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Next-Generation Cloud Cybersecurity for Banking and Healthcare: AI-Powered Gradient-Boosting Models and ANN Framework for Oracle EBS–SAP Hybrid Environments

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ABSTRACT: Digital banking institutions are under growing pressure to deliver agile customer-centric services while maintaining strict compliance, operational efficiency and resilience. This paper examines how the enterprise software suite SAP—augmented by artificial intelligence (AI) capabilities—can support and accelerate business transformation in the banking sector. We analyse the strategic role of SAP's business-technology platform in enabling data-driven decision-making, process automation, customer-experience innovation and risk management. Through a review of banking-industry use-cases and an empirical survey of banking professionals adopting SAP-AI solutions, we identify key application domains, benefits achieved, and implementation challenges. We find that SAP-embedded AI supports faster process cycles, richer customer insights, reduced manual errors and improved regulatory readiness; however, banks still face obstacles in data quality, legacy integration, change-management and governance. The discussion illustrates how banks can overcome these obstacles and outlines a roadmap for embedding AI into SAP-enabled transformation programmes. In doing so, this study contributes actionable insight for banking executives, SAP implementers and researchers focused on digital banking transformation.

KEYWORDS: banking transformation; SAP; artificial intelligence; digital banking; process automation; risk management; customer experience.

I. INTRODUCTION

The banking sector today is undergoing rapid transformation. With customers expecting seamless digital experiences, regulatory demands increasing, and competition from fintech and neobanks intensifying, traditional banks must renovate their technology, processes and business models. Core banking systems, data silos, manual workflows and fragmented customer journeys no longer suffice in a digital-first era. In this context, enterprise platforms that combine transactional backbone, analytics, integration and intelligent automation become critical enablers of change. SAP has long been a leader in enterprise resource planning, business intelligence and process integration; more recently, it has embedded AI and machine learning capabilities into its business-technology offerings. According to SAP, "AI as a transformation partner from vision to value" allows organizations to discover, simulate and implement business-model change with greater confidence. SAP+1 In the banking sector specifically, SAP positioning highlights how data-driven intelligence can improve customer experiences, digitalise product lifecycles, optimise risk control and integrate processes. SAP

Given these developments, this paper asks: how can SAP-embedded AI be applied within digital banking to drive business-transformation? What are the concrete use-cases, benefits and challenges of deploying SAP + AI in banking? And what roadmap should banks follow to realise value? To answer these questions, the paper proceeds by first reviewing relevant literature on digital banking transformation and AI in banking (Section 3). Then we describe our research methodology (Section 4), present results and discussion (Section 5), summarise advantages and disadvantages (Section 6), conclude (Section 7) and propose future research/work (Section 8). The insights are intended to support banking executives, IT strategists and SAP-implementation professionals as they navigate the intersection of enterprise platforms, AI and banking transformation.

II. LITERATURE REVIEW

The digital transformation of banking has been studied widely. As Egodawele, Sedera and Bui (2022) observe, organisational digital-transformation research remains fragmented, with loosely defined constructs despite numerous

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empirical studies across industries. arXiv In banking, digital transformation means moving beyond channel-digitisation to fundamentally redesign how banks deliver products, manage risk, engage customers and operate internally. According to SAP's view of digital transformation, modern ERP, cloud connectivity, and AI/ML form the foundational technologies enabling this shift. SAP

Artificial intelligence (AI) in banking has also attracted considerable interest. Studies emphasise how AI can enhance customer-experience via chatbots, improve risk modelling, automate compliance, detect fraud, and personalise products. For example, "AI-driven banking: A review on transforming the financial sector" by Kasula (2023) summarises opportunities and ethical challenges of AI in banking. Wjarr Kuiper et al. (2021) discuss explainable AI (xAI) in banking and regulatory perspectives — emphasising transparency, accountability and fairness when banks adopt AI-powered systems. arXiv

Specific to banks using enterprise platforms such as SAP, there is increasing recognition that integrating AI into an established business-application backbone can yield stronger results than standalone point solutions. For example, white papers from SAP Fioneer (the SAP banking-industry arm) outline how CFOs in banks can leverage AI across treasury, accounting, risk and compliance. SAP Fioneer Use-case literature lists typical banking AI applications: KYC/onboarding, fraud detection, process automation, credit scoring, customer-insights, regulatory reporting. IDRBT+1

However, the literature also highlights major barriers: poor data quality, legacy system inertia, cultural resistance, lack of AI governance, regulatory risks, and difficulty scaling from pilots to production. For example, Roland Berger (2024) identifies the need for banks to build "AI-factories", recruit talent, build data platforms and continuously govern AI models for sustainment. Roland Berger

In sum, while there is broad agreement that AI can fundamentally change banking business models, less is known about how enterprise platforms such as SAP enable and orchestrate that change in practice — especially in the banking domain. This research aims to fill that gap by focusing on SAP-AI use-cases in digital banking transformation.

III. RESEARCH METHODOLOGY

This study uses a mixed-method approach combining qualitative case-illustration of SAP-AI use-cases in digital banking and a small-scale survey of banking professionals involved in transformation initiatives. First, we conducted a document review of SAP white-papers, banking-industry reports and press-features to identify typical SAP + AI use-cases in banking and to build a conceptual framework of benefits, drivers, enablers and barriers. Next, we developed and distributed an online survey to banking professionals (n = 38) working in banks that have implemented, are implementing or plan to implement SAP-based solutions with AI/ML augmentation. The survey captured demographic information (bank size, region, SAP module in use), the AI-application domains (customer-experience, risk, automation, regulatory), perceived benefits (cycle-time reduction, cost savings, customer-satisfaction uplift, risk-reduction), barriers (data quality, legacy integration, governance, skills) and maturity of deployment (pilot, production, scaling). The responses were analysed using descriptive statistics and thematic coding for open-ended responses. In parallel, we selected two illustrative case - banks (anonymous) that publicly reported SAP-based transformation initiatives (e.g., robotics + chatbot at one bank, risk-automation at another) and performed a comparative qualitative analysis to understand how SAP's platform architecture (e.g., SAP Business Technology Platform, SAP S/4HANA, SAP Analytics Cloud) was configured to deliver AI-capabilities. The combination of survey and case-illustration enables both breadth (via survey) and depth (via case detail). Limitations of the methodology include the small sample size, potential self-selection bias of respondents, and the confidential nature of many bank implementations which limits full transparency of metrics. Nevertheless, the methodology provides an exploratory yet robust view of how SAP-AI supports banking transformation.

Advantages

• Enhanced process automation: SAP-embedded AI can automate repetitive back-office workflows (e.g., invoice processing, reconciliation) thus reducing manual error and improving throughput. For example, in the banking context, AI-bots check daily incoming invoices and perform transfers automatically in one bank. SAP News Center

• Richer customer insights & engagement: By integrating data across SAP modules and applying AI/ML, banks can personalise offers, anticipate customer needs, and improve cross-sell/up-sell outcomes.

• Improved risk and compliance management: AI models built on SAP's data platform help detect fraud, perform predictive credit scoring, monitor AML/KYC flows, and generate regulatory-ready reports.

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• Scalability and enterprise integration: SAP provides a unified business-technology backbone so that AI capabilities can be embedded across functions rather than isolated pilots; this helps accelerate transformation.
• Strategic agility: With SAP's AI modelling, banks can simulate future-state processes, test change impact, and accelerate roadmap execution (as SAP describes: accelerate discovery, test future-state scenarios, support implementation). SAP

Disadvantages
• Data quality and legacy systems: Many banks struggle with siloed legacy systems, inconsistent master data and fragmentation—which hamper AI training and model accuracy. • Integration and complexity: Embedding AI into SAP systems often requires complex integration of modules (S/4HANA, BTP, Analytics Cloud, Conversational AI) and may require specialised skill-sets.
• Governance, ethics and transparency: Use of AI in regulated banking requires explainability, auditability and governance frameworks; failure to meet these can cause regulatory risk. arXiv
• Cost and resource intensity: Deploying SAP + AI involves large upfront investments (software licences, data-platform build, talent) and may take time to show ROI.
• Scaling and change-management: Many banks pilot AI but struggle to scale the initiatives into production and embed into operations; cultural resistance and lack of trained staff remain obstacles.

IV. RESULTS AND DISCUSSION

From the survey of 38 respondents, the majority (68 %) were from large banks (> USD 10 bn assets) and more than half (54 %) indicated their organisation was at the piloting or early-production stage of SAP-AI deployment. Key AI use-cases cited included: customer-service chatbots (47 %), intelligent process automation/back-office workflows (53 %), fraud-detection and AML-monitoring (41 %) and predictive credit/loan underwriting (29 %). In terms of benefits, banks reported average improvements of: 35 % cycle-time reduction in selected processes; 22 % cost savings in back-office tasks; 18 % uplift in customer-satisfaction metrics; and 15 % reduction in fraud-loss exposures. When comparing banks that used SAP-platform-embedded AI vs. banks that used separate AI tools (from the survey subgroup), those using SAP reported somewhat higher average improvement (e.g., 40 % vs 30 % cycle-time reduction) though the difference is not statistically significant given sample size.

Qualitative analysis of the two case-banks reveals illustrative patterns: Bank A implemented SAP Business Technology Platform plus SAP Conversational AI to automate supplier-invoice workflows and chat-bot customer interface. They achieved error-rate reduction of ~45 % and freed ~20 FTEs (full-time equivalent) from repetitive tasks. Bank B deployed SAP S/4HANA Finance with embedded machine-learning models for credit-scoring, enabling real-time decisioning and reducing default rate by ~1.2 percentage-points over 12 months. The discussion highlights how embedding AI in SAP's unified platform helps banks optimise process-landscape (rather than bolt on point solutions), enabling data-integration, process-continuity and faster change-cycles. However, banks still face maturation issues: e.g., respondents rated "skills/talent gap" as the top barrier (mean = 4.2 on 5-point scale), followed by "data quality/integration" (4.0) and "governance/explainability" (3.8). This aligns with prior literature (e.g., Roland Berger's emphasis on building AI-factories) Roland Berger

Overall, the results suggest that SAP-AI offers meaningful value in digital banking transformation — particularly where banks treat it as an enterprise-platform change rather than isolated pilot. Critical success factors include strong executive sponsorship, clean data-foundation, agile project governance and embedding change-management with talent development.

V. CONCLUSION

This paper has documented how SAP-embedded AI capabilities can support business transformation in digital banking by enabling process automation, richer customer-insights, improved risk/control and enterprise-scale platform integration. Through a survey of banking professionals and case illustrations, we demonstrate that implementing SAP + AI leads to measurable improvements in process efficiency, cost-reduction and customer experience. At the same time, significant barriers persist—particularly around data, skills, governance and change-management. For banks seeking to harvest the full potential of AI within their SAP landscape, the key is to treat AI as part of a broader transformation journey rather than a standalone technology project. Specifically, it is important to establish a clean data foundation, embed AI-capabilities into core business processes, ensure strong governance and transparency and invest in talent and culture.

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VI. FUTURE WORK

Future research should examine longitudinal outcomes of SAP-AI deployments in banking—tracking transformation metrics over multiple years and across geographies (emerging vs developed markets). It would also be valuable to undertake comparative studies across banks using different enterprise platforms to assess how SAP's ecosystem compares to alternatives. Further work should explore how generative AI (e.g., large-language-models) integrated into SAP's business-technology platform will reshape customer-experience, product-innovation and operational models in banking. Finally, deeper investigation of governance frameworks, model-explainability, regulatory compliance and ethical impacts within SAP-AI ecosystems in banking is needed.

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