

FSCM integration for real-time credit risk and receivables monitoring in ERP systems

Kajendran Jayaraman *

Pondicherry Central University Kalapet, Puducherry – 605014

International Journal of Science and Research Archive, 2026, 19(02), 1634-1641

Publication history: Received on 08 April 2026; revised on 16 May 2026; accepted on 18 May 2026

Article DOI: <https://doi.org/10.30574/ijrsra.2026.19.2.1025>

Abstract

Global supply chains are becoming more complex and there are more demands of financial transparency that results in creating a need to bridge Financial Supply Chain Management (FSCM) systems with Enterprise Resource Planning (ERP) systems. The paper provides a detailed overview of the working of FSCM systems in collaboration with ERP systems to track credit risk and receivables in real time. The paper reveals the transformation of organizations that adopt the old school of thought in financial management that relies on slow data processing and fragmented systems to the new system of operation that provides real time information via their real time access to data. The research explores the role of ERP systems as core systems that help organizations to integrate their data resources as they develop superior system visibility and deploy predictive risk assessment tools. The research document contains a conceptual framework that shows how FSCM processes interact with ERP Accounts Receivable (AR) module and real-time analytics systems. The study article introduces a credit risk monitoring system that employs real-time data processing capabilities in the improvement of financial outcomes and reduction of the probability of default. The review identifies key challenges, including data integration issues and system complexity and regulatory limitations, whereas the research study defined future research directions to explore the digital transformation and intelligent financial ecosystems. The study reveals that FSCM-ERP systems require adoption by organizations to increase their financial risk management in dynamic business environments.

Keywords: Financial Supply Chain Management; ERP Systems; Credit Risk; Receivables Monitoring; Real-Time Analytics

1. Introduction

In volatile and global business environments, organizations are increasing their financial visibility and risk management capabilities across the entire supply chain. Financial Supply Chain Management (FSCM) is a fundamental practice that links financial operations of payables and receivables with credit management to supply chain operations processes. Enterprise Resource Planning (ERP) systems have a fundamental data-sharing capability that allows organisations to integrate their financial functions with their procurement, sales, and logistics functions. Implementation of FSCM in ERP systems is, thus, necessary to gain financial transparency, optimize working capital and aid in strategic decision-making. The greatest challenge is experienced when organizations are required to manage their credit risk activities and manage their receivable accounts. Conventional systems normally operate on data that is updated at fixed intervals and has been distributed in various sources of information, thus leading to delays in default detection and poor tracking of the receivables. Supply chain credit risk is a particular challenge due to its interdependent nature, where a financial issue by one member of the supply chain will have an impact on the whole network, involving multiple parties [1]. The scenario demands sophisticated surveillance software that works in real-time to provide immediate risk notifications and monitor potential risks.

* Corresponding author: Kajendran Jayaraman

Digital technologies including big data analytics and artificial intelligence (AI) and real-time data processing, have transformed ERP systems into intelligent platforms which help organizations make decisions through their data analysis capabilities. Modern ERP systems can handle extensive transactional data together with external information, which allows organizations to assess their financial status and risk management activities through continuous monitoring. Organizations use big data technologies because they reduce information gaps between financial institutions and enterprises while improving credit risk assessment accuracy which results in decreased default rates.

Organizations can now use real-time dashboards together with business intelligence tools to create visualizations of their financial risks which they can monitor and manage in real time. The tools collect data from ERP systems together with additional sources to produce insights which organizations can use to make decisions faster while they manage their receivables and credit exposure more effectively. Traditional ECC FSCM updates invoices, incoming payments, cleared items, dispute cases and promises to pay updates periodically, but in SAP HANA's in-memory capabilities credit exposure updates instantly whenever AR transactions occur.

Organizations achieve better financial performance because they can manage their financial activities before problems arise which results in better liquidity and financial security.

The field of FSCM integration with ERP Accounts Receivable (AR) module includes data integration difficulties and system interoperability challenges. This review paper presents a detailed examination of FSCM, which shows the credit risk management and receivable monitoring. The study evaluates the current problems that researchers can use in future studies.

2. Literature Review

Financial Supply Chain Management (FSCM) applications in Enterprise Resource Planning (ERP) systems have become increasingly significant as more companies have realized that the technology allows them to produce improved financial outcomes and enhance visibility and risk management systems. The ERP system acts as a centralized point that links various business activities in an organization and enables the free flow of data between the financial and operational departments. The system allows organizations to carry out financial transactions within their whole network of supply chain operations. The implementation of ERP systems leads to better operational performance and improved data accuracy because it replaces outdated manual processes with workflows that use automated and standardized methods according to the research findings [5].

The primary function of FSCM integration enables organizations to establish operational risk management systems which govern their entire supply chain network. The ERP system enables organizations to track their supplier performance data and financial transaction records and compliance documentation which helps them make better decisions while reducing operational uncertainties. The ERP-based vendor management systems allow businesses to determine which suppliers will most likely deliver on their commitments while they assess the financial risks associated with different suppliers and build long-term strategic relationships with them [6]. The ability to obtain timely and accurate information about credit risk enables organizations to evaluate their trading partners' financial health.

The implementation of FSCM into ERP systems presents organizations with various difficulties despite its many benefits. The two main risk-related problems for organizations involve their risk management practices and their compliance operations. The ERP implementation process requires organizations to deal with complicated system designs which include linking their existing systems to their new system and meeting various regulatory requirements. The situation creates risks that affect data security and lead to business operations problems and damage financial protection. Organizations need to create strong governance systems which combine with artificial intelligence technologies and automation tools to enhance their ability to detect risks and achieve compliance in their ERP systems according to research findings [7]. The lack of effective risk management procedures will create conditions that allow ERP system weaknesses and regulatory compliance problems to damage ERP system integration advantages.

The literature demonstrates that ERP systems function as essential tools which help organizations maintain accurate financial records while meeting their international compliance obligations throughout their entire supply chain operations. Organizations are dealing with three main obstacles to their operations which stem from their requirement to comply with different data standards and reporting systems and their need to meet multiple regulatory guidelines across numerous jurisdictions. Integrated ERP systems achieve real-time financial visibility through standardized reporting systems which enable organizations to access their financial data instantly while blockchain and cloud computing technologies provide them with instant access to their financial data [8]. The system enables organizations to achieve better transparency which enhances their accountability and enables them to make better decisions.

The research shows that organizations gain major advantages from their ERP-based FSCM system integration which improves their operational efficiency and risk management capabilities and helps them meet compliance requirements. Organizations need to implement advanced real-time data processing systems and analytics technologies which allow them to achieve full benefits from their FSCM operations within ERP systems according to the increasing adoption of digital technologies.

3. Conceptual Framework and Real-Time FSCM-ERP Integration

The current state of Financial Supply Chain Management (FSCM) has developed from its initial function of processing financial transactions into advanced systems that create financial ecosystems through data analysis and intelligent automation. Organizations today depend on digital systems that connect ERP software with next-generation technologies including big data analytics and artificial intelligence and Internet of Things (IoT) for instant tracking of their financial movements and credit limits. Organizations now require this transformation because they need to solve the financial-management problems which emerge from slow report generation and separate data systems and the inability to use predictive tools in their financial analysis work.

The framework for conceptual FSCM-ERP integration operates as a multi-layered system which connects transactional systems with multiple data integration levels and analytics engines and decision-support interfaces. ERP systems function as the primary system that organizes all financial activities which involve invoicing and payment processing and receivable management. The system achieves its full potential through linking up with all types of data sources, which allows data to flow continuously between supply chain partners. The research demonstrates that organizations which utilize multi-source data integration platforms experience better risk evaluation results while they build their intelligent credit assessment models [9]. Organizations use this capability to monitor financial conditions through constant data updates, which help them recognize new threats to their financial systems.

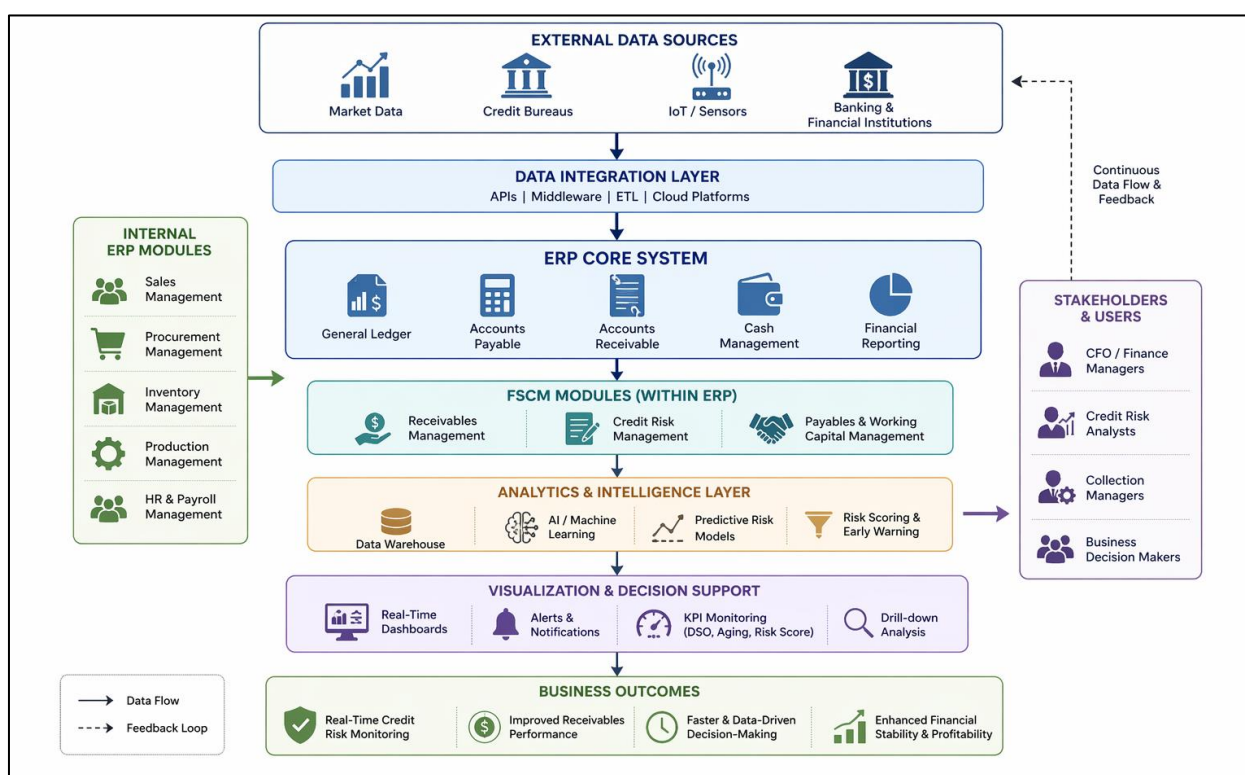
The conceptual model encompasses the use of advanced analytics elements that utilize machine learning and predictive algorithms to estimate the credit risk, monitor receivables and develop early warning notifications. The analytics engines strive to transform raw transaction data into useful insights that assist organizations in transforming their financial management into a response-based approach to an organized one. The ERP-integrated systems that involve Industry 4.0 technologies provide continuous monitoring capabilities and predictive analytics that are useful in operational performance and risk control in any supply chain operations [10]. This integration can enable the organization to have a financial system that not only follows all transactions but also anticipates potential disruptions and develops strategies to address the disruptions.

The framework comprises real-time data capture and processing technologies that are IoT-enabled systems. The systems enable the organizations to keep track of their financial and operational information in real time and this assists the organizations in conducting an analysis of their financial performance by dynamically analysing the risk. The study indicates that integration of real-time data enhances financial transparency of organizations that are now able to conduct continuous financial monitoring rather than using the traditional financial reporting systems [11]. This process is necessary in the management of receivables since it aids in detecting delays in payment and possible default at an earlier point. The structure requires technological links and operations that contribute to developing visual materials and tools that aid in decision-making. The digital interfaces and business intelligence dashboards are instruments that give the stakeholders real-time information on business key performance indicators including outstanding receivables, credit limits and payment behaviors. The tools enable organizations to react to situations more appropriately since they allow them to display problematic information in a manner that can be promptly grasped and actions are taken. The dashboards that run within ERP systems allow financial managers to monitor credit risk in real time as they undertake required risk management measures. This section shows the way real-time FSCM-ERP integration enhances the operational processes with a table that compares the traditional systems with the real-time systems. The study demonstrates that digital integration results in increased accuracy of data and more efficient risk detection and quicker operational decision making (Table 1, Figure 1). Tight integration between FSCM Credit Management and the AR module is critical to controlling customer credit risk in real time. AR postings and incoming payments update the customer's credit exposure in real time. It could enable FSCM during order-to-cash processes and high-risk transactions for review.

By leveraging real-time exposure data, behavioral scoring, and automated credit rules, the system significantly reduces credit risk and strengthens financial governance, and supports stronger, long-term customer relationships.

Table 1 Comparison of Traditional and Real-Time FSCM in ERP Systems

Aspect	Traditional FSCM Systems	Real-Time FSCM-ERP Systems
Data Processing	Periodic and batch-based	Continuous and real-time
Risk Identification	Reactive and delayed	Predictive and proactive
Data Integration	Fragmented systems	Fully integrated platforms
Decision-Making	Slow and manual	Automated
Visibility	Limited financial insight	End-to-end transparency
Technology Use	Basic IT systems	AI, Big Data, IoT-enabled

**Figure 1** FSCM-ERP integration architecture for real-time credit risk and receivables monitoring

4. Real-Time Credit Risk and Receivables Monitoring Model

Organizations require real-time credit risk monitoring because their global supply chains become more complex and digital financial systems become essential for their operations. Static financial statements and periodic reviews of traditional credit management approaches cannot handle the credit assessment requirements of evolving business conditions. Organizations now use data-driven models through ERP systems to assess credit risk and manage their receivables in real time.

The FSCM ERP system uses its real-time credit risk monitoring model to track financial information through ongoing data collection and data processing and data analysis activities. The model starts by gathering transactional information which includes invoices and payment histories and order volumes and customer financial records from ERP systems. Internal data is obtained from ERP systems while market indicators and supplier performance metrics and macroeconomic variables provide external data. Organizations can achieve better financial monitoring and risk

management through ERP-based systems. IoT and digital tracking solutions enable real-time asset and transaction monitoring [13].

The data collection process begins after which advanced analytical models carry out processing to measure creditworthiness and identify possible risks. Delayed payments and decreasing transaction volumes and unusual financial behavior represent patterns which machine learning algorithms and predictive analytics can detect. The system creates credit scores and risk indicators which receive constant updates through new data inputs. Organizations use predictive analytics through their ERP systems to forecast financial disruptions which enables them to take proactive measures instead of waiting to respond to problems [14]. This capability becomes essential for minimizing financial instability impacts across interconnected supply chains.

The model's next phase involves its ability to display real-time data while supporting decision-making processes. ERP system-based business intelligence dashboards deliver essential financial data to financial managers who need to know about their current receivables and credit limits and aging analysis and default probabilities. The system enables users to locate high-risk customers and take necessary steps through credit limit changes and payment reminders and collection activities. Advanced planning combined with integrated ERP systems enables financial and operational teams to work together better because their risk management decisions will match the goals of the entire supply chain [15].

The system incorporates alerts for deteriorating payment patterns or receivables exceeding a customer's credit limit. Automation also minimizes manual risk assessment by establishing automatic identification of all the critical risks. Digital technologies used by organizations involve simulation models and digital twins to evaluate different risk scenarios and understand the effects of various disruptions on their financial performance [16]. The forward-looking method helps organizations build resilience while making more precise operational decisions.

The real-time credit risk and receivables monitoring model shows how financial risk management improves when organizations implement FSCM through their ERP systems. Organizations achieve credit risk management which combines precise data processing with real-time decision making and rapid operational procedures. Organizations that use this integrated method can enhance receivables performance while achieving financial stability and maintaining competitiveness in complex supply chain situations (Figure 2).

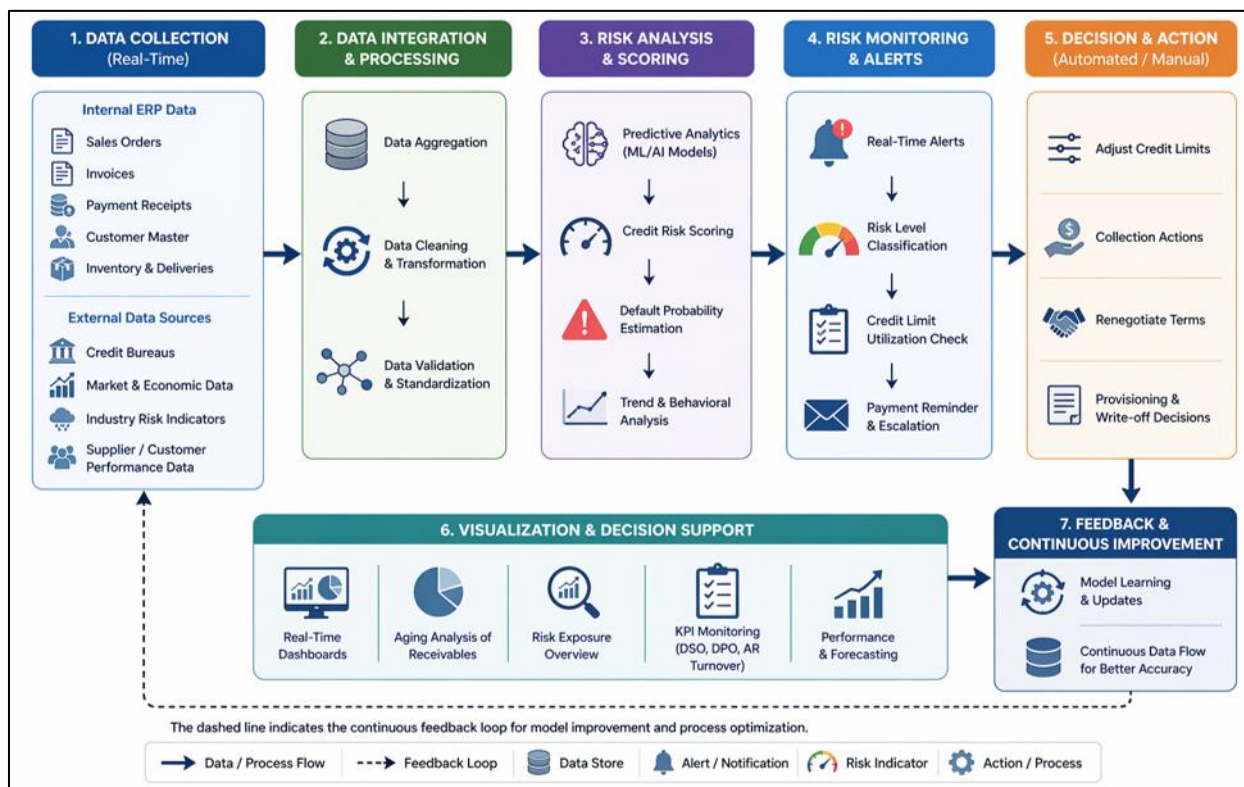


Figure 2 Real-time credit risk and receivables monitoring process in ERP systems

5. Challenges and Future Directions

The financial supply chain management system has established more effective links with enterprise resource planning systems which enable organizations to monitor credit risk and receivables in real time. The system encounters multiple obstacles which prevent it from achieving complete implementation and operational efficiency. The system faces multiple obstacles because of its intricate technological requirements which create problems for data connectivity and system expansion while organizations have to comply with changing data protection laws. The system needs to eliminate its existing obstacles so organizations can utilize all functions of their real-time financial monitoring systems.

The most important challenge which organizations face involves their ability to connect data with all their operational systems and business partners. The financial supply chain management system requires organizations to share data between their suppliers and financial institutions and their customers and their internal networks. The system enables data interchange among all these entities but its operation encounters problems because of existing data format discrepancies and the absence of established data standards and the limitations imposed by outdated systems. The challenge of siloed information structures and lack of interoperability remains a problem with traditional supply chain systems that are unable to undertake real-time monitoring and decision-making processes as per the latest research findings [17]. The process of credit risk assessment must be perfectly integrated since any delays will decrease its capability to evaluate credit risk correctly and in time. The real-time analytics process relies on the correct data that requires proper governance in its entire lifecycle. The two technologies of big data and AI can improve the accuracy of credit risk models but their usefulness is based on the availability of quality data that is reliable. Bad quality of data and missing datasets along with discrepancies among the sources results in incorrect risk assessment that generates hazardous consequences. New data protection concerns emerge as the use of external data sources grows that require organizations to protect their data and secure their networks without violating the legal regulations. Data ecosystems management involves the process of managing the data that requires organizations to have effective data management systems that must include both data governance frameworks and standardized protocols.

The implementation process faces major obstacles of existing technological limitations and financial restrictions. Organizations that want to implement advanced ERP-integrated FSCM systems need to allocate significant financial resources for upgrading their digital infrastructure and training their staff members and their existing systems. Small and medium-sized enterprises (SMEs) face barriers to technology implementation because they lack sufficient financial resources and technical expertise. The introduction of blockchain and IoT technologies to ERP systems results in system design challenges which affect both scalability and system upkeep requirements. Businesses face substantial difficulties when they attempt to join these technologies with their existing systems because they need to take care of both resource-heavy requirements and system compatibility problems [18].

Organizations need to handle both financial reporting standards which keep growing more complicated and they must meet all compliance requirements while managing cross-border regulations. The design of real-time financial monitoring systems must create compliance functions which protect against IFRS and SOX and regional regulatory frameworks. Organizations must integrate compliance functions into their ERP systems because requirements differ across different regions. The digital financial system environment has created new rules which require organizations to develop systems that can adapt to changing business requirements.

Research and development activities must work to increase FSCM-ERP system capabilities which handle greater system expansion requirements and better intelligent processing and system interoperability. The incorporation of advanced technologies such as blockchain, artificial intelligence, and machine learning is expected to play a crucial role in improving transparency, automating compliance, and strengthening predictive risk management capabilities. Blockchain-enabled ERP systems deliver unchangeable transaction records reducing financial supply chain fraud risks [17]. AI-driven models enable credit scoring systems, which develop more advanced risk forecasting models.

Future development should combine ERP systems with real-time analytics platforms and IoT devices with cloud-based infrastructures. The financial systems of the ecosystem provide continuous monitoring which helps organizations adapt their operations to changing market dynamics. The implementation of standardized data frameworks together with open integration platforms establishes a foundation which allows supply chain partners to work together more effectively while increasing system performance.

The system benefits from FSCM integration with ERP systems which enables organizations to monitor credit risk and receivable accounts in real time. Organizations face multiple operational difficulties which require resolution before they can successfully implement their systems for permanent operational success. Digital technologies will progress

because organizations will develop better data governance methods which enable them to meet regulatory requirements. This will create new innovations in financial supply chain management.

6. Conclusion

The integration of Financial Supply Chain Management with ERP systems represents a significant advancement in modern financial risk management practices. The research demonstrates how organizations achieve proactive credit risk monitoring and receivables management through real-time data integration which is supported by advanced artificial intelligence and big data analytics technologies. The proposed frameworks and models demonstrate that enhanced visibility, predictive analytics, and automated decision-making can significantly improve financial performance and reduce default risks. The successful implementation of such systems requires organizations to resolve three main challenges which include data integration problems and system complexity and regulatory compliance requirements. The future advancement of digital technologies together with standardized data ecosystems will enhance the existing FSCM-ERP integration capabilities. The implementation of real-time financial monitoring within ERP systems helps organizations enhance their financial stability and create competitive advantages while developing operational agility in complex supply chain systems.

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