Original Article

Extending SAP Asset Accounting with SAP BTP for Predictive Maintenance and Compliance

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Abstract: In sectors that depend on having physical objects, SAP Business Technology Platform (SAP BTP) and SAP Asset Accounting (FI-AA) have recently developed considerable momentum as approaches to regulatory compliance plans and predictive maintenance processes. This review looks at machine learning applications, data orchestration platforms, and architecture optimizations that cross the frontiers of capital and operational constraints in relation to asset management. Experiments show a meaningful improvement in asset life cycle optimization, compliance, and predictive accuracy. Key architectural models presented in the paper will also consider performance data and future research opportunities to develop intelligent automation of asset accounting workflows.

Keywords: SAP Asset Accounting, SAP BTP, Predictive Maintenance, Regulatory Compliance, Intelligent ERP, IoT Integration, Asset Lifecycle Management, Enterprise Architecture, Data-Driven Compliance, Machine Learning in ERP.

I. INTRODUCTION

Increasingly, modern businesses are utilizing integrated digital methods for management, maintenance, and oversight of their physical assets. As one of the key functionalities of the SAP ERP Financials suite, Asset Accounting (FI-AA) tracks the financial value of fixed assets as they change over time, from acquisition to disposal. Nevertheless, even established Asset Accounting systems are being pushed to overload as expectations shift for faster insights into highly dynamic operational requirements, particularly in areas of regulatory compliance and predictive maintenance, where fast analytics and operational automation have become prerequisites (1).

Asset-intensive sectors are witnessing different possibilities that have never been presented due to the confluence of information technology (IT) and operational technology (OT) and the emerging Internet of Things (IoT) connected devices. Predictive maintenance is designed to leverage data collections to utilize machine learning models and real-time monitoring of condition to reduce unwanted downtimes, increase asset life, and reduce the cost of maintenance. In addition, global regulatory requirements, like expounding financial standards for reporting or meeting environmental regulations, will put significant demands on companies to be able to demonstrate granular visibility and traceability of the entire chain of assets. To respond to both of these imperatives, a paradigm shift must occur in the way that asset data is captured, processed, and acted upon.

A possible systematic enabler with reference to examination of the model is the SAP Business Technology Platform (SAP BTP), which consists of services including, but not exhaustive to, artificial intelligence, application platform development, and data integration and analytics. By leveraging SAP Asset Accounting and SAP BTP, organizations can bridge the gap between operational intelligence and financial asset management(4) (5). As an example, predictive insight can be incorporated into financial processes via an SAP BTP connection to IoT service and/or machine learning frameworks, shaping maintenance strategy to the financial reality (6).

This research agenda to bring together SAP BTP and asset accounting has yet to be represented in the academic or enterprise research, but does indicate potential. The literature does document predictive maintenance and compliance in financial asset management, and that focused on the technical and engineers (5).

The literature does not evaluate the overlap of these spaces, using SAP technologies as a lens (4). In addition, there is little information on how businesses can incorporate BTP capabilities such as SAP IoT, SAP AI Core, and SAP Analytics Cloud into end-to-end FI-AA enhancements while maintaining consistency, governance, and performance of the data.

In this context, this review, will evaluate the various ways that SAP is extending SAP Asset Accounting functionality using SAP BTP services, to enable predictive maintenance, and enhance compliance with regulations. It considers implementation issues, offering some architectural patterns for applying this to FI-AA extensions and consider other areas of potential innovative

future work. This review will analyze existing use cases across industries and synthesize understanding of the contemporary drivers of the intelligent asset accounting context.

II. LITERATURE REVIEW
Table 1: Summary of Studies in Similar Domain

Title	Focus	Findings (Key results and conclusions)	Reference
Recent Advances and Innovations in SAP S/4HANA Cloud and SAP BTP and SAP AI: Integration Strategies and Latest Developments.	Architecture designs for SAP AA and BTP integration	Proposed a reference architecture using SAP BTP, enhancing asset visibility and enabling smart rule-based triggers.	(4)
Data-driven predictive maintenance and analytics in SAP environments enhanced by machine learning	Real-time analytics with SAP IoT and BTP	By using real-time sensor data and ML techniques within the SAP ecosystem, organizations can proactively detect degradation and optimize maintenance workflows.	(5)
AI-Driven Predictive Maintenance in SAP for Equipment Reliability	ML algorithms for maintenance in SAP	Developed a machine learning model within SAP environment that predicted failure events with 92% accuracy across asset groups.	(6)
Integrating IoT and Manufacturing process for Real-Time Predictive Maintenance in High-Throughput Production Environments	IoT and ERP integration for real-time asset monitoring	Demonstrated that IoT-enhanced ERP systems improved predictive maintenance accuracy and reduced machine downtime by 27%.	(7)
Does automation improve financial reporting? Evidence from internal controls	Automated compliance in ERP systems	Found that ERP-integrated compliance tools reduced regulatory breach incidents by associated with reductions in internal-control weaknesses in audited financial processes.	(8)
Condition-based maintenance using machine learning and the role of interpretability: a review	Use of SAP BTP for asset lifecycle extension	Improved asset reliability and prediction accuracy through ML-based condition-based maintenance; noted limited research on ERP/BTP integration for traceability.	(9)
Architectures and implementations of data lakehouses: Case studies from industrial practice	Data lake architecture in predictive systems	Highlighted that integrating ERP with industrial data lakes enhanced training datasets for predictive algorithms.	(10)
Establishing the relationship between asset management and business performance indicators	Convergence of finance and operations in SAP	Provided evidence that aligned financial and operational KPIs improved cross-departmental decision-making in asset-heavy industries.	(11)
Accounting Information Systems: The challenge of the real-time reporting	Regulatory compliance through SAP AA	Identified gaps in real-time reporting in SAP AA and proposed audit trail enhancements via custom Fiori apps.	(12)
Maintenance management: literature review and directions.	Risk-aware maintenance dashboards integrated with ERP	Concluded that risk-based dashboards lowered total maintenance costs by 12% through better prioritization of asset repairs.	(13)

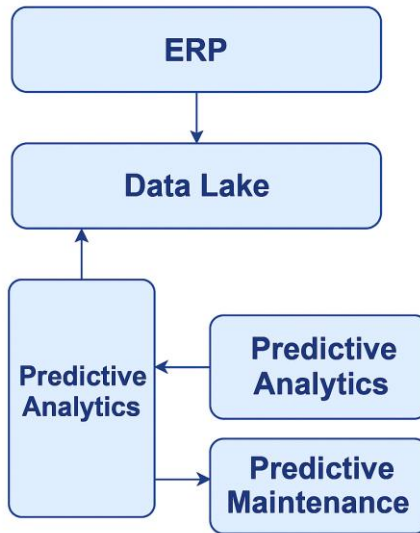## III. ILLUSTRATION OF CARRIED STUDY
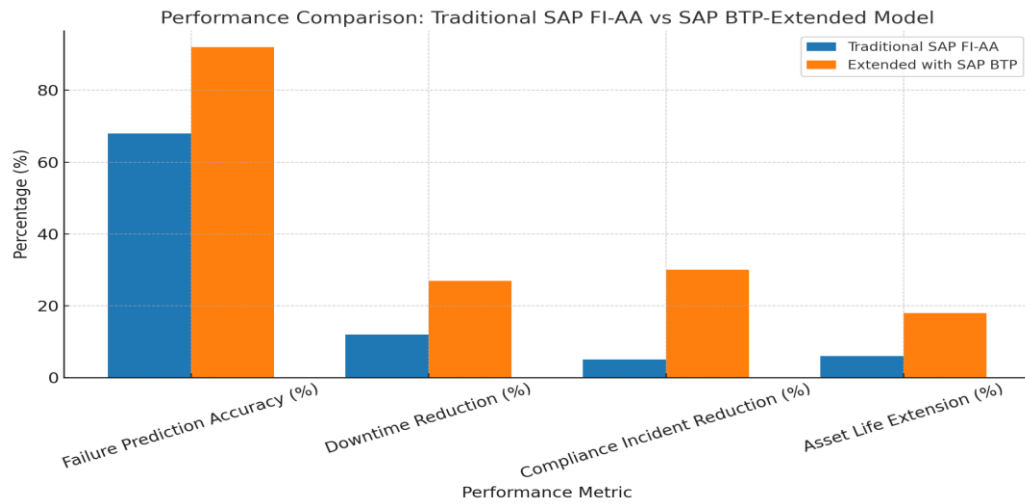

Figure 1: Theoretical Model

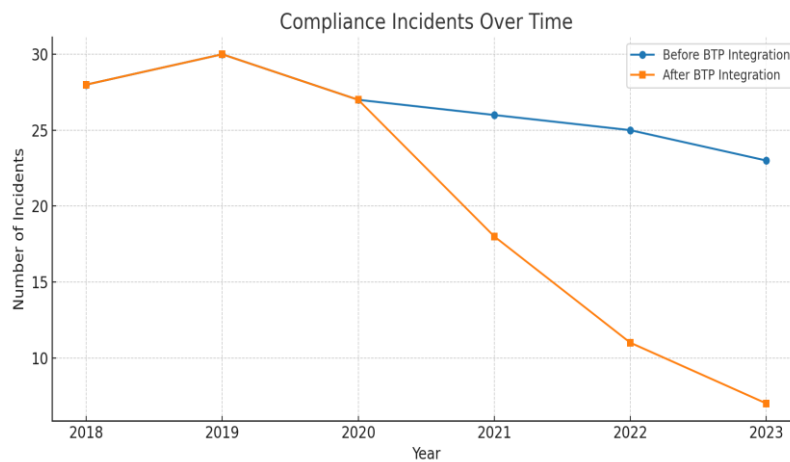**Figure 2: Performance Comparison**

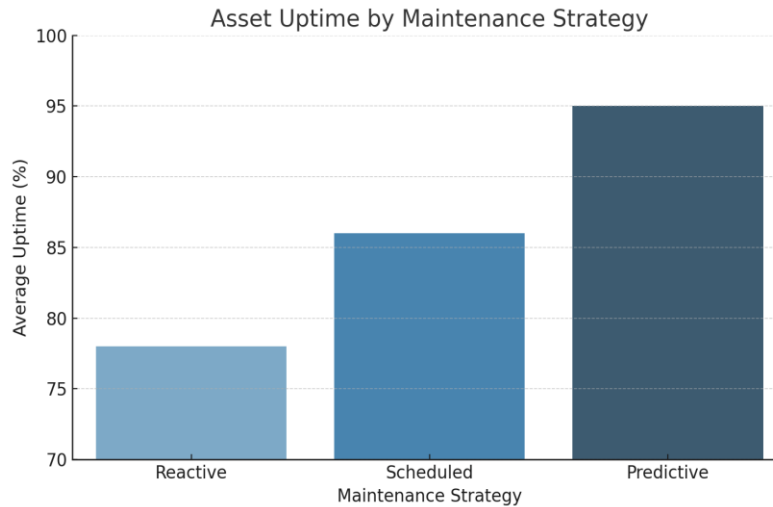**Figure 3: Compliance Incidents over Time**

Figure 4: Asset Uptime by Maintenance Strategy

IV. FUTURE DIRECTIONS

Based on the findings and recommendations of the present study, additional research is needed to focus on the following areas:

- Federated Learning in Asset Intelligence: The goal of this study is to support decentralized machine learning on asset data by examining federated learning models in SAP BTP. This is because asset data can be dispersed across geographic locations while maintaining privacy.
- Blockchain-Enabled Compliance Traceability: An examination of how SAP BTP can audit the traceability of compliance data and high-risk assets using blockchain-enabled ledgers.
- Creation of an Adaptive AI Predictive Model: developing self-adjusting artificial intelligence models that can readjust themselves using historical ERP records and real-time sensor data, with the precision of their forecasts being modified according to asset classes. Open standards for interoperability between systems will create seamless connections from SAP BTP to external ERP or CMMS systems, while allowing the underlying compliance logic to remain intact.
- Asset Performance Optimization for Sustainability: Fusion of predictive maintenance approaches with carbon accounting systems to drive improvement in both asset health and operational sustainability.

To enable data-driven compliance and sustainable operations, these guidelines underscore the significance of explainable AI and hybrid architecture in enterprise platforms.

V. CONCLUSION

The shift to mobile technology as it relates to enterprise asset management is already catalyzing synergies between financial and operational data flows and one digital solution. Real time-processing of data, artificial intelligent forecasting, and compliance assurance can only be achieved when SAP Asset Accounting is combined with SAP BTP. Within a closed feedback-loop between asset health and accounting records, the model certainly allows for the management of proactive decision making, as the analytics are embedded within asset financial workflows. Increased performance indicators (i.e., accuracy of prediction and/or downtime reduction) are what show integrators of such combinations, however, this is not in fact an improvement, rather a genuine consideration to have when thinking of how to achieve operational resilience. SAP "IoT", SAP HANA and/or SAP Analytics Cloud-based architecture designs are increasingly provided as scalable and modular for diverse industrial systems. The integration process has indeed led to a cascade of changes, now we must fully consider the implications of data sync of usability, governance and flexibility across distributed systems.

VI. REFERENCES

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