the application estate.
2. Reverse engineering	Identifies modules, dependencies, call flows, data usage and technical relationships.	Architecture and dependency map.
3. Business-rule discovery	Extracts rules, validations, calculations, conditions, exceptions and process behavior.	Business-rule catalogue linked to evidence.
4. Specification generation	Creates functional requirements, technical requirements, use cases, data definitions, APIs and acceptance criteria.	Modernization-ready specification package.
5. Human validation	Architects, developers and business owners review findings, ambiguity and exceptions.	Approved knowledge and traceability.
6. Modernization	Uses approved specifications to design and develop the target solution with AI-assisted engineering.	Controlled modernization delivery.

5. Strategic Objectives for Grupo GarLo

- Reduce the time and effort required to understand legacy applications.
- Create reliable documentation from the implementation that actually exists, not only from historical documents.
- Capture business rules and institutional knowledge before key people leave or systems are retired.
- Improve the accuracy of modernization scope, estimates and sequencing.
- Enable a controlled use of AI in software engineering.
- Reduce modernization risk by validating legacy behavior before redesign or migration.
- Create a repeatable capability that can be applied to additional applications and business domains.

6. Scope of the Initial Initiative

Workstream	Initial focus	Deliverable
Application analysis	VB6 source, project files, modules, forms and dependencies.	Application inventory and architecture view.
Database analysis	SQL Server schemas, procedures, triggers, views and data relationships.	Logical data model and database dependency map.
Integration analysis	APIs, file exchanges, jobs, interfaces and external dependencies.	Integration catalogue and data-flow view.
Business-rule extraction	Validations, calculations, conditions and exception paths.	Traceable business-rule repository.
Specification generation	Functional and technical requirements for selected modules.	Validated specification package.
Modernization design	Target architecture and candidate modernization patterns.	Prioritized modernization roadmap.

7. Target Architecture and AI Engineering Model

The proposed model separates evidence from interpretation and interpretation from implementation. This is critical when AI is used against business-critical systems.

- Evidence layer: source code, database objects, documentation, configuration and logs where authorized.
- AI analysis layer: code parsing, dependency analysis, semantic reasoning, contextual retrieval and structured extraction.
- Knowledge layer: architecture, data model, business rules, processes and specifications.
- Governance layer: source traceability, confidence/uncertainty, approval workflows, access control and audit.
- Engineering layer: target architecture, backlog, test cases and AI-assisted development.

Core principle: AI accelerates engineering; people remain accountable for business and architectural decisions.

8. Business Benefits

Benefit	Expected value to Grupo GarLo	Suggested KPI
Productivity	Less manual effort during discovery and documentation.	Hours per module/application.
Knowledge retention	Reduced dependence on individual legacy experts.	Critical components with validated documentation.
Modernization confidence	Better understanding of scope, dependencies and behavior.	Scope changes and rework during delivery.
Business continuity	Lower risk of unintentionally changing critical legacy behavior.	Incidents/defects after migration.
Speed to change	Faster creation of requirements and technical specifications.	Time from analysis to approved specification.
Scalability	Reusable process across applications.	Applications/components processed per quarter.

9. Financial Business Case

The financial case should be built from Grupo GarLo's actual baseline. A short assessment can establish the cost of the current discovery/specification process and compare it with the AI-assisted model before a broad rollout. This avoids assuming savings that have not yet been measured.

Metric	Calculation
Baseline analysis cost	Current person-hours x blended hourly cost.
AI-assisted analysis cost	AI-enabled person-hours + platform/engineering cost.
Direct annual benefit	Baseline cost - AI-assisted cost.
Risk/rework benefit	Avoided rework, defects and delayed delivery attributable to misunderstood legacy behavior.
Net benefit	Direct benefit + risk/rework benefit - program cost.
ROI	Net benefit / total program investment.
Payback	Total program investment / monthly recurring benefit.

Recommended commercial decision: start with a fixed-scope pilot, establish baseline and measured productivity, then approve scale-up using evidence-based ROI.

10. Pilot Proposal

Step	Indicative duration	Decision / deliverable
Discovery and baseline	1-2 weeks	Select one representative legacy application or module; baseline current effort, risks and artifacts.
AI reverse engineering	2-3 weeks	Generate architecture, dependencies, data flows and technical knowledge.
Business-rule extraction	1-2 weeks	Identify and validate critical business rules and exceptions.
Specification generation	1-2 weeks	Produce functional and technical specifications for a defined modernization scope.
Business case review	1 week	Measure time, quality, traceability and rework; decide scale-up.

11. Governance, Security and Risk Controls

Risk	Control
Incorrect AI inference	Every material conclusion linked to source evidence and reviewed by qualified people.
Data / source-code exposure	Controlled execution environment, least privilege, encryption and approved AI services.
Hallucinated requirements	AI-generated specifications are clearly marked until human validation.
Loss of undocumented behavior	Business rules and exception paths validated against current behavior before implementation.
Automation without accountability	Approval gates required before knowledge becomes development input.
Change impact	Regression testing and production safeguards remain mandatory.

12. Implementation Roadmap

Stage	Outcome
1. Assess	Baseline the selected application, technical debt, business criticality and available artifacts.
2. Pilot	Prove AI reverse engineering and specification generation on a bounded scope.
3. Industrialize	Standardize prompts, pipelines, evidence models, templates and governance.
4. Modernize	Execute selected modules using the validated specifications and target architecture.
5. Scale	Extend the method to additional applications and establish a modernization factory.

13. Success Criteria

- Measurable reduction in analysis and documentation effort versus the baseline.
- High percentage of critical findings traceable to source evidence.
- Validated catalogue of business rules and application dependencies.
- Reduction in ambiguity before modernization design begins.
- Approved functional and technical specifications produced faster than the current method.
- Demonstrable reduction in key-person dependency.
- Clear financial case for scaling the capability across the legacy portfolio.

14. Recommended Management Decision

Approve a controlled pilot focused on one business-critical legacy component. The pilot should be treated as a business transformation initiative, not merely a technology experiment. Its purpose is to prove three things with measurable evidence: speed - how much faster the organization can understand the system; quality - how accurately business rules and dependencies are captured; and economics - whether the approach provides a compelling return when applied at portfolio scale.

A successful pilot would give Grupo GarLo a practical foundation to modernize legacy technology without betting the business on a large, irreversible rewrite. It would also establish a reusable capability for continuous modernization as the technology portfolio evolves.

Proposed guiding principle:

“Understand before you replace. Document before you migrate. Validate before you generate.”

15. Information Required to Finalize the ROI Case

To convert this proposal into an investment-grade business case, the following Grupo GarLo data should be inserted after the pilot baseline: number of legacy applications/modules, criticality by business process, annual change volume, current analysis/specification hours, blended internal/external costs, defect/rework costs, modernization portfolio size, target timelines, available SMEs and approved AI/platform options.

Prepared for executive discussion at Grupo GarLo. This document is a proposal framework and intentionally distinguishes validated business facts from items that should be measured during the assessment.