10.48047/jocaaa.2026.35.04.02

Greenfield S/4HANA Implementation: Integrating Business Transformation with Technical Modernization through SOA Governance and Code Remediation

Srilekha Sangaraju
Independent Researcher, USA

Abstract

The migration from SAP ECC to SAP S/4HANA through greenfield implementation represents a strategic inflection point in enterprise digital transformation, offering organizations opportunities to redesign business processes while eliminating accumulated technical debt. This article examines the comprehensive methodology required for successful greenfield adoption, emphasizing the critical interplay between business transformation and technical modernization. While greenfield approaches prioritize process standardization and SAP Best Practices adoption, this article demonstrates that rigorous technical preparation remains essential for implementation success. The article analyzes service-oriented architecture governance through SOA Manager activities, repository adjustment methodologies encompassing SPDD and SPAU transactions, and systematic custom code remediation strategies required for S/4HANA compatibility. Through examination of the SAP Activate framework, the article reveals how structured governance, disciplined technical execution, and comprehensive change management enable organizations to achieve substantial custom code reduction, accelerate business processes through real-time analytics, and establish scalable digital cores. The article indicate that successful implementations balance transformation ambition with operational pragmatism, investing strategically in integration continuity assurance, data migration quality, master data governance, and organizational capability building. This article contributes practical insights for enterprises navigating S/4HANA adoption, highlighting governance imperatives and technical practices that determine long-term system stability, upgrade resilience, and sustained competitive advantage in increasingly digital business environments.

Keywords: SAP S/4HANA Greenfield Implementation, Service-Oriented Architecture Governance, Custom Code Remediation, Repository Adjustment Methodology, Enterprise Digital Transformation

1. Introduction

Enterprise resource planning systems have undergone substantial evolution since their inception, with SAP S/4HANA representing the most significant architectural shift in SAP's product portfolio. The transition from SAP ECC to S/4HANA confronts organizations with critical strategic decisions regarding implementation methodology, particularly the choice between brownfield conversion and greenfield adoption. While brownfield approaches preserve existing configurations and customizations, greenfield implementations offer opportunities for comprehensive process redesign and technical debt elimination. Recent industry analyses indicate that approximately 65% of large enterprises pursuing S/4HANA transformation opt for hybrid or selective greenfield strategies to balance innovation with operational continuity [1].

Despite the emphasis on process standardization and SAP Best Practices adoption, greenfield implementations demand rigorous technical preparation. Service-oriented architecture reconfiguration, repository object adjustments, and custom code remediation remain essential activities that determine system stability and integration readiness. The SAP Activate methodology provides a structured framework for managing these complexities, yet scholarly literature offers limited examination of the technical governance mechanisms required during greenfield transitions.

10.48047/jocaaa.2026.35.04.02

This article addresses this gap by analyzing the technical architecture requirements, SOA Manager activities, and upgrade adjustment methodologies that underpin successful greenfield implementations. Particular attention is given to SPDD and SPAU adjustment phases, custom code remediation strategies, and middleware integration considerations. By examining the intersection of business transformation and technical modernization, this research contributes practical insights for organizations navigating S/4HANA adoption while maintaining enterprise integration continuity and operational resilience.

2. Literature Review

2.1 Evolution of SAP Enterprise Systems

SAP ECC emerged in the early 2000s as the successor to R/3, consolidating multiple business modules into a unified enterprise application suite. For nearly two decades, ECC served as the backbone of global enterprise operations, supporting finance, logistics, manufacturing, and human capital management functions. However, the architecture inherited legacy constraints from client-server computing paradigms, relying on row-based database structures that limited real-time analytical capabilities. Market drivers for S/4HANA adoption include regulatory pressures, competitive demands for operational agility, and SAP's announced mainstream maintenance deadline for ECC 6.0, originally set for 2027 and subsequently extended to 2030. Organizations face mounting pressures to modernize their digital cores to support cloud integration, advanced analytics, and intelligent automation initiatives [2].

2.2 Limitations of SAP ECC Architecture

ECC landscapes frequently exhibit technical debt accumulation resulting from decades of incremental customizations and workarounds. Customization complexity often reaches levels where 30-40% of standard functionality has been modified, creating upgrade barriers and maintenance burdens. Data model fragmentation manifests through redundant tables for materials management (MKPF, MSEG) and separate ledgers for financial and controlling data. Integration challenges emerge from point-to-point interfaces and middleware dependencies that lack standardization. Performance constraints become evident in batch processing windows, month-end close cycles, and materials requirements planning runs that can extend for hours in large-scale implementations.

2.3 SAP S/4HANA Innovations and Capabilities

S/4HANA leverages HANA's in-memory computing architecture to eliminate the distinction between transactional and analytical processing. The simplified data model consolidates financial postings into the Universal Journal (ACDOCA) and materials documents into MATDOC, reducing database footprint by up to 75% compared to ECC. Real-time processing capabilities enable instantaneous ATP checks, concurrent MRP Live execution, and embedded analytics without extraction latency. The Fiori user experience transformation replaces traditional SAPGUI transactions with role-based applications optimized for mobile and browser interfaces. Native cloud integration with SAP Business Technology Platform, Ariba, and SuccessFactors positions S/4HANA as an intelligent enterprise hub capable of supporting machine learning and robotic process automation workflows.

2.4 Greenfield Implementation Philosophy

Greenfield implementations prioritize process standardization by adopting SAP Best Practices across organizational boundaries, eliminating regional variations that complicate governance. Technical debt elimination occurs through conscious decisions to sunset legacy customizations, with organizations typically reducing custom code volumes by 40-70% during greenfield transitions. SAP Best Practices adoption accelerates implementation timelines by leveraging pre-configured business processes aligned with industry standards. Master data governance opportunities arise from clean-slate data

10.48047/jocaaa.2026.35.04.02

migration, enabling organizations to establish unified hierarchies, standardized classifications, and quality frameworks that were previously impossible to implement in fragmented ECC landscapes.

2.5 Research Gap

Academic literature on S/4HANA implementation predominantly addresses strategic decision-making and business case development, with limited scholarly focus on technical governance mechanisms essential for greenfield scenarios. Existing practitioner publications from SAP and consulting firms provide tool-specific guidance but lack comprehensive methodology documentation that integrates SOA governance, repository adjustments, and custom code remediation within cohesive frameworks. This gap leaves organizations without evidence-based approaches for managing the technical complexities that determine implementation success beyond process design considerations.

3. Theoretical Framework and Methodology

3.1 SAP Activate Methodology Overview

SAP Activate represents the convergence of SAP's implementation methodologies into a unified agile project delivery framework designed specifically for S/4HANA deployments. This methodology integrates ASAP, SAP Launch, and agile practices into a phase-gate approach that balances structured governance with iterative development cycles [3]. The framework provides accelerators including pre-configured solutions, guided configuration tools, and SAP Model Company templates that reduce implementation timelines by 20-30% compared to traditional waterfall approaches. Each phase incorporates defined deliverables, quality gates, and success criteria that ensure alignment between business objectives and technical execution.

3.2 Discover Phase

The Discover phase establishes the foundation through comprehensive business case development that quantifies expected benefits, investment requirements, and risk factors. Fit-to-standard analysis evaluates existing processes against SAP Best Practices, identifying gaps that require configuration, extension, or process redesign. Stakeholder alignment workshops secure executive sponsorship and clarify roles across business units, IT organizations, and external partners. Governance structure establishment defines the project management office architecture, steering committee composition, decision escalation protocols, and change control procedures that will govern the implementation lifecycle.

3.3 Design Phase

To-Be process modeling workshops translate strategic objectives into detailed process flows using SAP Solution Manager or SAP Signavio tools. Organizational design activities define company codes, plants, storage locations, purchasing organizations, and sales organizations that reflect target operating models. Master data architecture specifications establish material master structures, vendor/customer hierarchies, cost center frameworks, and chart of accounts designs. Integration landscape design maps data flows between S/4HANA and peripheral systems including PLM, MES, WMS, and third-party applications. Security and authorization frameworks translate segregation of duties requirements into role designs using SAP's authorization object methodology.

3.4 Build Phase

Configuration approach focuses on activating SAP Best Practices content through the Manage Your Solution (MYS) application, minimizing custom development requirements. SAP Best Practices implementation involves selecting relevant scope items, configuring business processes through guided procedures, and validating functionality against requirements. Fiori app enablement requires ICF service activation, gateway configuration, and role-based catalog assignments. Custom development governance enforces standards through code review protocols, naming conventions, and mandatory use of enhancement frameworks rather than modifications. Integration development

10.48047/jocaaa.2026.35.04.02

leverages OData services for real-time synchronous interfaces, REST APIs for cloud connectivity, and IDocs for high-volume asynchronous data exchange.

Phase	Duration	Key Deliverables	Technical Activities	Success Criteria
Discover	4-6 weeks	Business case, Fit-gap analysis, Project charter	System landscape design, Sizing requirements	Executive approval, Budget allocation
Design	8-12 weeks	Process models, Organizational structure, Integration architecture	Security role design, Master data architecture	Solution design sign-off
Build	12-20 weeks	Configured system, Custom developments, Interfaces	SOA configuration, Custom code remediation, Fiori enablement	Unit test completion
Data Migration	6-10 weeks	Cleansed master data, Migrated transactions	ETL development, Data validation scripts	Migration acceptance
Test	6-8 weeks	Test scripts, Defect logs, Performance results	Integration testing, UAT execution, Cutover rehearsal	Test sign-off
Deploy	2-4 weeks	Production system, Cutover documentation	Go-live execution, Hypercare support	Production validation

Table 1: SAP Activate Phase Deliverables and Technical Activities [3]

3.5 Data Migration Strategy

Legacy data extraction employs SAP's standard extraction programs, custom ABAP reports, or third-party ETL tools to retrieve master and transactional data from ECC systems. Data quality management includes profiling activities to identify duplicates, incomplete records, and inconsistencies, followed by cleansing routines that standardize formats and validate completeness. Transformation and mapping specifications define conversion rules, value mapping tables, and business logic required to align source data with S/4HANA structures. Migration tools and techniques utilize SAP Migration Cockpit for predefined objects, Legacy System Migration Workbench for custom scenarios, and SAP Data Services for complex transformations requiring extensive business rules.

3.6 Testing and Validation Approach

Testing taxonomy encompasses unit testing of individual configuration elements, integration testing validating end-to-end process flows, user acceptance testing confirming business requirement

10.48047/jocaaa.2026.35.04.02

fulfillment, and performance testing verifying system responsiveness under production-equivalent loads. Cutover rehearsal methodology involves executing complete go-live sequences in sandbox environments, measuring activity durations, identifying bottlenecks, and refining procedures until cutover windows meet business constraints, typically requiring three to five rehearsal iterations before production deployment.

3.7 Deployment and Hypercare

Go-live execution follows documented runbooks specifying transport sequences, timing dependencies, data load procedures, and validation checkpoints. Stabilization activities during the initial weeks include issue triage, workaround development, emergency fixes, and user support escalation. Production support transition gradually shifts responsibility from implementation teams to permanent support organizations through knowledge transfer sessions, documentation handover, and phased reduction of hypercare resources over 8-12 week periods.

4. Technical Architecture Foundations

4.1 Service-Oriented Architecture in S/4HANA Context

Service-oriented architecture remains fundamental to enterprise integration despite S/4HANA's API-first design philosophy. Legacy SOAP services coexist with modern RESTful APIs, requiring careful governance during greenfield implementations. Greenfield SOA considerations include evaluating which ECC-era services remain relevant, identifying opportunities to replace custom interfaces with standard S/4HANA APIs, and establishing service lifecycle management practices aligned with SAP's API Business Hub [4].

4.2 SOA Manager Activities and Configuration

4.2.1 Service Registry and Endpoint Management

WSDL and binding validation ensures service definitions accurately reflect S/4HANA endpoint structures and supported operations. SSL certificate and PSE updates address changed hostnames, renewed certificates, and updated cipher suites required for secure communications. Enterprise Service Registry integration maintains centralized service catalogs enabling discovery, governance, and impact analysis across distributed landscapes.

4.2.2 Web Service Provider and Consumer Reconfiguration

Namespace migration challenges arise when S/4HANA introduces new service versions with incompatible structures. Proxy regeneration procedures involve deleting obsolete consumer proxies and creating new implementations based on current WSDLs. Logical port binding updates reconnect services to target systems through SOAMANAGER configuration. Authentication mechanism modernization replaces basic authentication with OAuth 2.0 or SAML-based single sign-on, enhancing security posture [5].

4.2.3 ICF/SICF Service Activation

OData service enablement activates gateway services supporting Fiori applications and external API consumers. SOAP service configuration ensures backward compatibility for systems unable to adopt RESTful interfaces. Fiori ICF node activation enables launchpad functionality, theme management, and application-specific services.

4.2.4 Middleware Integration Architecture

PI/PO and SAP CPI integration requires regenerating Enterprise Service Repository objects reflecting S/4HANA message structures. Agreement updates reestablish sender-receiver relationships with correct identifiers and communication channels. Certificate and trust management validates mutual authentication between integration platforms and S/4HANA. End-to-end integration testing validates message flows under various scenarios including error handling and retry logic.

10.48047/jocaaa.2026.35.04.02

4.3 Integration Continuity Assurance

Testing protocols define systematic validation covering functional correctness, performance benchmarks, and failure recovery. Rollback strategies establish procedures for reverting changes when integration issues jeopardize business operations, including service deactivation sequences and alternative routing configurations.

5. Repository Adjustment Methodologies

5.1 SPDD: Dictionary Object Adjustments

5.1.1 Modified Object Identification

Transaction SPDD serves as the primary tool for identifying modifications to SAP Data Dictionary objects during system upgrades or selective migrations. Custom table modifications typically include additional fields appended to standard tables, altered key structures, or modified technical settings such as buffering parameters. Structure and domain enhancements encompass extended data elements, modified domain value ranges, and altered conversion routines. Impact assessment involves analyzing where modified dictionary objects are consumed across programs, screens, database views, and interfaces, with dependencies often spanning hundreds of objects in mature ECC landscapes [6].

5.1.2 Adjustment Decision Framework

Reset to standard strategy represents the preferred approach for greenfield implementations, eliminating technical debt by reverting modifications and adopting S/4HANA-native alternatives. Modification reapplication criteria evaluate business criticality, regulatory compliance requirements, and availability of standard alternatives before approving continued modifications. Extension framework redesign leverages append structures, customizing includes, and CDS view extensions that preserve upgrade compatibility while meeting business requirements. Organizations typically reset 60-80% of dictionary modifications during greenfield transitions, selectively retaining only those modifications lacking viable alternatives.

5.1.3 Validation and Activation

Object activation procedures follow dependency hierarchies, activating domains before data elements, data elements before structures, and structures before tables. Dependency validation employs transaction SE11 and custom scripts to verify all dependent objects remain functional after adjustments. Integration testing confirms that modified dictionary objects support critical business processes without introducing data integrity issues or performance degradation.

5.2 SPAU: Program and Customizing Adjustments

5.2.1 Modification Analysis

Transaction SPAU identifies modifications to SAP standard programs, function modules, classes, and customizing settings. Custom program modifications often include altered selection screens, modified processing logic, and enhanced output formats. Enhancement identification catalogs user exits, customer exits, BAdIs, and BTEs implemented within standard objects. Compatibility assessment evaluates whether modifications conflict with S/4HANA simplifications, deprecated functionality, or new standard capabilities that supersede custom logic [7].

5.2.2 Remediation Strategies

Standard adoption involves removing modifications where S/4HANA provides equivalent functionality through new transactions, Fiori apps, or enhanced standard features. Selective reapplication applies when modifications address unique business requirements with no standard alternative, requiring careful testing to ensure compatibility. Modern extension techniques replace direct modifications with BAdI implementations, implicit enhancements, or side-by-side extensions on SAP Business Technology Platform, reducing future upgrade friction while maintaining required functionality.

10.48047/jocaaa.2026.35.04.02

5.2.3 Quality Assurance

Regression testing validates that adjusted programs produce identical outputs for representative test cases spanning various business scenarios. Performance validation ensures modifications do not introduce inefficiencies, particularly when interacting with HANA's columnar data structures. Quality gates enforce documentation standards, code review approvals, and transport management protocols before promoting adjustments to production environments.

5.3 Selective Migration Governance

Business criticality assessment scores modifications based on usage frequency, supported revenue streams, and regulatory obligations. Technical debt evaluation quantifies maintenance effort, compatibility risks, and architectural misalignment for each modification. Migration vs. redesign decisions balance short-term migration costs against long-term maintainability, typically favoring redesign for modifications requiring substantial rework to achieve S/4HANA compatibility.

Activity Domain	Specific Tasks	Tools/Transactions	Risk Level	Integration Impact
Service Registry	WSDL validation, Endpoint verification, ESR synchronization	SOAMANAGER, ESR	Medium	Critical for service discovery
Provider Services	Service definition migration, Namespace updates, Binding reconfiguration	SOAMANAGER, SE80	High	Direct impact on consumers
Consumer Services	Proxy regeneration, Logical port binding, Authentication updates	SPROXY, SOAMANAGER	High	Requires consumer coordination
ICF/SICF Activation	OData service enablement, SOAP activation, Fiori node configuration	SICF, /IWFND/MAINT_SERVICE	Medium	Essential for Fiori and APIs
Security & Certificates	SSL certificate renewal, PSE updates, OAuth configuration	STRUST, SOAMANAGER	High	Security and compliance critical
Middleware Integration	PI/PO ESR regeneration, CPI agreement updates, End-to-end testing	PI/PO, SAP CPI	High	Business continuity dependent

10.48047/jocaaa.2026.35.04.02

Table 2: SOA Manager Configuration Activities for Greenfield Implementation [4,5]

6. Custom Code Remediation Framework

6.1 Custom Code Impact Analysis

Object inventory catalogs all Z-programs, Y-programs, custom function modules, enhancements, user exits, and BAdI implementations across development, quality, and production systems. SAP Custom Code Analyzer utilization provides automated assessment of simplification item impacts, identifying code referencing deprecated tables like BSEG, MKPF, or MSEG [8]. ABAP Test Cockpit implementation runs comprehensive checks covering syntax errors, performance issues, security vulnerabilities, and S/4HANA readiness. Issue categorization framework classifies findings as critical blockers requiring immediate remediation, warnings needing evaluation, or informational items for future consideration.

6.2 Simplified Data Model Adaptation

Deprecated table identification highlights direct SELECT statements accessing removed tables, requiring replacement with CDS views or new standard tables. CDS view migration strategy develops reusable views encapsulating access to ACDOCA, MATDOC, and other simplified structures. MATDOC and ACDOCA compatibility ensures custom reporting and interfaces correctly interpret new document structures and derive equivalent information previously obtained from legacy tables. Join and aggregation optimization refactors code to leverage HANA's calculation engine rather than application-layer processing.

6.3 Obsolete Technology Replacement

6.3.1 Legacy Technique Inventory

BDC recording limitations include lack of error handling robustness, maintenance burden from screen changes, and poor performance compared to API-based alternatives. Classic ALV report constraints involve limited interactivity, absence of drill-down capabilities, and incompatibility with mobile devices. Direct table update risks encompass bypassed business logic, audit trail gaps, and data integrity vulnerabilities. Outdated BAPI dependencies reference deprecated interfaces lacking S/4HANA support or offering inferior functionality compared to newer APIs.

6.3.2 Modern Alternative Adoption

Fiori application migration replaces custom transactions with standard or custom Fiori apps providing responsive design and enhanced usability. OData service implementation exposes business logic through RESTful interfaces consumable by web applications, mobile apps, and integration platforms. CDS-based analytics leverages virtual data models enabling real-time reporting without data replication. RAP adoption provides structured development framework for building Fiori applications with managed business objects, draft handling, and validation logic [9].

Remediation Category	Legacy Technique	S/4HANA Alternative	Complexity	Expected Reduction
Data Access	Direct SELECT on BSEG, MKPF, MSEG	CDS views on ACDOCA, MATDOC	High	Significant reduction

10.48047/jocaaa.2026.35.04.02

User Interface	Classic SAPGUI transactions, ALV reports	Fiori applications, CDS-based analytics	Medium-High	Moderate-High reduction
Data Entry	BDC recordings, Direct table updates	OData services, Standard APIs	Medium	High reduction
Integration	Custom IDocs, RFC calls	RESTful APIs, SAP CPI integration	Medium	Moderate reduction
Enhancements	User exits, Customer exits	BAdIs, Implicit enhancements, BTP extensions	Low-Medium	Technical debt elimination
Business Logic	ABAP loops, Application-layer aggregation	AMDP, CDS table functions, HANA procedures	High	Performance optimization

Table 3: Custom Code Remediation Categories and Strategies [8, 9]

6.4 HANA Performance Optimization

Code-to-data paradigm shift moves processing from application servers to the database layer, exploiting HANA's parallel processing capabilities. AMDP and CDS table functions encapsulate complex calculations within HANA-optimized procedures. Database operation optimization consolidates multiple SELECT statements into single queries with appropriate WHERE clauses. Nested SELECT elimination replaces inner loops with JOIN operations or FOR ALL ENTRIES constructs, reducing database roundtrips from thousands to single-digit figures.

6.5 Extension Modernization

BAdI framework alignment replaces obsolete user exits and customer exits with standard BAdI implementations offering cleaner interfaces. In-app extensibility adoption enables key users to create custom fields, logic, and UIs without ABAP development. SAP BTP side-by-side extensions relocate non-core functionality to cloud environments, reducing on-premise system complexity. Technical debt reduction targets 40-70% custom code elimination through these modernization strategies.

6.6 Remediation Testing and Validation

ATC revalidation confirms all critical and high-priority findings are resolved before migration. Functional regression testing executes comprehensive test scripts verifying business process integrity. HANA performance benchmarking compares execution times before and after remediation, targeting improvements of 50-90% for database-intensive operations. Quality gate enforcement blocks transport release until all validation criteria are satisfied.

6.7 Code Governance and Sustainability

Future upgrade resilience derives from eliminating modifications and adopting standard extension points. Maintenance cost reduction results from cleaner code, better documentation, and reduced custom object counts. Documentation standards mandate technical specifications, business justifications, and test evidence for all retained customizations [10].

10.48047/jocaaa.2026.35.04.02

7. Organizational Change Management

7.1 Process Ownership Transformation

Role redefinition establishes clear accountability for end-to-end processes spanning multiple functional areas. Accountability frameworks specify decision rights, performance metrics, and escalation protocols.

7.2 User Experience Adoption

Fiori UX training familiarizes users with tile-based navigation, responsive layouts, and embedded analytics. Role-based access implementation configures catalogs and groups aligned with job functions. User acceptance strategies include early prototyping, iterative feedback incorporation, and change champion networks.

7.3 Capability Building

Training curriculum development addresses technical skills, functional knowledge, and change leadership competencies. Knowledge transfer programs capture implementation decisions, configuration rationale, and operational procedures. Center of Excellence establishment creates sustained capability for continuous improvement, incident resolution, and future enhancements.

7.4 Master Data Governance

Data stewardship models assign ownership for master data domains including materials, vendors, customers, and cost centers. Quality frameworks define validation rules, completeness standards, and enrichment requirements. Governance processes establish creation, modification, and deactivation workflows with appropriate approval hierarchies.

7.5 Change Sustainability

Adoption metrics track system usage, user satisfaction, and business outcome achievement. Continuous improvement mechanisms solicit feedback, prioritize enhancements, and measure value realization against original business case projections.

Change Dimension	Key Activities	Stakeholder Groups	Success Metrics	Timeline
Process Ownership	Role redefinition, Accountability frameworks, Cross-functional coordination	Process owners, Business leaders	Clear ownership assignment, Decision velocity	Weeks 1-8
User Experience	Fiori training, Role-based access, Change champion networks	End users, Power users	System utilization rates, User satisfaction scores	Weeks 8-16
Capability Building	Training curriculum, Knowledge transfer, CoE establishment	All user segments, IT teams	Training completion rates, Competency assessments	Ongoing

10.48047/jocaaa.2026.35.04.02

Master Data Governance	Stewardship models, Quality frameworks, Approval workflows	Data stewards, Business users	Data quality scores, Duplicate reduction	Weeks 4-12
Change Sustainability	Adoption tracking, Continuous improvement, Feedback mechanisms	All stakeholders	Post-go-live stability, Enhancement velocity	Post-deployment

Table 4: Organizational Change Management Framework and Success Metrics [11-13]

8. Business Outcomes and Value Realization

8.1 Quantitative Benefits

Custom code reduction of 40-70% results from adopting SAP Best Practices and eliminating legacy workarounds, translating to reduced maintenance effort and faster future upgrades. Process performance improvements manifest through accelerated month-end close cycles, reduced order processing times, and enhanced inventory turnover rates. Total cost of ownership reduction stems from simplified infrastructure requirements, lower licensing costs through indirect access elimination, and decreased support staffing needs. Real-time analytics capabilities enable immediate visibility into operational metrics without batch processing delays, improving decision quality and responsiveness.

8.2 Qualitative Benefits

Process standardization across global operations eliminates regional variations that previously complicated reporting, compliance, and resource mobility. User experience enhancement through Fiori interfaces improves employee satisfaction and reduces training time for new hires. Cloud integration readiness positions organizations to rapidly adopt complementary SAP solutions including Ariba, Concur, and SuccessFactors without extensive integration development. Digital core scalability provides foundation for emerging technologies including artificial intelligence, machine learning, and robotic process automation.

8.3 Success Factors

Executive sponsorship provides strategic direction, resource commitment, and organizational mandate necessary to overcome resistance and competing priorities. Governance discipline maintains scope control, enforces quality standards, and ensures alignment between technical execution and business objectives. Technical excellence in areas including custom code remediation, integration architecture, and performance optimization determines system stability and user satisfaction. Change management effectiveness influences user adoption rates, process compliance, and realization of projected benefits [13].

8.4 Risk Mitigation

Common pitfalls include underestimating data migration complexity, insufficient testing coverage, inadequate change management investment, and premature resource demobilization. Organizations frequently encounter challenges with interface stabilization, performance tuning under production loads, and user proficiency development. Mitigation strategies emphasize realistic timeline estimates with built-in contingency, comprehensive testing including cutover rehearsals, sustained hypercare support extending 8-12 weeks post-go-live, and phased capability building through waves or regional rollouts. Risk management frameworks identify critical dependencies, establish contingency plans, and maintain executive visibility into emerging issues requiring intervention.

10.48047/jocaaa.2026.35.04.02

9. Future Research

9.1 Summary of Findings

This research demonstrates that successful greenfield S/4HANA implementations require coordinated technical and organizational transformation efforts extending beyond process redesign. Critical success factors include executive sponsorship, disciplined governance frameworks, technical excellence in SOA reconfiguration and custom code remediation, and comprehensive change management. Governance imperatives encompass service lifecycle management, repository adjustment methodologies, master data stewardship, and continuous quality assurance mechanisms that ensure system stability and upgrade resilience.

9.2 Practical Implications

Implementation recommendations emphasize early technical assessment of custom code portfolios, proactive SOA governance planning, and realistic timeline estimates incorporating adequate testing and stabilization periods. Governance best practices include establishing Centers of Excellence, implementing formal change control procedures, and maintaining executive visibility into technical and organizational risks. Technical execution guidelines prioritize adoption of standard extension frameworks, elimination of deprecated technologies, and HANA performance optimization through code-to-data paradigm shifts.

9.3 Limitations of Current Study

Scope boundaries limit this analysis to greenfield implementations, excluding brownfield and selective data transition scenarios that represent alternative migration paths. Methodological constraints include reliance on practitioner literature and SAP documentation rather than primary empirical research across diverse industry implementations. Longitudinal analysis of post-implementation performance and sustained benefit realization remains outside the current study scope.

9.4 Future Research Directions

AI and automation integration represents emerging opportunities for intelligent document processing, predictive analytics, and robotic process automation within S/4HANA environments. Cloud-native extension strategies leveraging SAP Business Technology Platform warrant investigation regarding optimal workload distribution between on-premise and cloud architectures. Continuous innovation frameworks enabling regular feature adoption without disruptive upgrades merit scholarly examination. Industry-specific adaptations for manufacturing, retail, utilities, and public sector organizations require tailored research addressing unique regulatory, operational, and technical requirements [14].

Conclusion

The transition from SAP ECC to S/4HANA through greenfield implementation represents a comprehensive enterprise transformation that extends far beyond software deployment. This article demonstrates that while greenfield approaches emphasize process standardization and adoption of SAP Best Practices, technical governance activities including SOA Manager configuration, SPDD/SPAU repository adjustments, and systematic custom code remediation remain fundamental to implementation success. Organizations that successfully navigate this transformation exhibit disciplined execution across multiple dimensions: rigorous technical preparation ensuring integration continuity, structured governance frameworks managing scope and quality, comprehensive change management fostering user adoption, and sustained executive commitment providing strategic direction and resource allocation. The evidence indicates that greenfield implementations can reduce custom code volumes by 40-70%, accelerate business processes through real-time analytics, and establish scalable digital cores capable of supporting emerging technologies. However, realizing these

10.48047/jocaaa.2026.35.04.02

benefits requires organizations to balance transformation ambition with operational pragmatism, investing adequately in data migration quality, testing rigor, and capability building. As enterprises increasingly pursue digital innovation, the methodologies, governance frameworks, and technical practices examined in this study provide essential foundations for achieving stable, future-ready S/4HANA landscapes that enable sustained competitive advantage in rapidly evolving business environments.

References

[1] Ankit Kumar Gupta, et al., "Efficient Strategies for S/4 HANA Cloud Migration in Large Enterprise Landscapes". International Journal of Innovative Science and Research Technology. 9. 3628-3645, February 8, 2025. https://zenodo.org/records/14836417

[2] SAP Insider, "SAP Announces Extension of Mainstream Maintenance for SAP ERP 6.0". https://sapinsider.org/blogs/sap-announces-extension-of-mainstream-maintenance-for-sap-erp-6-0/

[3] Adharsh K S, "SAP Activate Methodology in SAP S/4 HANA", Gaurav Learning Solutions, Aug 1, 2024. https://www.gauravconsulting.com/post/sap-activate-methodology-in-sap-s-4-hana

[4] pushkar_patil23, "Custom Code Adaptation - SAP ECC to SAP S/4HANA (Greenfield Approach)", 2019 Oct 16 , https://community.sap.com/t5/enterprise-resource-planning-blog-posts-by-sap/custom-code-adaptation-sap-ecc-to-sap-s-4hana-greenfield-approach/ba-p/13392468

[5] Kundan Singh, "SSO Authentication: Complete Guide to OpenID, SAML & OAuth", loginradius, 2025-08-08. https://www.loginradius.com/blog/engineering/guide-to-openid-saml-oauth

[6] SAP, "Updating SAP ABAP Systems on Windows: HANA DB". https://help.sap.com/doc/c7853ba56c1210149efc13dd4e204223/sum20.24/en-US/sum2_abap_win_hana.pdf

[7] Mukund_Kshirsagar,"Understanding SAP Readiness Check and Simplification Check for SAP S/4HANA Migration and Upgrades", 2024 Jul 29. https://community.sap.com/t5/technology-blog-posts-by-members/understanding-sap-readiness-check-and-simplification-check-for-sap-s-4hana/ba-p/13770134

[8] "SAP S/4HANA Focus Group Meeting". https://sapsa.se/wp-content/uploads/2020/11/sap-s4hana-fokusgruppsmote-2020-11-03-med-appendix-1-2.pdf

[9] SAP Help Portal, "ABAP RESTful Application Programming Model". https://help.sap.com/docs/btp/sap-abap-restful-application-programming-model/abap-restful-application-programming-model

[10] SAP Help Portal, "Checking Quality of ABAP Code with ATC" https://help.sap.com/docs/ABAP_PLATFORM_NEW/ba879a6e2ea04d9bb94c7ccd7cdac446/4ec5711c6e391014adc9fffe4e204223.html

[11] SAP Fiori, "The enterprise user experience, reimagined". https://www.sap.com/products/technology-platform/fiori.html

[12] "SAP S/4HANA and SAP S/4HANA Cloud Private Edition". https://help.sap.com/docs/SAP_S4HANA_ON-PREMISE/8308e6d301d54584a33cd04a9861bc52/4a5c02a93ce54b7e9a1f5f7c30a8f3f1.html

[13] Sobia Asher, et al., "Exploring the change management framework: An in-depth investigation". MethodsX, 13, 102978, Volume 13, December 2024,. https://www.sciencedirect.com/science/article/pii/S2215016124004291

[14] Fengwei Yang & Sai Gu, "Industry 4.0, a revolution that requires technology and national strategies". Complex Intell. Syst. 7, 1311–1325 (27 January 2021). https://link.springer.com/article/10.1007/s40747-020-00267-9#citeas