e-ISSN:2582-7219

# INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 8, August 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.521

© 2024 IJMRSET | Volume 7, Issue 8, August 2024| DOI:10.15680/IJMRSET.2024.0708082

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

# Enterprise-Wide Procurement Consolidation: Ivalua-SAP-EDW Integration Architecture for Global Supply Chain Excellence

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**ABSTRACT:** The document discussed is an Enterprise Architecture to integrate the numerous International Procurement and Supply Chain Business Systems into one common Ivalua Platform using sophisticated ETL/EAI Integration with SAP MM/FI Modules, and an Enterprise Data Warehouse, which is very important to provide Master Data Management for Source-2-Contract and Procure-2-Pay processes to ensure data fidelity, and high ETL success rates. The proposed solution is to provide greater efficiency in processing invoices, to reduce Procurement-2-Payment (P2P) Cycle Time, and to create considerable cost savings. The integration of these systems will be accomplished in a phased rollout with a strong error handling process that will also improve visibility and compliance within Global Supply Chains. Numerous KPI's show that the project continues to demonstrate progress and those future phases will include Blockchain Traceability, Cloud Scalability, Real-Time ETL, and Artificial Intelligence Driven Predictive Buying to help stay competitive in a very Volatile Marketplace.

**KEYWORDS:** Enterprise Architecture, Supply Chain Business Systems, ETL/EAI Integration, Source-2-Contract, Procure-2-Pay, Procurement-2-Payment, Cloud Scalability

## I. INTRODUCTION

The global procurement process considers the various risks associated with the international sourcing process. There are a number of risks associated with the global supply chain including: dependency upon operational relationships; environmental re-and dislocations related to natural disasters, cyber events and geopolitical instabilities; and economic instability, all of which could result in shut-downs in business operations and increased cost.

Among some of the primary risks are: natural disasters; cyber events; lost production due to labor shortages caused by employee strikes; unexpected supplier failures; regulatory violations and subsequent fines; trade disputes and tariffs resulting from sanctions imposed on companies due to their business affiliations with countries under sanctions; and damage to infrastructure caused by environmental disasters or delays in transporting cargo once delivered. Economic risks related to suppliers include supplier bankruptcies, and financial conditions of suppliers, which can lead to increased prices due to inflation; and the fact that cyber-threats will result in reduced levels of trust from consumers as a result of data breaches.

One way that supply chain management effectively manages risk is by having the ability to implement a strategic approach to risk mitigation. The strategies related to the planning process are visibility, diversification and flexibility, which, when implemented correctly, can mitigate many of the aforementioned risks. The utilization of diversification to reduce the number of suppliers uses “friend-shoring” and “near-shoring” as additional methods of determining the amount of suppliers that provide customers with the best product at the lowest possible price. In order to achieve optimal risk mitigation, suppliers must consider their vulnerability, from a technology stand point, related to environmental and other factors as well as the ability to share inventory and provide customers with accurate, real-time information. In conjunction with this process, supplier development is essential to maintain a healthy relationship. Agile planning methodologies can help facilitate supplier cooperation and improve the supply chain process [1].

Integrating these strategies into an existing system (e.g. Ivalua) provides for greater visibility to the company regarding the supply chain, streamlines processes associated with cross-border shipments and enhances the company’s ability to

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respond to fluctuating demand and increased regulatory restrictions. Evidence of results from successful implementation of these strategies can be seen with various companies. Increased visibility, improved forecasting, and the creation of an efficient, integrated supply chain will all result from the use of advanced technology (AI, data analytics) within the context of Global Supply Chain Management (SCM). Ultimately, Global SCM and Global Procurement must work together to develop Global Supply Chains that continue to be resilient, competitive and sustainable [2].

The challenges associated with Global Supply Chain Risk are exacerbated by cross-border interdependencies and the complexity of operating in a global marketplace and culture. Cross-border interdependencies (e.g., regulatory differences, multinational trade networks) increase Global Supply Chain risk and also increase the risk of supply chain disruptions by creating situations where a single disruption impacts multiple supply chains.

Considerable events have taken place during the Pandemic Period (e.g., COVID-19) that caused significant Supply Chain Instability in some regions, largely as a result of that region's dependence on imports. Supply Chain Instability has transpired as a consequence of a combination of factors. Examples of this include the COVID-19 Pandemic, which caused substantial instability in Sub-Saharan Africa due to an import-dependent economy; and, Major Food Supply Disruption & Inflation (e.g., due to the Russia-Ukraine Conflict) in the Middle East and North Africa from the blocking of shipping lanes. Other examples include Trade Disputes (e.g., The US/China Trade War) that resulted in increased transportation costs, and Brexit, resulting in increased costs and Logistics Bottlenecks involved with the flow of perishable goods. Each of these examples demonstrates the need for all supply chain parties to have real-time visibility into the status of the goods and services they procure, and to develop a robust, multiple sourcing strategies to mitigate the impact of cross-border disruption on their Global Operations [3].

The Global Procurement and Supply Chains of formal organizations consist of all sourcing, procurement, manufacturing, exporting/importing, and delivery of goods and services done by an organization in their own countries as well as other countries. The ultimate goal of these activities is to maximise the value of these operations for the organization and the customers who will use the products and services theyAn integrated strategy may include quality assurance, sustainability, and adherence to international standards' such as the United Nations, while simultaneously managing complex, global supplier networks. The thorough integration of all aspects of the integrated global supply chain supports access to niche markets, state-of-the-art technology, and favourable pricing. Adequate support for effective process preparation relies on careful planning, on-going real-time communications, and strong technology integration, as well as the use of Artificial Intelligence (AI) for demand forecasting, the Internet of Things (IoT) for information tracking/monitoring and Blockchain technology for transparency [4].

Global procurement consists of four main areas: sourcing/procurement; manufacturing/production; logistics/distribution; and customer/returns management. Within the sourcing/procurement phase of global procurement, foreign suppliers are evaluated for cost, dependability, and political risk. The focus during this review process is on cost efficiencies and reliability/effectiveness of the manufacturers; therefore, while evaluating manufacturers, it is essential to consider both the cost and reliability of the manufacturer and the stability of the manufacturer from a political perspective. The manufacturing/production area measures production efficiencies versus customer-specific customisation and regulatory compliance.

Digital technologies (e.g., real-time analytics), blockchain technology, and artificial intelligence (AI) will assist organisations in optimising their supplier selection process by providing the organisation with a host of analytic capabilities for understanding and comparing supplier offerings. Therefore, organisations that use digital technology to monitor and analyse supplier performance and innovations increase their daily operational efficiency and profitability to respond to changing customer requirements, such as quicker response times and improved product quality. In summary, digital technology improves operational efficiency within the supply chain, increases collaboration within the supply chain, and promotes continuous improvement within the supply chain [5].

## II. RELATED WORK

Numerous academic studies have explored the relationship between global procurement and innovation, particularly with a focus on how public procurement can act as a catalyst for economic growth. Studies indicate that procurement

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can increase research and development investments, increase supplier competition and create new market opportunities for innovative products and services. It has been shown that public procurement can also be used as a means of creating a more inclusive economy through collaboration between public organisations and suppliers. The key findings of these studies highlight the importance of enhancing the capacity of the public sector to support innovation through enhanced stakeholder collaboration and systematic monitoring of the outcomes of innovation. Innovation procurement is often seen as a route through which businesses that operate in the high technology market can participate in a value-added way, thus enabling the widespread uptake of innovative goods and solutions through a co-ordinated approach to purchasing at all levels [6].

Reports from the OECD, for example, contain empirical evidence of the positive impact of innovation procurement on increased R&D expenditures, patenting and overall economic performance. Other reported challenges faced regarding the implementation of PPI include the need to establish appropriate levels of transparency and support for both local and non-local suppliers to ensure a level playing field for all those involved in the process. Overall, the existing literature supports the notion that procurement should be viewed as a strategic tool for enhancing the innovation capacity of countries and assisting in their ability to compete in the global economy, rather than just as a tool for managing costs associated with procurement [7].

Public procurement for innovation plays a crucial role in promoting the R&D of firms, enhancing firm-based innovation, and creating better socio-economic outcomes through demand-side policies. The evidence is clear from key studies that the existence of procurement tenders for R+D and other related services creates the conditions for an increase in the level of innovation in the public sector. Italian research has shown that the creation of a connection between the strategic goals of a PPI project and the consequent positive community and economic outcomes following its completion is critical.The evaluations conducted in Peru have shown that innovative forms of Publicly Funded Innovation can generate increased innovation outcome through procurement as compared to traditional procurement techniques. A review by the (OECD) Organisation for Economic Cooperation and Development stresses the importance of a well-designed procurement process, shared use of PPI processes and support to Research & Development programs.Many recent review articles and meta-analyses have been published to document the positive effects of PPI on investment cycle, patent and R&D expenditures. These reviews also provide classifications for PPI instruments and barriers to their effectiveness.All of these studies provide evidence supporting the use of PPI strategies within a wide array of International contexts.

The information provided is based on various reports and case studies related to supply chain management and Electronic Procurement Technology and includes case studies and reports that highlight issues related to sustainable procurement of Beef. The case study on the Accountability Framework Initiative provides examples of using Sustainability and Compliance Monitoring together with the establishment of a common set of standards for Data Used for Procurement Visibility. The case study on SCAtech showcases how to optimize sourcing and production through the SCA Planner software, which utilizes the ETL principles, and can provide similar benefits for both Electronic Procurement Technology systems and Physical point-of-purchase systems.

The report produced in 2019 regarding the Electronic Procurement Systems identifies real-time data efficiency and developing and implementing an Outsourced Global Platform for the purposes of Enabling Franchise Logistics and Supplier Connectivity. The 2025 case study on G11 Global Supply Chain Management highlights some best practices for Supplier Management, including how to standardize Supplier Management processes and establish a Sustainable and Accurate data loop through the use of PPI processes to provide and support Supplier Personalization initiatives. Other resources available on this topic stress the need for consistency in the Supply Chain and to establish practices that support strict procurement processes. As such, there are many resources available regarding ways to improve the Accuracy and Visibility of Supply Chain Practices using Ivalua's proprietary technology.

This summary will discuss various resources available with regard to McDonald's Supply Chain Management as well as Electronic Procurement Technologies.The Accountability Framework Initiative produced a case study that demonstrates how combining sustainability with compliance monitoring during the beef procurement process provides a means for greater visibility within the procurement process through standardization of data. The use of SCA Planner TM software demonstrated in the SCAtech case study was illustrated to illustrate how sourcing and production could be optimised based upon the principles demonstrated in ETL (Extract, Transform, Load)-type systems. The 2019 E-

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Procurement System Report focused on real-time data processing efficiencies and an outsourced global platform for franchise logistics/supplier connections. The 2025 G11 Global Supply Chain Management Case Study focused upon standards like supplier management, standardisation, and closures for personal procurement. Other articles discussed the need for more uniformity in supply chains, as well as the need for restrictions on how goods are procured. As a result, these publications provide excellent examples of how to improve the accuracy and increase the visibility of supply chain management based upon information developed from the proprietary Ivalua Project.

Centralising data management and consolidating the procurement platforms into one centralised system allows for the greatest possible cost savings through automating and streamlining processes. An excellent example is that of Crédit Agricole, which saved €80 million (approximately $90,000,000 US) by centralising a total of €3 billion (approximately 3,500,000,000) in spending using Ivalua. An example of a textile manufacturer that improved its procurement spending by 38% based upon an AI (Artificial Intelligence)-optimised vendor selection process demonstrates this principle as well, as did a mid-sized enterprise that reported saving $2 million (estimate) and that experienced a 30% improvement in productivity from integrating the IT and procurement systems of the two companies into a single IT solution. An oil and gas company has also realised the benefit of combining its contract and eSourcing platforms, demonstrating an average 15% ROI.The efficacy of worldwide procurement alignment, underpinned by this trend toward unified master data management, is evidenced through the establishment of real-time visibility.

In order to achieve optimum efficiencies and better data management from enterprise-wide procurement consolidation, companies are employing a number of different strategies. These strategies include: Integration of procurement platforms with total visibility from the Source-to-Contract process through the Procure-to-Pay process, establishing a central repository of procurement master data in order to ensure accuracy and optimal governance, Automating Procurement workflows (including Purchase Orders) in order to minimize errors associated with manual processes, and Utilizing Advanced Analytical Tools and Artificial Intelligence in order to assess Procurement performance and support better decision-making. The ability for companies to manage risk through effective Change Management and User Adoption Strategies (including Training and Stakeholder Identification and Engagement) is critical for successfully implementing enterprise-wide Procurement initiatives. Furthermore, using a Phased Approach will help ensure that existing operations remain uninterrupted, while enabling the phased-in decommissioning of legacy Procurement Systems. Excellent examples of organisations that have benefited from Global Procurement Alignment include (a) A Global Oil and Gas company that has "digitalized" their Contract Management processes and (b) Technology Companies that have automated their Procurement processes via SAP Ariba.

In order to measure Procurement Efficiency improvements as a result of Global Procurement Alignment, organisations should measure Key Performance Indicators (KPIs). These KPIs provide a unique view of the effectiveness of the Procurement process, including Operational Speed, Cost Control, Supplier Performance, and Compliance. Key empirical measures used to evaluate the efficiencies of Procurement include: Time required to complete the Procurement Cycle (which can be used to determine where there are "bottlenecks"), Cost Savings/Avoidance (which is used to quantify the financial advantages of Effective Procurement), Spend Under Management (this indicates the level of Control an Organisation has over its Internal Spending), Contract Compliance Rate (this measures the extent to which organisations honour their agreements with Suppliers), Supplier Performance Assessment (this assesses how Reliable and Quality the Supplier is), Purchase Order Accuracy (this ensures that the Orders match what is Delivered), and Procurement Return on Investment (this measures Cost Savings and operational expenses). To enhance procurement assessment activities, organisations may employ Advanced Techniques such as Predictive Analytics, AI-Driven Automation Metrics, and qualitative feedback surveys. The combination of these practices can also help to create new opportunities for improved efficiencies and strategic procurement-related decision-making through Integrated Analytic Platforms.

Empirical Research using archival records of Public Procurement at the Contract-Level is critical for gaining a detailed understanding of Customers, Suppliers, Pricing, Procedures, and Risks. The Global Public Procurement Dataset (GPPD), which covers 42 Countries from 2006 - 2021, provides a complete set of procurement data that can support Risk Assessments and Efficacy Evaluations. Additionally, the EU's TED publishes aggregated procurement data that can be used by researchers to conduct statistical analyses of procurement processes. Finally, The Kaggle Procurement KPI Analysis Dataset provides anonymized corporate Procurement KPIs that can be used for performance evaluation and Research Purposes. Finally, the BidCorpus Dataset is designed to allow for Textual Analysis of Machine Learning

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applications for Public Procurement. These datasets support a wide range of Research Applications, including Risk Assessment, Data Quality Studies, and Predictive Analytics. For Firms interested in conducting Firm-Level Research, it is recommended that they Integrate Data from Internal Systems and follow data quality procedures to ensure Data Governance.

## III. SYSTEM ARCHITECTURE

An enterprise-wide Procurement platform can be established in Ivalua through a proposed design based on a strategy that uses a modular and gradual approach to scale, integrate and accept the implementation by users. The Enterprise Procurement Platform has two main components, (i) a Technology Strategy which outlines the specific plan for building a new, single Ivalua solution on top of Legacy Systems; and (ii) all the Financial and Procurement Systems required for the Operational Deployment of the Ivalua System and Integration of Data. System Integration is achieved by utilizing ETL and EAI methods to connect financial and procurement enterprise systems to Ivalua, allowing for the synchronization of procurement and financial data in near real-time. Centralized Master and Transactional Data Management is the primary focus of the Master and Transactional Data Management System, which aims to maintain Master Data consistency and integrity by Centralizing Key Procurement Data of the enterprise. Building User Experience through Custom Module Development will replace obsolete workflow with Automation by means of automated workflows and processes that enhance user experience.

Key features of the evolving platform are new modules based on the release of new Custom Modules such as, "Intake Management". The data migration and synchronization processes must be conducted in a manner that maintains business continuity and the integrity of data during the Transition Process, while deposition of Security Policies will ensure the protection of Sensitive Data. It is critical to have collaborative relationships with stakeholders such as Business Analysts and Procurement Teams to ensure alignment of requirements and support of Adoption of the new systems. The Deployment of the Procurement Platform will follow the best practices of Ivalua and Modular Deployment Strategies that allow the generations of high return on investment through the staggered implementation of high return modules to yield immediate Cost Savings and Workflow Improvements at the Global Operations Level. The Integration Frameworks developed by SAP and Ivalua that support the integration of Financial and Procurement Module data to connect the Ivalua System and the Enterprise as shown in Figure 1.

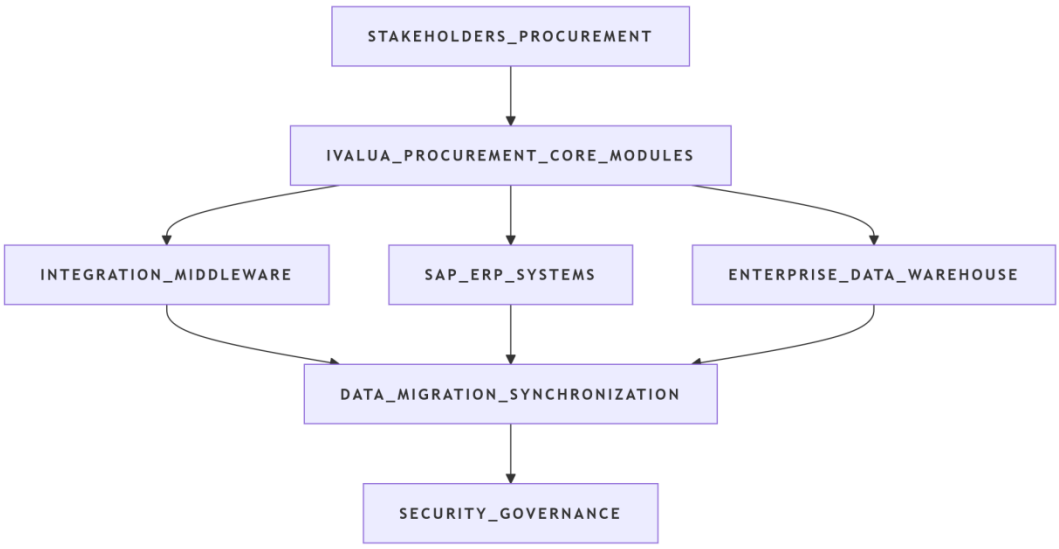


Figure 1: Ivalua Integration Architecture

1. **Ivalua System:**
- Procurement Management System Providing Source-to-Contract and Procure-to-Pay Processes;
- Master Data Store for Contract, Supplier, & Sourcing Documentation;

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- Customizable Workflow Tools and Ticketing Functions Available by Customer Request.

2. **Integration Middleware:**

- API Connectors for Ivalua Integration into SAP ECC/SAP S/4HANA;
- ETL and EAI Supports ETL to Extract, Transform and Load and Enterprise Applications Integration;
- Supports Protocol Translations (API, IDoc, Web Services and FTP);
- Transaction Information Captured to Generate a Resend for Any Message Error.

3. **SAP ERP Systems:**

- Procurement-Invoicing and Accounts Payable in SAP MM and FI;
- Financial Transition Reconciliation with FBI AP-Amex Payment System.

4. **Enterprise Data Warehouse (EDW):**

- Combines Analytics/Report Data from SAP and Ivalua;
- Uses ETL Pipelines to Keep Master and Transactional Data Continually in Sync.

5. Data Migration and Synchronization Layer:

- Provides Batch and Real-Time Data Migration Capabilities;
- Carries Out Data Enrichment/Reconciliation/Validation Functions;
- Provides Robust Error Handling Functionality to Enable Validation of Data and Integrity.

6. **Governance and Security:**

- Provides for Data Governance (Audit Logging), Role-Based Data Access Restrictions, and Data Encryption;
- Ensures Compliance with External Standards and Internal Policies.

Ivalua's supplier and contract master data is shared with the SAP MM and FI modules using an automated, consistent method (ETL Process/APIs) to enable real-time transactional data exchange (POs, Invoices, Requisitions) to take place during the Procure to Pay Cycle. Analytical and Reporting information from these Systems can be viewed as an integrated entity in the EDW. The combination of these elements is used to optimize Strategic Procurement-based decisions; evaluate Operational Performance, and provides a clear view of the interaction network supporting these functions. The Integration Architecture has the Ivalua component in the centre, with two components on either side supporting Ivalua and SAP ERP integration and the flow of information between them. The Middleware Platforms supporting the integration are designed to provide secure storage, processing, and delivery of Required Documents using both Batch and Real-time Data as they support the Automation of Document Processing. The Integration Architecture was developed to comply with Ivalua's Integration Design Principles and contains a plug-and-play SAP Connector (Integration Workplace), Accessing through a Governance Layer to protect and validate information.

The Mapping of the Integration Design Matrix for Mapping S2C/P2P in the Integration Workplace identifies how Master Data and Transactional Processing will be mapped between Ivalua and SAP MM and FI modules, as well as the financial transactions created from Ivalua. The Integration Workplace, along with the Ivalua Connector and other API, allows both Systems to automatically exchange Electronic Documents continuously. The following master data will be mapped from Ivalua to SAP: Vendor Master Data; Material and Item Catalog Information; Plant Location Information needed for mapping Vendor Records; Purchasing Org; Contract Records(s) with Vendor(s). Key Transaction Data will be mapped to/from Ivalua to SAP, including Purchase Requisitions, Purchase Orders, Goods Receipt, and Invoices. Every Transaction Record will link to every Key Data Element in both Systems and create inventory and Invoice Verification Financial Postings when Authorized. Comprehensive Bidirectional Interaction/Synchronization will take place between the two Systems. Mapping Validation Requirements within the Required Fields for each Transaction Record using the Error Handling Mechanism for Failed Transaction Resends will be automated. Finally, Custom Data created by Ivalua may be included in Expanded Mapping to fully automate the Procure-to-Pay Process between the TWO IT Systems as identified in Table 1: Integration Design Matrix Mapping S2C/P2P.

| Ivalua Entity | SAP MM Field/Table | SAP FI Field/Table | Mapping Purpose |
|---|---|---|---|
| Supplier | LFA1 (Vendor Master), LIFNR | LFB1 (Company Code Data) | Vendor creation/sync, bank details, tax IDs |
| Material/Item | MARA (Material Master), MATNR | N/A | Item catalogs for POs/requisitions |
| Plant/Location | T001W (Plants), WERKS | N/A | Distribution centers/stores linkage |

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| | | | |
|---|---|---|---|
| Purchasing Org/Group | T024 (Purch Org), EKGRP | N/A | Org structure alignment |
| Contracts/Agreements | EKKO/EKPO (Outline Agmt) | N/A | S2C master data for negotiations |

**Table 1:** Data Mappings Between Ivalua And SAP MM and FI

To guarantee data reliability, trustworthiness, and observance of regulations as it pertains to the transfer of "itemM" from Ivalua to the SAP MM System, a number of validation instructions have been developed. The following validations are required: unique material numbers must exist in SAP; material description requirements must be standard; and all differences in formatting of these materials shall adhere to character guidelines to ensure the correct identification of any material type codes assigned by SAP, and industry sector code requirements must be consistent with the SAP system setting. When assigning 'basic unit of measurements' (UOM) used for any item, it must be assured that these meet SAP-established requirements for appropriate conversions to other measurement units.

When sourcing any material type, all materials must be categorized through the grouping of similar materials for more effective reporting/purchasing. All plants and storage locations must be linked to organizational structures maintained within SAP. Costing and valuation information must be accurately completed as per Pricing Control (PC) and Valuation Class (VC) field, as well as Purchasing information (including Purchase Value PVP) and Purchasing Group keys, with any Purchaser Quota arrangement correctly completed. To comply with local laws and regulations (e.g., tax), it is essential to accurately process data fields for local Hazardous Material compliance. The data fields for Quality Control/Inspection-type must be checked for their accuracy as to what was assigned to them. Compliance validation is mandatory for the purchase of data being valid and current. All Custom Fields' validations must adhere to the approved Custom Data formatting and method of validating data before loading the data into SAP. A repetition detection process should also be utilized to ensure there are no conflicts within the data to avoid inconsistency prior to data load.

Utilizing these validation principles for obtaining Advantage Data for Procurement of all items can greatly decrease the likelihood of having a Purchasing failure or Procurement Audit Failure by using the Ivalua Build Processes and SAP MM Validation Scripts. The Ivalua Enterprise Data Warehouse (EDW) ETL Swimlane Diagram, is an overview of how the two systems operate and provides the major Swimlane for Procurement's integration architecture to include seven Swimlanes, which illustrate both functionally and by the individual roles within the Ivalua and SAP system architectures. The Systems Swimlane covers the following four systems [Ivalua Platform – ETL Middleware, EDW, SAP ERP], which are responsible for carrying out the four data management tasks of Extraction, Transformation, Loading and Validation.

The Roles Swimlane consists of the following areas: Data Engineers, Procurement Team, Data Governance. The focus will be on monitoring and providing support in regards to the Quality of Data received into Ivalua, monitoring and maintaining high levels of Compliance towards all applicable local laws and regulations. The Recommendations outlined above visually identify the exact flow of data (itemM) out of the Ivalua Platform, through to each Data Process of the Ivalua Build Process, ensuring sustaining Governance and maximizing the efficiency of the business while handling data. To avoid Data Bottlenecks and to maintain Compliance with respect to the Governance of Data Handling, and Scaling of Ivalua Building Costs, the Ivalua Platform can begin the Extraction of Purchase Data from the supplier in order to enter all of their items into the system.

ETL Middleware integrates all data via ETL processes into the Ivalua EDW. After all data are extracted from Ivalua, transformed, loaded into the EDW for storage, generated Analytical Models/Reports, and utilized to identify areas of improvement in the procurement process. In addition, customers maintain maximum data integrity and have a clearer understanding of how to improve their business analytics, as the ETL Architecture demonstrates the process used to build a centralized platform using Ivalua and an enterprise data warehouse (EDW) is shown in below Figure 2:

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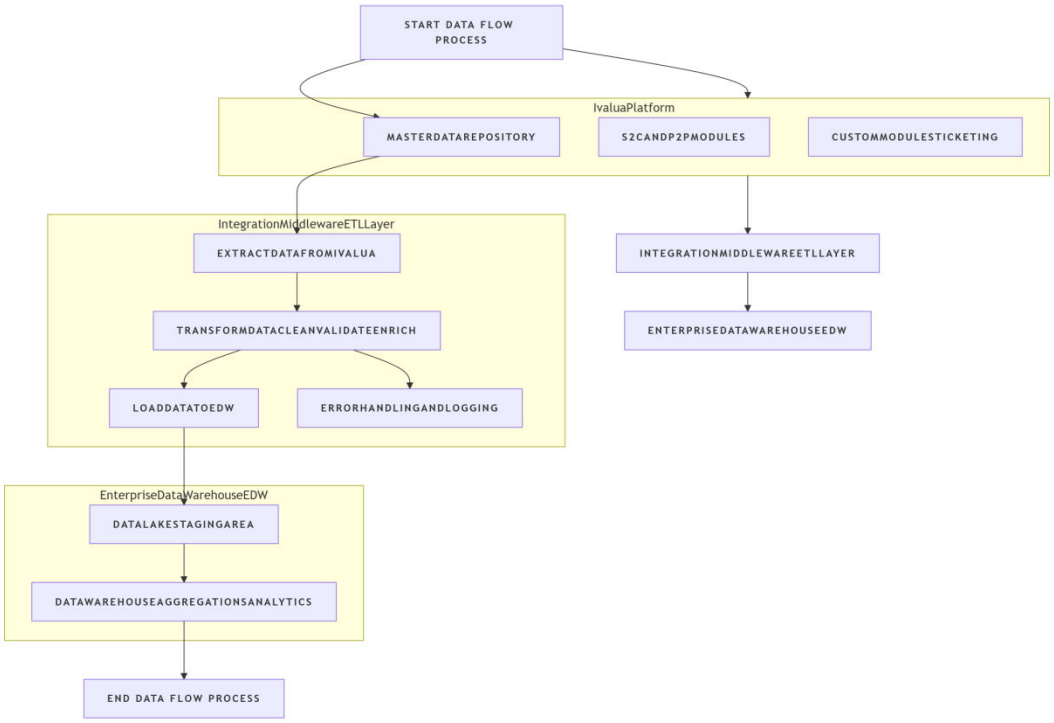


**Figure 2:** Data Flows from Ivalua to the Enterprise Data Warehouse (EDW) Via ETL

As Ivalua is implementing processes that should produce data for EDW, Ivalua has provided over designs with detailed definitions of systems along with clear responsibilities and processes relating to each system or job to establish accountability and focus on core competency. The Swimlanes detail the inputs and outputs to and from the Ivalua platform, as well as the data extraction trigger, use of staging, and API exposure for the integration of the ETL. One of the key processes is the extraction of data through transformation and quality checks. All error records are tracked, allowing for a record of errors and a retry mechanism. The swimlanes for SAP integration provide details of master data synchronization and transaction validation for the procurement team and the staging area for analytical data sets. The swimlanes specify how data is validated, along with any business rule changes. The swimlanes also indicate the use of dashboards, as well as how dashboard requests are initiated, by the procurement team. Data governance efforts will ensure that errors are corrected and that the evolution of schema and compliance audits are managed, as well as that they are verifying data lineage, through the reconciliation of reports. This framework will help bring about an efficient ETL process and effective oversight of data governance.

The performance indicators to assess Ivalua to EDW ETL integration are focused on data quality, process reliability, performance effectiveness, and the business impact on the procurement function. Performance metrics will include the success rate of ETL, and the degree of data completeness, and accuracy of data, and execution times related to the success rate of the ETL process, as well as measure of purchase order processing efficiency, and the effectiveness of touchless invoice processing of 85% or more, as well as the procurement cycle time of fewer than 15 days.

Dashboards will be utilized for monitoring real-time performance indicators and evaluating monthly trends in ETL performance metrics. In addition to moving towards effectively executing this ETL integration process and the fixed target of an estimated 95% success rate in ETL and faster procurements, and effectively providing the maximum amount of money saved from these processes, the available dataset provides KPIs over a six-month period for ETL and procurement integration. The KPIs will be similar to the previously mentioned ETL success rate, data completeness, accuracy, and execution time for ETL, as well as the procurement cycle time, invoice processing effectiveness, and the estimated amount of savings achieved. The data also reveal an overall trending upward in relation to KPI performance

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metrics as they relate to ETL success rates, data quality, and efficiency of data processing, as well as large decreases in execution times and procurement cycle days. This data will assist in analyzing how ETL and procurement integration trends have changed, as illustrated in Figure 3.

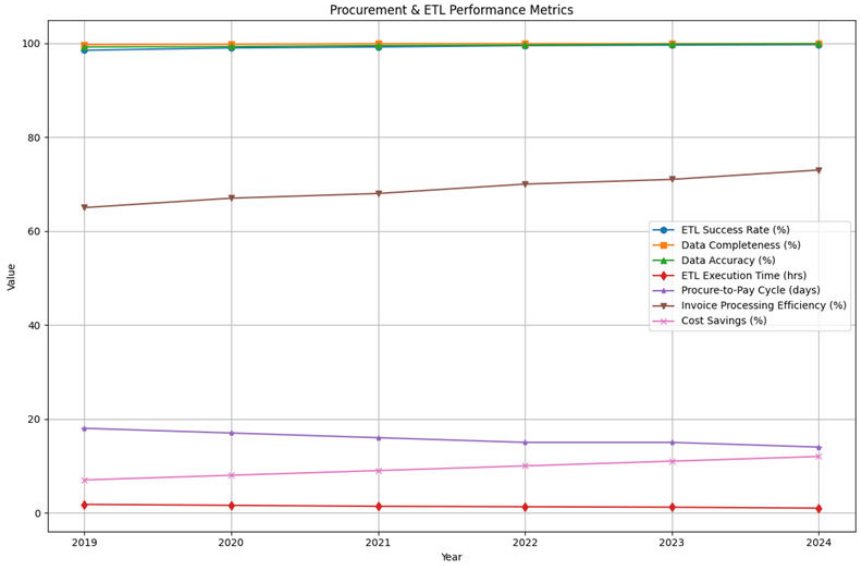


**Figure 3:** Procurement & ETL Performance Metrics

## IV. CONCLUSION

Global supply chain and procurement systems can now have visibility across all departments through the integration solutions offered at [insert Company Name]. These integrations allow the user to work with both systems easily while having an accurate, reliable, and consistent source of data. The solutions allow for "real-time" or "batch-level" synchronization of Critical Data on Supply Chain and Procurement using Extract Transform Load (ETL) and Enterprise Application Integration (EAI) Middleware, reducing cycle times in procurements and invoice processing, and ultimately generating Cost Savings due to timely and accurate reporting and decision-making. The Security and Governance Layer protects the organization from data access issues, ensuring compliance with the standards for all industries. A Successful Integration Solution will ensure that Operational Resiliency and Agility can be maintained despite the complexity of the Business Environment. To improve the Integrated Procurement Solution moving forward, Consider adding Advanced Predictive Analytics and AI Technology to support Demand Planning and Risk Management; further enhancing Real-Time ETL Processing with "Hot" Links to Source Systems; incorporate AI Evaluations of Suppliers to enhance Supplier Collaboration; develop a Cloud-Native Data Architecture for Scalable Analytical Support; Automate Manual Tasks; and, use Blockchain Technology to enhance Traceability. The Growth Phase of the Project Aligns Current Enterprise Operations with an Integrated Expansion Strategy Based on Data Governance and Competitive Advantages in the Procurement Management Functions.

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ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

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