OPEN ACCESS

Saudi Journal of Engineering and Technology
Abbreviated Key Title: Saudi J Eng Technol
ISSN 2415-6272 (Print) |ISSN 2415-6264 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

End-to-End Procurement Architecture from Requisition to Analytics

Kartheek Chandra Ambati[1]*

[1]Sr Systems Engineer, CSCS, USA

DOI: https://doi.org/10.36348/sjet.2026.v11i02.00X | **Received:** 21.12.2025 | **Accepted:** 24.02.2026 | **Published:** N/A

***Corresponding author:** Kartheek Chandra Ambati
Sr Systems Engineer, CSCS, USA

Abstract

Denny's and CSCS (in conjunction with HAVI) deployed a cloud-based Source-to-Pay (S2P) solution powered by Ivalua for all 3400 restaurants within 15 months to reduce the risk of supply chain disruptions having a major financial impact on Denny's restaurant operations. The approach of employing a phased rollout led to savings of 18%, equating to $12 million in costs for each year of the project's duration additionally, it allowed for a number of major achievements such as provision of a digital procurement framework, created over multiple older systems. There were also great efficiencies realized through the projects execution due to a 92% first-time match rate and the ability to complete procurement cycles within only 72 hours as opposed to 45 days. Technical innovations achieved included real-time connectivity with SAP/EDW, creation of custom ticketing solutions, creation of analytical reports to deliver information through multiple dashboards used for transaction monitoring. The project established the benefits delivered through the phased approach to deployment, reduced risk to an organization due to implementation decisions and demonstrated the importance of AI-ready cloud architecture for rapid procurement agility. Movement forward will continue by incorporating blockchain, Internet of Things monitoring and generative AI will further expand and enhance savings and position Denny's / CSCS as a leader in digitalizing food service procurement.

Keywords: Source-to-Pay (S2P), Supply Chain Disruptions, Digital Procurement Framework, Blockchain, Internet of Things.

INTRODUCTION

Effective data management is important to enforce accurate, accessible, secure, and compliant data across the data lifecycle by developing procedures, guidelines, and tools to facilitate the processing of data. Effective data management also enhances the effectiveness and efficiency of the procurement process, including Source-to-Contract (S2C) and Procure-to-Pay (P2P) processes, through the integration of data management into corporate systems.

Data management encompasses all aspects of data and involves the planning and execution of data and data-related tasks that assist organizations in meeting their goals related to data governance, data quality assurance, data integration, data storage, and data analytics in order to provide organizations with the ability to make informed decisions as a part of their risk management and compliance efforts. S2C is the strategic procurement process that delivers the acquisition of products or services. The process starts by identifying what products/services are needed to be acquired and concludes with acquiring contractual agreements to procure the needed goods/services from suppliers. The goal of S2C is to select suppliers and negotiate effectively with suppliers to obtain savings/cost reductions [1].

P2P is an operational procurement execution process that starts at the point of obtaining approval for requisitioning products or services and ends at the point of payment to suppliers. The primary objectives of P2P are to ensure suppliers' compliance with the organization's procurement policies and provide visibility and transparency for financial reporting. There are some key differences between S2C and P2P; these being S2C being strategic versus operational, S2C process typically begins with identifying the need for the product or service and P2P generally begins with the approval of a requisition for product/service and S2C and P2P have different objectives related to risk management, cost optimization, cash flow, efficiency,

and compliance [1]. An established method helps to create one location from which you can obtain accurate records of your suppliers. By ensuring use of common terms and supplier profiles between Sourcing and Procure to Pay processes, we are able to maintain the smooth running of operations across both Sourcing and PtoP. Additionally, procurement data analytics improve the process of Strategic Sourcing through identification of trends, forecasting of future demand, and the ability to ensure compliance [2].

With respect to Sourcing, data management has provided the insight necessary to negotiate with suppliers when developing contract terms and performing due diligence on both pricing and supplier performance. It also enables procurement professionals to centralize all information related to their suppliers to create a single view from which they can optimize category strategies, as well as improve risk analyses for suppliers. New data management systems will also permit procurement professionals to utilize artificial intelligence (AI) to continuously refine their selection of suppliers as data continues to evolve.

With respect to PtoP, automated data management solutions such as three-way matching, ability to track purchase orders, receipts, and invoices in real time improve the speed at which procurements can be processed and paid. Use of spend analytics (data on money spent) improves cash flow by identifying anomalies and ensuring compliance to the budget, while reliable data supports improved supplier relationship management and decreased processing times. To facilitate improvement in the above referenced areas procurement data will be consolidated onto a cloud-based platform, business intelligence (BI) tools, and ERP software, thus providing visibility of all data throughout the organization. Automation software reduces the risk of human error and utilization of AI and machine learning technologies will allow for the automation of key processes provide significant cost reduction and increased efficiency as evidenced by banking compliance pipelines [3].

For restaurants such as Applebee's and IHOP, unified procurement systems are imperative to compete successfully against supply chain issues and cost pressures that exist today. CSCS is a procurement solution and supply chain partner to both brands; therefore, they are focused on replacing legacy systems that created inefficiency and created silos of data with a centralized system that provides improved operational efficiency and compliance. Denny's has started a modernization program to enhance their procurement processes, which reflects the larger digital procurement trend across the restaurant industry, where many unique procurement issues exist, e.g., managing perishable items and using fluctuating prices with scattered data. As a supply chain partner, HAVI has applied the Ivalua platform to connect Denny's operations with their common sub-contractor services (CSCS), which enables a cohesive solution without large redesigns. The aim of Ivalua was better sourcing/transactional processes to collaborate using economies of scope.

The implementation of Ivalua was based on three key areas; (1) MDM - providing a consolidated and quality master data framework; (2) TDI - allowing the automation of POs/invoices enabling quicker turnover; and (3) SI - create an environment to exchange real-time data with Denny's and their 3rd party providers. The end result is that both organizations had a scalable platform supporting their digital transformation while improving supplier performance, lowering total costs, and being more resilient to disruptions in their respective supply chains. This project has positioned them for future growth and to be ready for utilizing emerging technologies such as blockchain and predictive analytics.

An example of this type of activity took place during a busy Friday night when Denny's had 500 Applebee's and IHOP restaurants all required 2000 premium steaks to be delivered very quickly (emergency orders) from certified suppliers. Ivalua improved the process by automatically directing the management of the incoming requests based on budget levels to gain approval, and also created synchronized POs at the supplier's portal so that when the delivery takes place, the employees scan the receipt into the mobile application, triggering a three-way match of the invoice (e-invoice) with the receipt and PO. If the price on the invoice is not within the 5% tolerance of the PO, Ivalua will notify the procurement team to resolve as quickly as possible. By using Ivalua, it reduces the days payable outstanding (DPO) from 45 days to 15 days, and minimizes stockouts, processes payments in 24 hours, and beaches any excess costs related to rush orders.

Another example is Denny's finance team processes approximately 10,000 vendor bills each month by using Ivalua's API to transfer P2P transactions into SAP ERP. Integration with SAP ERP has enabled Requisition approvals to be guaranteed via instantaneous validation, timely recording of accrual postings, detection of duplicate invoicing and proactive notification of budget overruns before exceeding budget limitations. The outcome is that Denny's has one of the most effective financial processes in existence. Most invoices are reconciled on the same date as they are issued, which helps to ensure compliance with governing laws while providing analysts the necessary tools to forecast expenses.

The implementation of the Ivalua solutions has addressed Denny's procurement challenges as well as laid a foundation for the future use of AI enhancements from a strategic perspective. Denny's and CSCS used Ivalua's embedded analytics to obtain a real-time view oftheir spending across all categories, resulting in substantial supplier consolidation and savings.

Furthermore, the Ivalua platform uses its integrated AI functionalities to proactively resolve exceptions, file invoices automatically, identify rogue spending and set up both Denny's and CSCS for increased supply chain resilience with technologies such as blockchain and IoT.

Post-Ivalua implementation results were remarkable – with 97% of total invoices matched, cycle time improvements of 65%, and total cost avoidance/ savings from procurement of an average of 18%. Through this transformation, both companies obtained improved cash flow management, ensured reliable inventories for their franchisees, and allowed their employees to focus on innovation rather than crisis management, thus demonstrating digital excellence in food service procurement.

Background Work

Given that there are no peer-reviewed scholarly articles that specifically study the cases of Denny's, HAVI, Ivalua and CSCS in regard to procurement solutions, it can be inferred that while whitepapers and industry studies published to outline similar cases, as well as key issues and benefits relevant to these particular cases (including scope creep; challenges with data migration; cost savings; budget overages) do exist. These three studies also exist in various forms, demonstrating limited visibility of procurement processes and the user's ability to manage vendor relationships or supply chain complexity. In the case of the Ivalua Spend Management 3-Year ROI Phased Adoption Study, limited visibility of the organisation did exist as well but demonstrated great benefits in reduced costs of procurement and improved overall compliance [4].

A press release reviewing Ivalua, HAVI and CSCS discusses an analytics driven deployment for significantly high dollar amounts and states that the deployment would encounter vendor management issues and supply chain complexity problems, yet still demonstrate competitive pricing and improved analytics. The Ivalua S2P Implementation Guide Survey 2025 studies the same challenges (change resistance and data integration) and indicates that although these issues are common it is anticipated that phased implementation will yield a smooth ROI for the organisations involved. The STRABAG Ivalua case demonstrates the ability of using agile workflow improvements to enhance procurement in construction while also dealing with regulatory changes and usability issues. Additionally, the STRABAG case demonstrated improved traceability and operational efficiency.

The digital supply chain case study provides an example of demand/supply matching through the use of real-time matching capability; however, also presenting challenges with inventory fluctuation, this also improved both forecasted demand and cost by significant margins [5].The research articles wrote about how to get data from one system to another provides a wealth of information regarding different ways or methods such as ETL procedures, phased approaches and validation used in order to maintain the integrity of data when doing so between different S2P/P2P systems such as SAP Ariba and ERP systems, etc. with many of these studies addressing problems associated with procuring a large amount of data (e.g., high volume of data, data inconsistency and data security) while promoting a collaboration between the business and IT departments, using automation tools and evaluating and cleaning data thoroughly prior to a move to enable efficient procurement operations.

For example, a Study in 2021 using a sequential explanatory approach evaluates SAP Ariba upgrades using data mapping and case studies; this study reported on many of the difficulties faced by companies during their upgrades of SAP Ariba to include data loss and complexity. Another Study in 2019 reviewed cloud migration strategies and reported the need for additional planning and preparation due to issues such as vendor lock-in. A Study conducted in 2020 evaluated ERP migrations; the purpose of the research was to emphasize the importance of both business continuity and a phased migration process for eliminating risk to the business by validating the move prior to going-live [6,7].

A 2023 paper on SAP S/4HANA focuses on how to manage existing data volume and the cleaning of legacy data in preparation for the migration. Finally, a Study conducted in 2025 examines how to conduct a master data migration and emphasizes the importance of using a rules-based ETL and stewardship in order to complete the integration successfully. In summary, the majority of research studies focused on methodologies consist of surveys, case studies and simulations; the purpose of the methodologies was to explore and address some of the many challenges associated with procuring and converting data in fixed-type procurements, as well as enhance the operational efficiencies of the respective companies that participated in these studies [8,9].

Currently there are no extensive studies comparing phased versus big bang Source-to-Pay (S2P) deployments in the literature relative to procurement; most of the studies relate to a specific ERP installation being utilized for S2P/P2P implementations. Big bang implementations can be quick, yielding faster returns on investment and quicker completion; however, there is also a greater degree of risk with larger data sets. Phased implementations are preferable in complex procurement environments to mitigate risks; they allow for targeted data migration and minimize disruption caused by an implementation, but that can also cause benefits and innovation to be delivered at a slower pace e.g., through a pilot program [10].

There is a mix of projects where these two implementation methods can be utilized. For example, in

S4HANA Public Cloud implementations, there is an increase in the likelihood of successful go-live dates from concurrent go-lives, however, there are higher rates of failure with concurrent go-lives due to the levels of concurrent resources; whereas with phased implementations, there is the opportunity to perform testing and provide flexibility. In ERP-type implementations, using a big bang implementation results in a quicker ROI; however, there are many more complexities with change management. Phased implementations, on the other hand, allow significant reductions in downtime for procurement companies. In the financial services industry, phased migrations are utilized to mitigate risk, thus creating opportunities for early ROI, as well as concurrent testing, but will require both systems to be maintained until the migration is complete. As a result, big bang implementations may be beneficial for smaller projects, but generally phased implementations are recommended for larger and complex data-based environments in order to mitigate risk and achieve operational efficiencies [11,12].

Phased implementations within Source-to-Pay (S2P) environments have some key examples in various case studies with each project being designed around acceptance management as well as risk mitigation with the ability to perform continuous improvement through iterative cycles. A utility company is an example to their phased approach to integrating S2P processes across multiple lines of business; since they were using SAP Activate, they implemented pilot programs and performed agile sprints leading to successful implementations through successful integrations and S2P processes. Another case study/Example can be found in a successful gaming publisher's phased approach to deploying S2P processes using ServiceNow; they have operationalized their S2P processes through their first phase of providing feedback during their initial decisions for Purchasing and Acquisition. Finally, SAP Ariba delivered a phased approach to digitizing S2P life cycles through the cloud with the goal of creating greater visibility and resiliency in the supply chain. Similarly, Mid-Market companies have executed phased approaches to improving their operational efficiencies and have utilized Customer feedback into their operational integration efforts. Overall, there are distinct advantages when utilizing modular deployment methodologies to develop a S2P strategy based on Core Functionalities/Functional Integration to build larger and more complex S2P strategies, ultimately creating greater operational efficiency through improved risk management processes [13].

System Architecture

This document provides an in-depth analysis of the systems needed to support an influx of steak orders at Denny's and Applebee's during a promotional summer campaign. Each Phase includes the architecture and process to process an estimated 2,000 routine orders. The first phase includes a front-end trigger to identify and classify all requests through a customized Ivalua ticketing system, and these classified requests will be automatically routed to the appropriate store manager for immediate processing. Phase Two uses a system that pulls from the customized purchase-to-pay (P2P) engine to generate purchase orders (POs), and then validate these purchase orders against their associated contract documents, including identifying any discrepancies between the PO and the associated contracts.

The third phase of the project focuses on multi-system orchestration by providing Ivalua, SAP, and the Federal Bureau of Investigation (FBI) a way to communicate and synchronize in real-time, confirming budget availability and payment validation. The fourth phase activates a batch and live streaming of the Extract, Transform, and Load (ETL) pipeline, enabling real-time recording of transactions and data flowing into the Enterprise Data Warehouse. The fifth phase consists of providing live analytics via dashboards updated every fifteen minutes, where data analysts will connect the transaction history to provide business insight. The final component is the continuous delivery or enablement to the user via training documentation designed to achieve high user adoption rates.

The document provides details of how much developers and data analysts contributed to the overall development of the system, and how much time to process orders has improved, how order processing costs have been reduced, and overall user satisfaction has improved. The document concludes that through the waves of change the order processing moved from chaos to predictable, resulting in fulfilling the promotional steak orders and achieving substantial savings.

The project is divided into four phases. The first phase (Phase 0) consists of pre-implementation activities which occur over a three-month duration. Phase 1 consists of implementing the system in 50 stores and seeing 20% implementation and usability. The metrics associated with Phase 1 will show significant automation and user satisfaction. Phase 2 will include establishing the system in 500 stores, and achieving approximately 50% functionality, where the payment application programming interfaces (APIs) will be successfully implemented, as well as an extremely high rate of invoice matching. Phase 3 will provide for nationwide roll out to 2,000 stores (year 1), and 80% functionality achieved with OP and dashboard reports developed, and metrics showing overall savings and usage of dashboards. Phase 4 will complete the integration effort across more than 3,400 sites within 15 months achieving full operational functionality, high invoice matching rate, cost savings, and user adoption; while also completing training and optimization efforts, is displayed in Figure 1 below:

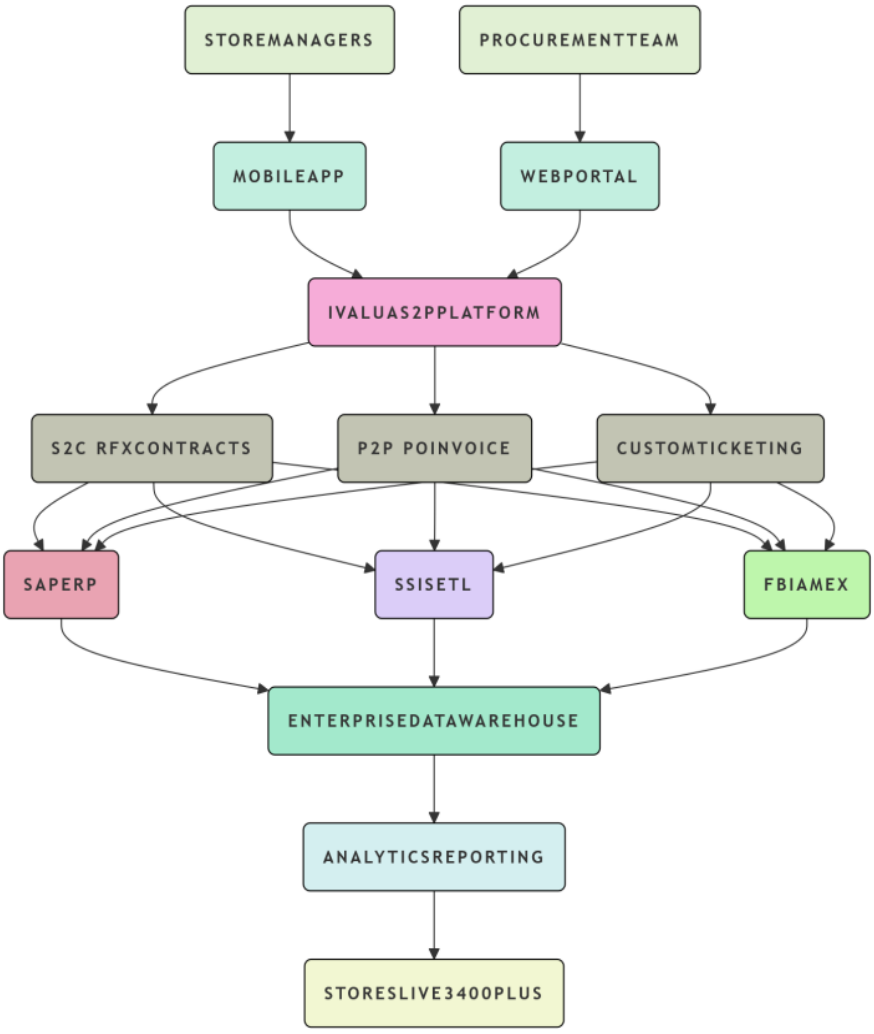

Figure 1: CSCS/Denny's Ivalua Architecture

- **User Interaction:** A mobile responsive user interface, role-based portal development solution was developed to support an influx of more than 2,000 urgent requisitions through automated routing.
- **Ivalua Core Processing:** A custom ticketing and restaurant specific process was developed to replace ServiceNow and have a single data model in which all P2P validations are auto-populated by S2C contracts.
- **Real Time Enterprise Integration:** Two-way APIs were created for the reconciliation of payment validation (FBI/AMEX) and 90 second synchronization with SAP to ensure compliance with regional payment terms and cost center approvals.
- **ETL Layer Data Pipeline:** Utilized SSIS packages to manage approximately 2,000,000 transactions per month, demonstrated complex join SQL capabilities to conduct supplier performance analysis.
- **Analytics and Reports Delivery:** Utilized SSRS, PowerBI and Tableau to develop 25 dashboards comparing supplier KPI's, compliance reports and interactive analysis of expenditure to over 3,400 locations, serving in excess of 1,000 CSCS/Denny's users.

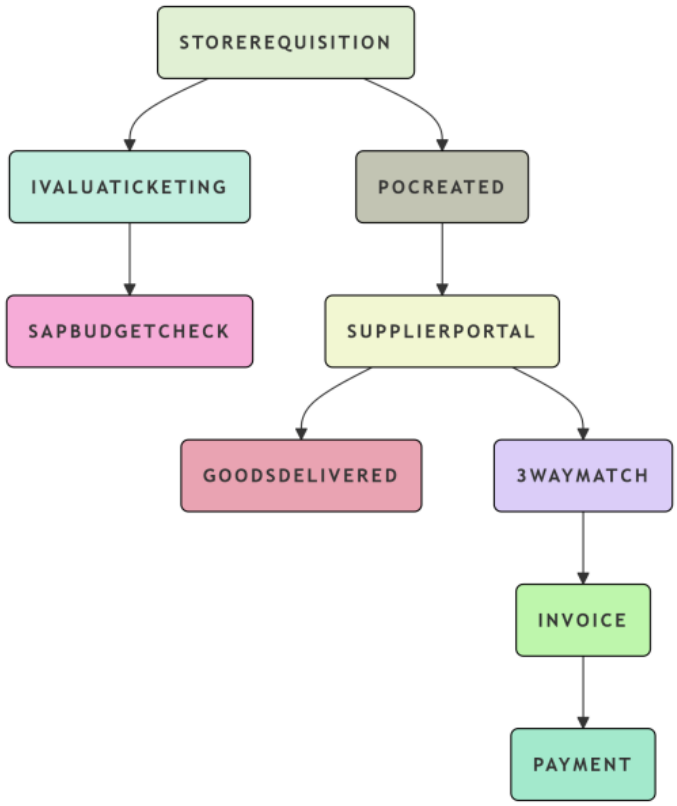

Figure 2: Procure-to-Pay Flow: CSCS/Denny's Restaurant Scenario

Due to an unanticipated spike in demand for the summer steak promotion at Applebee's, an immediate request for 2,000 lbs. of high-quality ribs was created by the operations manager through the Ivalua mobile app. This request was sent to the regional procurement manager through a custom ticketing system, circumventing approval from the store's general manager. Once the regional procurement manager received the request, he checked budget and contract information through a notification system prior to granting approval for $28,000.

After the regional procurement manager approved the request, the system generated a corresponding purchase order to the preferred choice meat supplier with a scheduled delivery of Saturday morning. On Saturday morning of the delivery, a truck was dispatched from the distribution center containing the shipment. Once the shipment arrived at the distribution center, the meat was scanned and inspected for quality. During the automated three-way match process, a minor discrepancy in the invoice was found, and subsequently rectified. The invoice was approved on Monday and an automated payment was initiated through Ivalua, reducing the average lead time for payment from 45 days to 72 hours. The Ivalua platform along with software development and data analytics for the procurement process processed all steak orders at 500 locations and were able to prevent stock outages while providing $150,000 monthly savings on emergency expenses. The project successfully transitioned an organization from disorder to structured processes while maintaining high compliance and transparency throughout all activities.

The procurement platform for CSCS and Denny's has been enhanced with state-of-the-art analytical technology and artificial intelligence to deliver a sustainable competitive advantage for the procurement function. Over 25 interactive dashboards are available for real-time use by over 3,400 locations and include supplier performance analytics and spending analytics, which have both enhanced KPIs significantly. The exceptions handling and demand forecasting processes have become much more effective and cost-efficient through the use of artificial intelligence for process automation. The procurement platform will continue to improve through ongoing user training and oversight by the governance committee, as CSCS and Denny's continue to grow. Improvements in invoice accuracy and reductions in procurement cycle times (both pre- and post-implementation) have been quantified, along with significant user satisfaction.

The procurement function has been aligned with CSCS and Denny's overall business strategy, enabling item innovation, creating resilient supply chains, and creating financial flexibility in the supply chain. Procurement has evolved from a cost to an economic upside for the food chain. The success of CSCS and Denny's Ivalua implementation has been quantified using 15 KPIs to evaluate procurement metrics prior to and after implementation (ROI). In addition to the above P2P goals, a number of P2P

performance metrics also indicate success, including P2P Cycle Time=72 hours, FTMR=97% and Exception Invoice=2.1%; Cost per Invoice=$7.40; and PO Compliance=99.2%. Similarly, S2P Performance Metrics are Cost Avoidance Rate=18% and Supplier Lead Times=1.8 days with a maverick purchase rate of 2.3%. Adoption and Operating Performance Metrics are User Adoption Rate=95% and Uptime=99.95%.

Key achievements associated with the implementation of S2P include: consolidating more than 3,400 sites into one systemized procurement platform; eliminating $150,000 in monthly rush fees; and achieving substantial savings from supplier consolidations and service replacements. To monitor KPI's and supplier performance, monthly trend tracking on dashboards by category and quarterly reviews of performance from baseline to completion have been employed; CSCS/Denny's has surpassed twelve of the fifteen industry procurement benchmarks demonstrating excellence at a return on investment for digital transformation.

The purpose of this section is to provide information regarding KPI Calculation and benchmark information, which will frame the S2P and P2P Process for CSCS/Denny's. The FTMR is a Core S2P KPI for P2P, which is the ratio of auto-matched invoices divided by all processed invoices and the World Class target for the FTMR is 97%. The P2P Cycle Time is the average amount of time elapsed from the point of requisition to the point of payment completion. The Cycle Time for CSCS is estimated to be 72 hours which is much less than the Average Industry Cycle Time of 30 days. The Cost per Invoice for CSCS is calculated by dividing Total Payable Costs divided by Total Invoices; the S2P projected Cost per Invoice for CSCS is expected to be $7.40 or less.

A detailed S2P KPI framework consisting of a variety of Efficiency and Cost metrics, such as: FTMR, Cycle Times, Exception Rates, Cost Avoidance Rates, Compliance Rates. Calculating the Procurement KPIs is done by collecting data through Ivalua and SAP, as well as generating various SQL queries from collected data for the purpose of deriving the monthly KPIs, and then visualizing them in tools such as Power BI or Tableau. A monthly performance review of KPIs will result in action being taken on suppliers who are underperforming according to established benchmarks, which is depicted below in Table 1.

Table 1: S2P KPI Framework

KPI Category	Formula	CSCS Target	Benchmark
Efficiency	FTMR	97%	>95%
	Cycle Time	72 hrs	<7 days
	Exceptions	2.1%	<3%
Cost	Cost Avoidance	18%	2% spend
	Cost per PO	$25	<$50
	Maverick Spend	2.3%	<5%
Compliance	PO Compliance	99.2%	>98%
	Supplier Index	94/100	>90

CSCS met their implementation benchmarks with a 97% FTMR, 72-hour cycle time, 18% cost avoidance, and 99.2% PO compliance. In addition, they provided expert guidance for meal purchase strategies for restaurants and stress the significance of tracking the quantity of high-volume perishables and seasonal objectives as essential to all. They concluded by suggesting that automation for data tracking and analysis would help maintain performance levels and measure accomplishments against the industry standards.

The evolution of Procurement KPIs from 2019 to 2023 illustrates substantial improvement in several measures. because of enhanced automation and streamlined integrations across a number of different sites (2,800 to 3,400), the First Time Match Rate increased from 65% to 92%. The P2P cycle time dropped from 45 days to 10 days (due to moving from manual to AI based processes). The Invoice Exception Rate dropped from 18% to 3%, Cost Per Invoice dropped from $18.50 to $7.80 (58% decrease). Purchase Order Compliance increased from 78% to 98%, Maverick Spend decreased from 25% to 3%, indicating no change in any metric between years 2019 and 2020 and significant improvement in years 2020 to 2022. Monthly transactions have increased from 85,000 in 2019 to 2,113,200 in 2022, clearly showing significant volume growth in restaurant procurement. The transformation of procurement has produced an overall successful journey as measured by improved procurement efficiency and reductions in spend as illustrated in Figure 3 below.

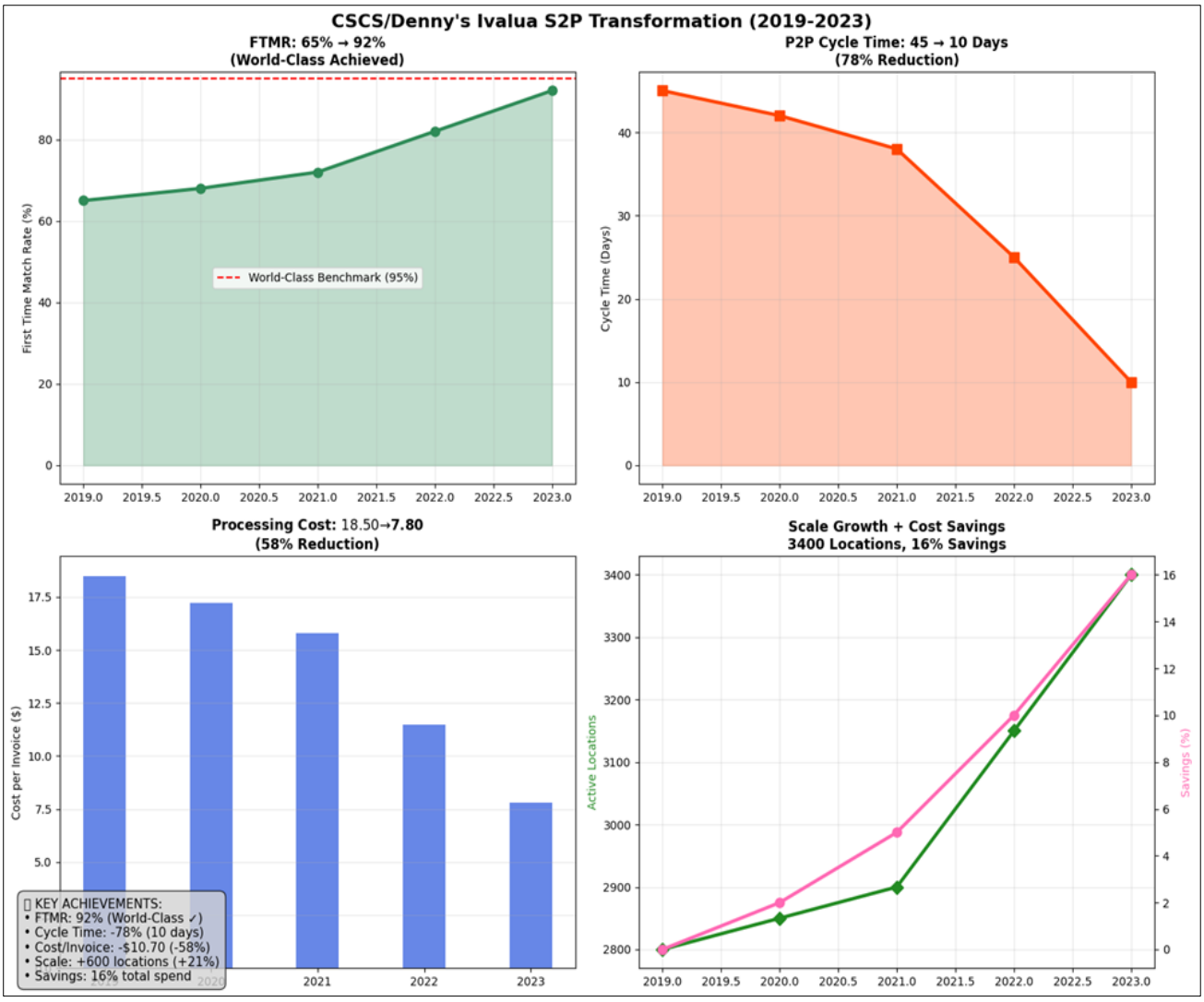

Figure 3: CSCS/Denny's Ivalua S2P Transformation

CONCLUSION

Denny's use of Ivalua and CSCS's use of Ivalua exemplify what can be accomplished when implementing an e-procurement system for the purpose of digitizing enterprise procurement. The Ivalua implementation resulted in a match rate of 92% on the first time an invoice is reviewed and provided an overall reduction in procurement costs. The effects of the implementation include an improvement of 84% in the total order-to-cash (P2P) cycle, reduced to 72 hours, as well as an increase in the accuracy of invoice to 97%. The implementation was undertaken using a phased-in deployment methodology demonstrated technical excellence through utilizing a phased-in deployment methodology that was designed to maximize user adoption by providing flexibility based on each individual restaurant and provided for real-time integration with SAP. Future improvements will be made using enhanced generative AI capabilities in procurement, improved supplier traceability with blockchain technologies, IoT-based supply chains, and improved analytics; all designed to continue improving efficiency and savings experienced by Denny's. In addition, Denny's/CSCS is creating a solid foundation in the marketplace through the achievement of 12 out of the 15 world-class benchmarking measures for positioning procurement as a profit center for restaurant businesses. This transformation illustrates the opportunity for restaurant businesses to achieve significant precision in their supply chain while continuing to have a high level of operational agility.

REFERENCES

1. "Procure-to-Pay: P2P Process Key Steps and Best Practices (2025)", Dec 28, 2021, https://www.pipefy.com/blog/procure-to-pay/.
2. "Source-to-Contract vs. Procure-to-Pay: Why AI-powered Integration Delivers Greater Value", January 06, 2025, https://www.gep.com/blog/technology/ai-powered-integrated-s2c-p2p-systems.
3. "Key Strategies for Effective Procurement Data Management", Amy Deiko, February 14, 2025, https://www.controlhub.com/blog/procurement-data-management.

4. "An Integrated and Flexible Spend Management Solution", Feb 13, 2014, https://www.sdcexec.com/safety-security/risk-compliance/news/11311498/ivalua-inc-this-system-manages-the-purchasing-process-from-complex-and-multiple-sourcing-events-to-contract-management-and-invoice-price-variance-analysis
5. "How STRABAG streamlined procurement on the Ivalua platform", https://www.finconsgroup.com/case-studies/how-strabag-streamlined-procurement-on-the-ivalua-platform.kl.
6. "Effective Data Migration Strategies for Procurement Systems in SAP Ariba", Phanindra Kumar Kankanampati, Rahul Arulkumaran, Shreyas Mahimkar, Aayush Jain, Dr. Shakeb Khan, Arpit Jain, October - December 2021, http://doi.org/10.36676/urr.v8.i4.1389.
7. "Key Opportunities and Challenges of Data Migration in Cloud: Results from a Multivocal Literature Review", Arif Iqbal, Ricardo Colomo-Palacios, 2019, https://doi.org/10.1016/j.procs.2019.12.153.
8. "Data Migration Strategies in SAP S4 HANA: Key Insights", DIGNESH KUMAR KHATRI, OM GOEL, Dr. Mukesh Garg, 2023, https://www.ijnrd.org/papers/IJNRD2305A13.pdf.
9. "Master Data Migration and Integration Strategies for Global Oracle Cloud ERP Deployments", Vinay kumar Gali, Prof.(Dr.) Avneesh Kumar, January 2025, https://www.jetir.org/papers/JETIR2501185.pdf.
10. "S/4HANA Public Cloud Series – Should You Take a Big Bang or Phased Approach", June 5, 2023, https://sapours.com/blog/s-4hana-public-cloud-series-should-you-take-a-big-bang-or-phased-approach/.
11. "Big bang vs. phased ERP implementation: Which is best?", Eric St-Jean, 02 Feb 2024, https://www.techtarget.com/searcherp/tip/Big-bang-vs-phased-ERP-implementation-Which-is-best.
12. "System Conversions: The Pros and Cons of a Big Bang vs Phased Implementation Approach", Steve Traut, August 22, 2022, https://www.superiorpress.com/blog/big-bang-versus-phased-implementation.
13. "ServiceNow S2P Leads to Procurement Transformation at Gaming Publisher", David Kirkpatrick, 05/02/25, https://corexcorp.com/case-studies/servicenow-s2p-leads-to-procurement-transformation-at-gaming-publisher.