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NUCLEUS RESEARCH

ENHANCING VISIBILITY FOR MAKERS, MOVERS, AND SELLERS

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EXECUTIVE SUMMARY

In this report, Nucleus explores the need for complete visibility within the supply chain to help organizations navigate today's unpredictable and dynamic market and economic landscape while managing growth and profitability within their business. It discusses the challenges that manufacturing, distribution, building supply, and retail organizations face when defining a data strategy to improve Supply Chain Visibility (SCV). The report also showcases what data is needed for SCV, how companies share and consume data, and the critical need to enhance SCV for organizations in these verticals.

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OVERVIEW

Nucleus' report explores the vital role of Supply Chain Visibility (SCV) in navigating today's unpredictable economic landscape, highlighting its impact on the performance of companies in sectors such as Manufacturing, Distribution, Building Supply, and Retail. It analyzes responses from 613 professionals from North America, the UK, Ireland, Australia, New Zealand, Europe, the Middle East, Africa, and the Asia Pacific. Participants' job titles include Supply Chain Directors, S&OP Directors, IT and Finance professionals, Store Owners, and Inventory Managers. It focuses on how leveraging Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems within a single IT ecosystem can significantly improve visibility across the supply chain.

Nucleus found that 41% of those surveyed depend on an integrated ERP and SCM solutions from a single vendor to enhance SCV vs 24% of respondents rely solely on their ERP systems for SCV.

The report's findings reveal insights into organizations' methods to achieve enhanced SCV. Nucleus found that 41 percent of survey participants depend on leveraging ERP and SCM solutions from one vendor to enhance SCV. Leveraging ERP and SCM technologies from one vendor offers end-to-end visibility from the procurement of raw materials to the delivery of final products. From a financial perspective, centralizing ERP with SCM on one platform greatly enhances data accuracy, informs financial forecasting, and enables more effective capital allocation. It enhances collaboration with suppliers and partners, streamlines compliance and business planning, and improves demand forecasting and inventory control.

In comparison, 34 percent of respondents rely solely on ERP systems, underscoring the limited visibility of ERP-only approaches in accessing external supply chain dynamics such as supplier inventories and logistics operations. The limited visibility of ERP-only approaches in accessing external supply chain dynamics such as supplier inventories and logistics operations. Organizations experience restricted SCV, as the insights they obtain are confined to the perspective of their ERP systems, without the context that SCM solutions provide for a more complete picture of the supply chain.

Survey results show that 15 percent of respondents rely on point solutions, and 10 percent rely on SCM solutions to enhance supply chain visibility. This showcases how organizations that leverage ERP and SCM solutions under one IT environment improve SCV. Nucleus' report further discusses the benefits of optimizing SCV through these integrated systems, including an 18 percent improvement in service levels and a 19 percent increase in demand forecasting accuracy. The market's pivot away from isolated point solutions and standalone SCM systems is rooted in a growing awareness of their limited capacity for seamless integration and the inability to offer a comprehensive view of the supply chain. Isolated

systems often lead to fragmented data and processes that impede the fluid exchange of information critical for real-time decision-making. Conversely, integrated ERP and SCM platforms are rising as the preferred solution as they bridge these gaps, ensuring that data from every touchpoint of the supply chain is captured and synthesized. This holistic approach enables businesses to harness extensive data and deploy advanced analytics, fostering agility and responsiveness in their supply chain operations.

WHAT IS SUPPLY CHAIN VISIBILITY?

Supply Chain Visibility (SCV) refers to an organization's ability to track and monitor all parts of its supply chain in real-time or near real-time. This includes having a clear view of inventory levels, order processing, production schedules, shipment and logistics operations, and the status of goods as they move from suppliers to the end customer. SCV is sourced from technology solutions like ERP and SCM systems and other digital tools like real-time visibility platforms, IoT devices, RFID technology, and advanced analytics platforms. When integrated, these technologies solutions collect, analyze, and present data across various supply chain stages, enabling organizations to make informed data-driven decisions quickly, respond proactively to potential disruptions, and enhance operational efficiency. SCV allows for greater collaboration among all stakeholders in the supply chain, including suppliers, manufacturers, logistics providers, and retailers, by providing them with access to the same real-time information. This level of transparency helps optimize supply chain operations, improve customer satisfaction through better on-time delivery rates, and increase the organization's overall performance.

> Multiple technologies working together to collect, analyze, and present data across various supply chain stages leads to Supply Chain Visibility.

WHAT ARE MATURE DATA-SHARING PRACTICES?

Mature data-sharing practices refer to the methodologies and systems organizations implement to facilitate seamless, secure, and efficient internal and external data exchange. These practices involve integrating technology platforms, such as ERP and SCM systems, supply chain point solutions, and IoT technology into one comprehensive IT ecosystem to ensure data accuracy and real-time availability and create network-wide visibility across the

supply chain. They also include establishing clear protocols for data governance, ensuring data security and compliance with regulatory standards, and fostering a culture of collaboration and transparency among all stakeholders involved in the supply chain.

BARRIERS TO ENTRY

Nucleus discusses the barriers to adopting and sharing data in organizations within the construction, manufacturing, retail, and distribution industries to enhance SCV.

DATA ADOPTION

Organizations face several challenges in adopting mature data-sharing practices, a critical component for effective SCV. Point solutions, or specialized tools designed for specific supply chain processes, present the most significant barrier, with 28 percent of respondents indicating difficulty in adopting mature data-sharing practices. This is primarily due to the lack of integration capabilities inherent in point solutions, which often results in data silos and complicates the process of data sharing. Furthermore, while point solutions may offer depth in their specific area of focus, they typically lack the breadth required to capture and process data from all supply chain sources, limiting the visibility provided in a multi-faceted supply chain environment. On the other hand, 93 percent of respondents claim that integrated ERP and SCM solutions within one IT environment support greater data adoption. ERP and SCM solutions on one technology platform can integrate data seamlessly, providing a unified view that naturally exchanges data across different supply chain segments, minimizing the obstacles to data sharing internally and with external partners.

Effective SCV relies on an accurate and consistent data flow. Challenges in data accuracy, quality, and collection can affect supply chain visibility, as well as improper data storage and security, management, and analysis also impact SCV.

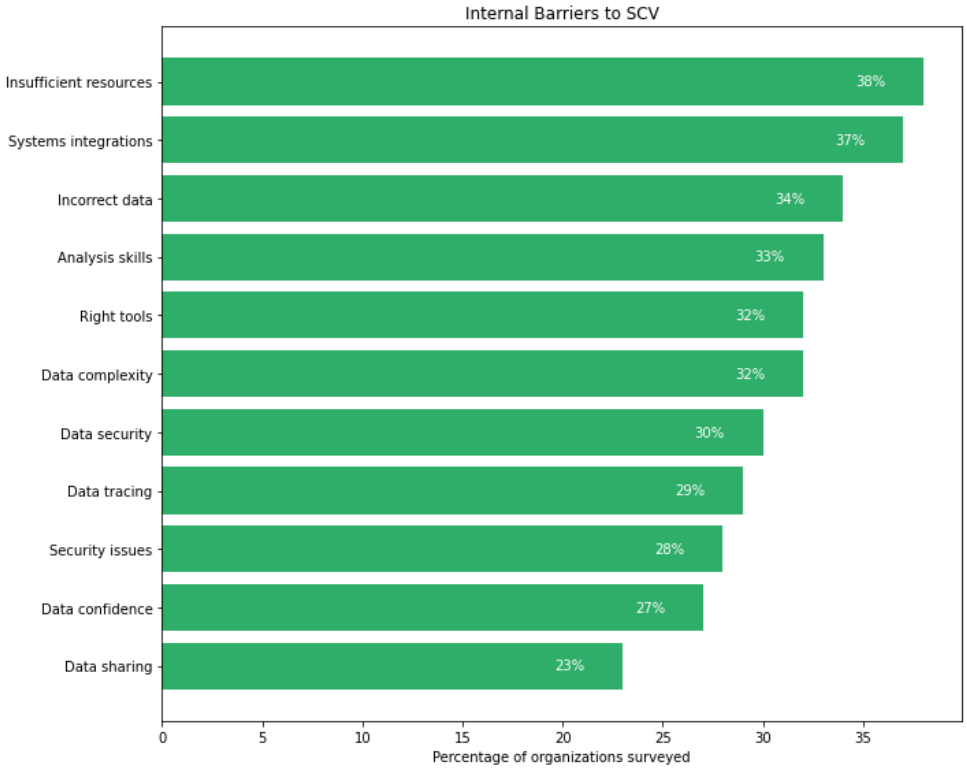
Implementing mature data-sharing practices requires a thoughtful strategy. While ERP and SCM solutions have high implementation costs, requiring a significant investment of time, resources, and money. Data management issues also need to be considered, as effective SCV depends on the accurate, consistent flow and quality of data from collection to analysis. Additionally, integrating with external systems may be challenging due to varying technology platforms, data standards, and communication protocols among partners. This inhibits visibility into supplier, distributor, and other external partners' operations due to a lack of control over their data-sharing practices. Despite these challenges, this underscores

the need for organizations to define a thoughtful strategy and invest in targeted technologies to help achieve complete visibility throughout the supply chain.

DATA SHARING

Nucleus examined the internal and external data-sharing barriers organizations face when trying to achieve SCV. Internal barriers refer to challenges within an organization that hinder the sharing of data across departments or systems, such as integration issues, data silos, or lack of internal collaboration. External barriers relate to obstacles encountered when sharing data between the organization and its external partners, like suppliers or customers, which can include differing data standards, lack of trust, or technological incompatibilities.

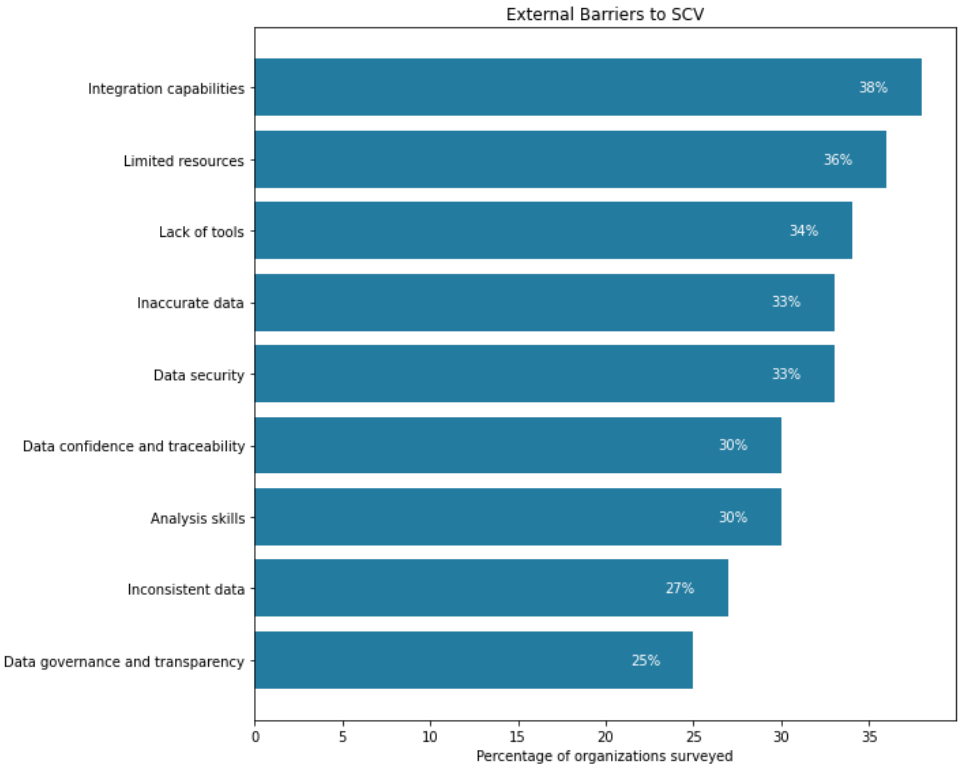
- **Internal barriers.** According to Nucleus' findings, organizations aiming for effective Supply Chain Visibility face several internal challenges:



A notable challenge is the limited resources and expertise available within companies, indicating struggles in capacity and specialized knowledge necessary for effective SCV management. Integrating diverse internal systems and technologies also presents significant

obstacles, hindering efforts to synchronize data for a comprehensive SCV. Another major challenge is dealing with inaccurate or incomplete data, which directly impacts the reliability of SCV insights. Furthermore, many organizations identify a gap in data analysis skills, indicating a need for enhanced technical expertise to interpret SCV data effectively. Managing data's sheer volume and complexity also emerges as a challenge, emphasizing difficulties navigating extensive datasets and extracting actionable insights. The absence of appropriate tools and technology is reported as a barrier to achieving optimal SCV, suggesting a need for more sophisticated solutions to support supply chain functions. Finally, data security and integrity concerns highlight the importance of protecting supply chain data and ensuring its accuracy for trustworthy decision-making.

- **External barriers.** According to Nucleus' findings, organizations aiming for effective Supply Chain Visibility face several external challenges:



Organizations aiming to improve SCV encounter significant external barriers, which primarily include issues with integration, limited resources and expertise, and inadequate technology. Challenges in integration surface when trying to connect with trading partners' technology

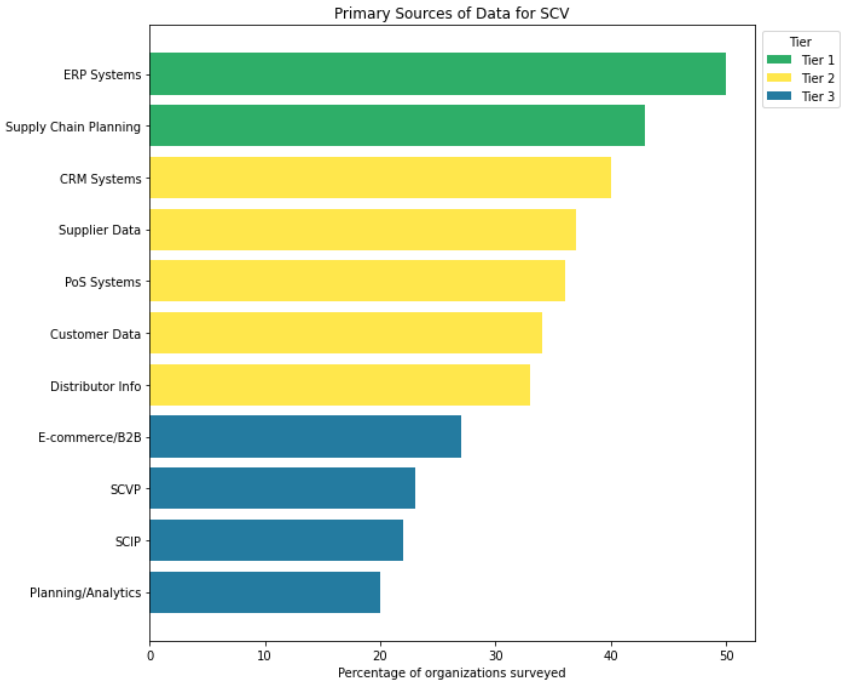
systems, a process complicated by the lack of compatible technologies and the necessary resources to forge these connections, including Electronic Data Interchange (EDI) and Application Programming Interfaces (APIs), which are crucial for seamless data exchange. Additionally, the lack of tools and technology prevents organizations from leveraging solutions that could ease the complexities of managing and sharing supply chain data. Data security and integrity also pose considerable concerns, as ensuring the protection and accuracy of data is paramount but often challenging due to technical and resource limitations. Barriers such as quality issues, including the prevalence of inaccurate or incomplete data, undermine the reliability of SCV. There's also a noticeable gap in data analysis skills, reflecting a shortfall in the technical know-how required to derive meaningful insights from supply chain data.

SOURCES FOR SUPPLY CHAIN VISIBILITY

This section delves into the foundational data sources for supply chain visibility.

PRIMARY SOURCES OF DATA

Organizations rely on various data sources for SCV, color-coded into three categories based on their significance and scope within the supply chain framework. Survey results show:



Tier 1 sources, highlighted as organization-wide systems of record and marked in green, are considered foundational for SCV. Fifty percent of organizations prioritize ERP systems as their primary data source, reflecting ERP's central role in integrating various business processes and providing a comprehensive view of organizational operations. Survey results show that 43 percent of organizations use supply chain planning systems, signifying their importance in strategizing and executing supply chain operations, ensuring that resources, inventory levels, and production schedules are optimally aligned with demand forecasts and business objectives.

Tier 2 sources, indicated in yellow, represent data sources within the supply chain and include Customer Relationship Management (CRM) systems at percent, supplier data at 37 percent, point of sale (PoS) systems at 36 percent, customer data at 34 percent, and distributor information at 33 percent. These sources are crucial for managing interactions and transactions along the supply chain, offering insights into customer and supplier behaviors, sales trends, and distribution dynamics.

Tier 3 sources include e-commerce/B2B platforms, Supply Chain Visibility Platforms (SCVP), Supply Chain Integration Platforms (SCIP), and planning/analytics tools. These platforms are essential for accessing broader market and customer behavior insights, facilitating efficient business transactions, and supporting strategic planning with advanced analytics.

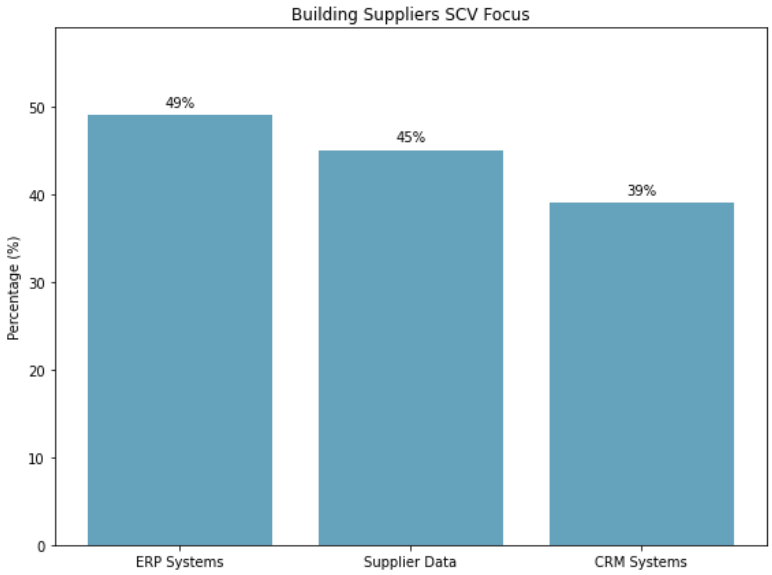
Diverse data sources showcase companies' multi-pronged approach to supply chain insights, highlighting complexity and the challenge of achieving end-to-end visibility.

Other sources such as carriers, global trade management systems, Warehouse Management Systems (WMS), Manufacturing Execution Systems (MES), Transportation Management Systems (TMS), forwarders, and other Data-as-a-Service (DaaS) options, though less frequently cited, play specialized roles in enhancing specific aspects of SCV. These varied data sources, spanning across tiers, illustrate organizations' multifaceted approach to gathering comprehensive insights across their supply chains. This highlights the complexity and collaboration needed to achieve end-to-end supply chain visibility.

INDUSTRY BREAKDOWN

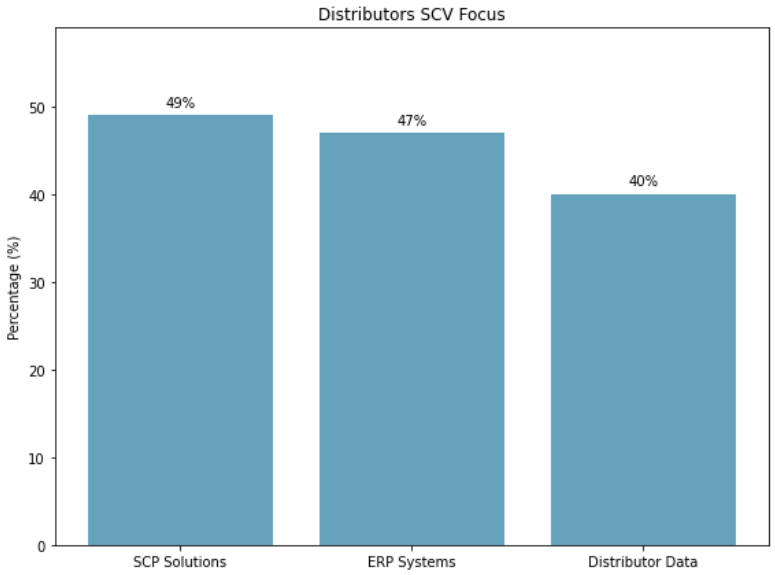
Adopting key data sources for supply chain visibility y varies significantly across industries, reflecting each sector's unique operational requirements and challenges.

- Building Suppliers prioritize ERP systems, supplier data, and CRM systems to achieve SCV. Survey results show:



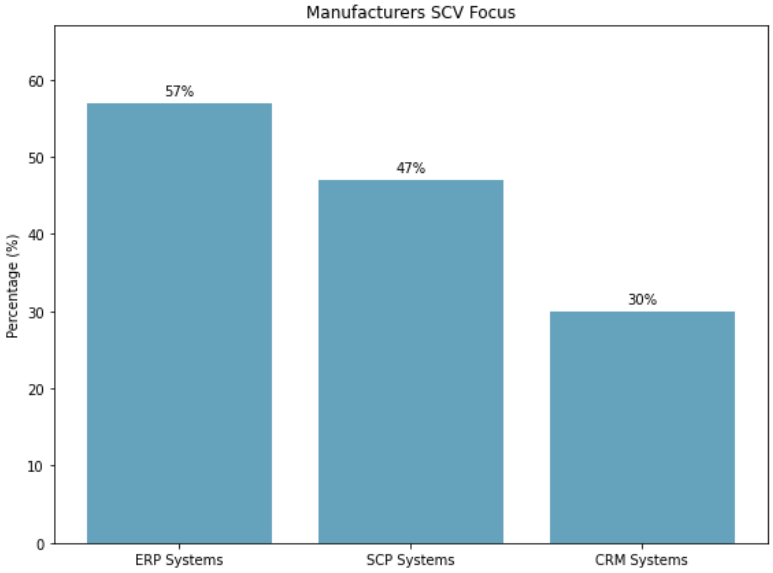
Organizations in the building supply sector demonstrate a strategic approach to enhancing supply chain visibility by prioritizing a mix of data sources that cater to their industry needs. Nearly half of the surveyed building supply organizations underscore the importance of ERP systems as foundational tools for integrating diverse business functions, from inventory management to financial tracking, which is essential for a comprehensive understanding of operations in a sector characterized by complex project demands and materials management. Supplier data highlights the sector's emphasis on supplier relationships, crucial for the timely and cost-effective procurement of building materials. CRM systems are also prioritized, focusing on managing customer relationships and project-based interactions, vital to securing contracts and ensuring customer satisfaction.

- Distributors primarily rely on SCP, ERP systems, and distributor data to enhance SCV. Survey results show:



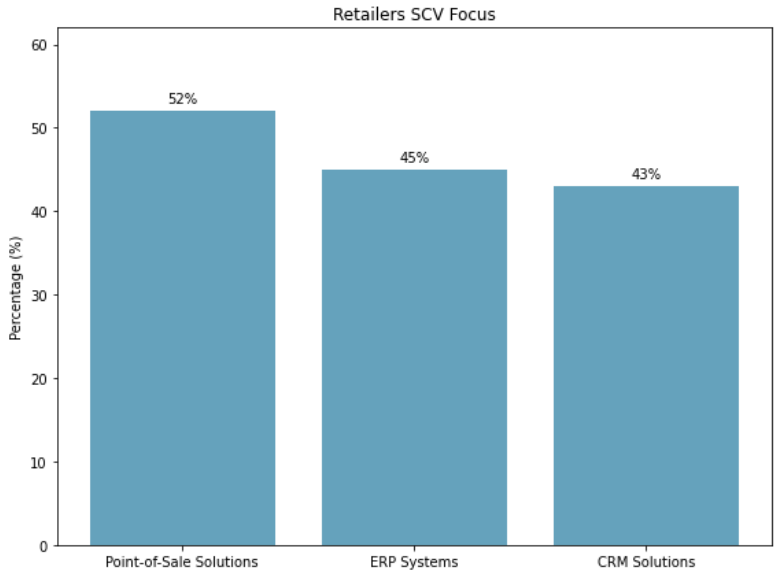
Organizations utilize SCP solutions, ERP systems, and distributor-specific data in the distribution industry to navigate the complexities of their extensive distribution networks. Nearly half of the surveyed distribution organizations rely on SCP solutions to enhance SCV, underscoring the need for advanced planning and coordination tools to optimize logistics planning, manage inventory levels, and forecast supply and demand across widespread distribution channels. Distribution organizations also rely on ERP systems to enhance SCV due to its ability to integrate various aspects of the business process, from order processing to finance, ensuring seamless operations and data flow within these expansive networks. Distributor data also plays a key role, as it helps organizations gain insights into operational performance, customer preferences, and market trends.

- Manufacturers depend primarily on ERP, SCP, and CRM systems to enhance SCV. Survey results show:



In the manufacturing sector, many organizations leverage ERP systems to integrate digital operations essential for streamlining production and manufacturing supply chain processes efficiently, such as production scheduling, procurement, and distribution coordination. This approach allows manufacturers to optimize production planning and scheduling, directly improving operational efficiency and output quality. Additionally, the sector values supply chain planning (SCP) solutions for enhancing coordination across production activities and resource management. CRM systems are also prioritized, reflecting manufacturers' focus on fostering strong relationships and coordinating with vendors and customers.

- Retailers emphasize point-of-sale, as well as both ERP and CRM systems, to achieve SCV. Survey results show:



In the retail sector, organizations emphasize leveraging PoS systems for SCV as they can capture real-time sales data, which is crucial for monitoring transactions and adapting to consumer behavior. This focus is complemented by ERP systems, which are essential for connecting sales data with back-office operations such as inventory management, procurement, and financial reporting. CRM systems also significantly enhance SCV, enabling retailers to manage customer relationships effectively, personalize marketing efforts, and improve customer service. This combination of technology adoption underscores the retail industry's need to combine sales transactions, operational efficiency, and customer engagement to maintain a competitive edge in the market.

INDUSTRY OVERVIEW

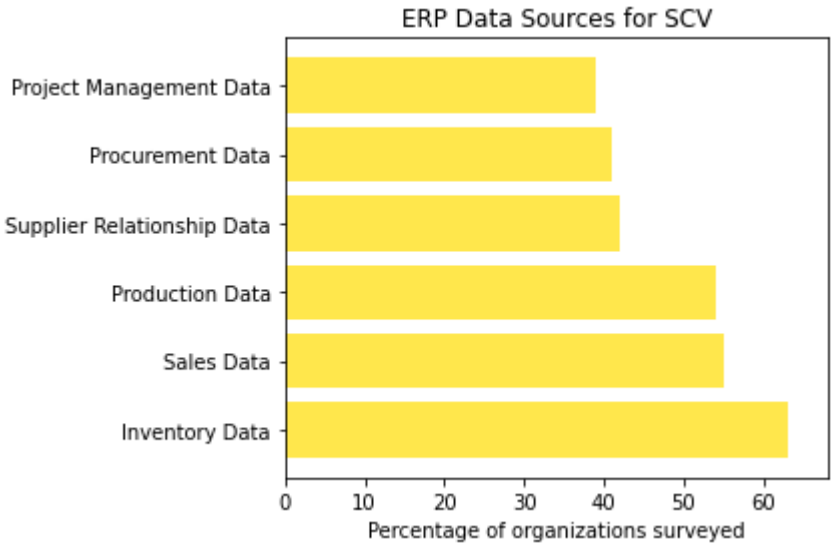
The reliance on various industry data sources underscores the strategic nature of enhancing supply chain visibility. Organizations must recognize the need to carefully select sources that provide the most relevant insights based on their unique operations and objectives. Having data sources supporting their specific industry needs allows organizations to gain meaningful insights on where it matters most to manage their supply chains.

The industry-specific emphasis reflects a thoughtful, strategic approach to implementing supply chain visibility rather than a one-size-fits-all model. Companies that understand

general data sources cannot meet their visibility requirements but require targeted sources that deliver the correct information to drive their desired performance outcomes.

ERP DATA SOURCES FOR SCV

ERP systems are a comprehensive source of operational information across various facets of an organization's supply chain. ERP data is vital for organizations looking to enhance supply chain visibility, as revealed by Nucleus' findings. Results show that inventory, sales, production, supplier relations, procurement, and project management data are the primary SCV sources:



Nucleus has observed that:

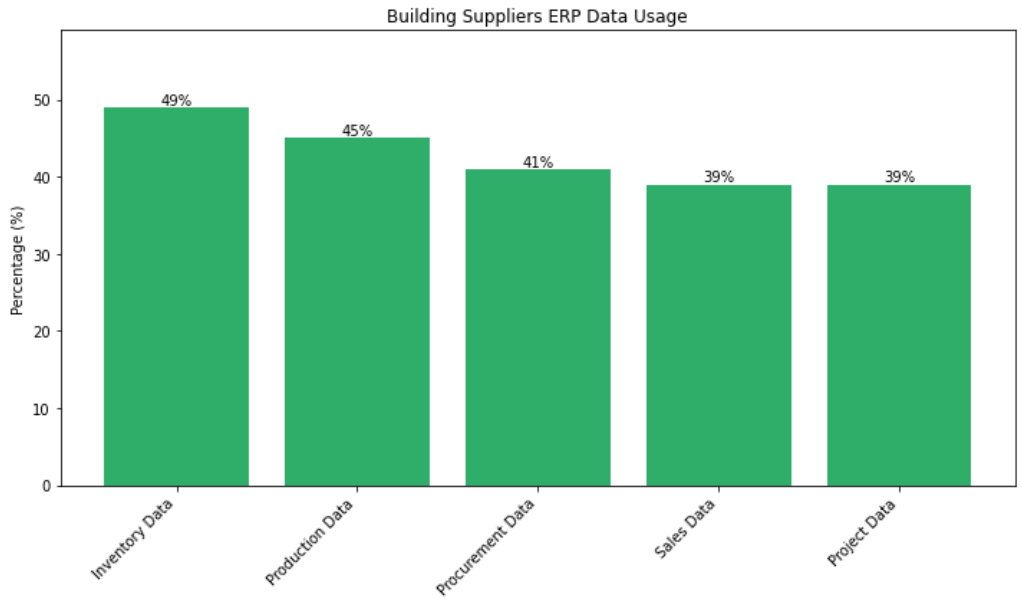
- Inventory data is crucial for effectively leveraging inventory analytics to monitor stock across the entire supply chain ecosystem.
- Sales data gives organizations demand visibility to inform forecasting models and understand customer buying patterns.
- Production data allows organizations to track manufacturing efficiency and throughput to identify issues.
- Supplier relationship data helps maintain partnerships and collaboration, critical for transparent business processes.

Across industries, 63% of survey respondents value inventory data as critical for providing supply chain visibility, followed by sales and production data.

- Procurement data enables organizations to employ better sourcing strategies and supplier integration practices.
- Project management data allows for the oversight of supply chain operations and initiatives. Specific data sources such as service, finance, workforce, and sustainability data are essential for comprehensive visibility.

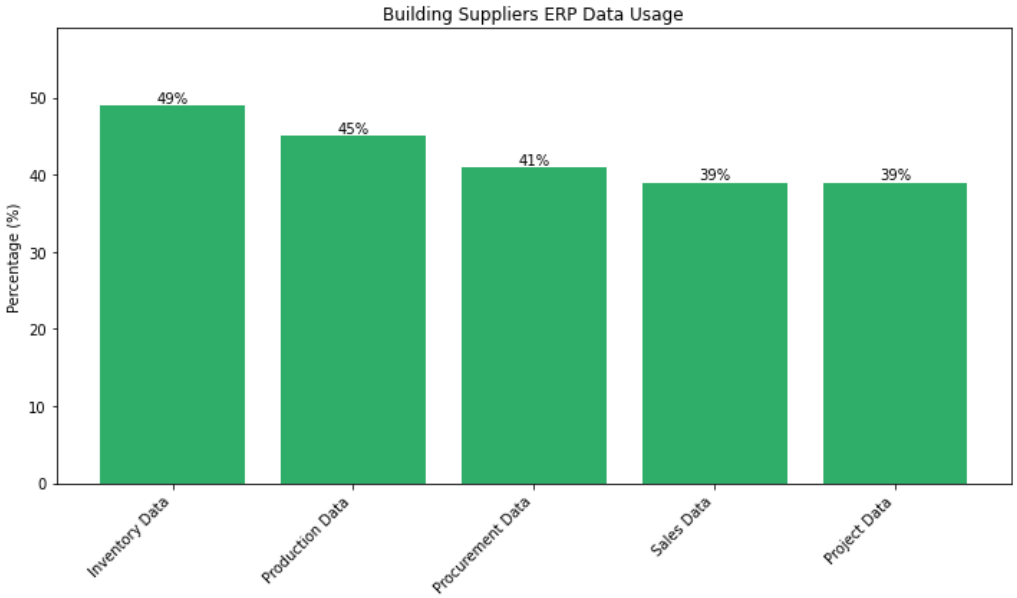
ACROSS INDUSTRIES

Results show that the ERP data breakdown for Building Suppliers is as follows:



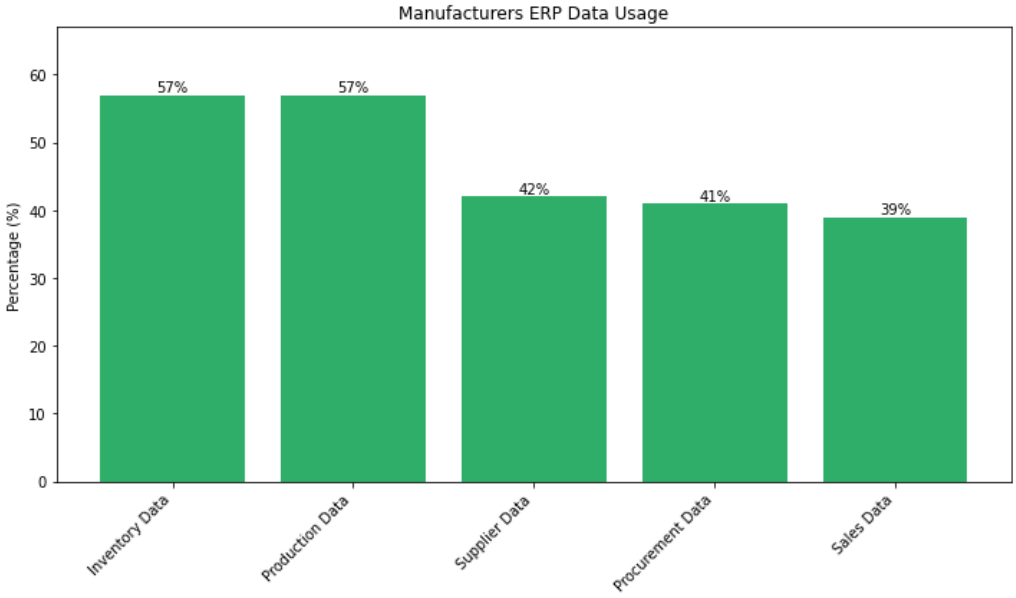
Building Suppliers surveyed utilize a variety of data types, including inventory, production, procurement, sales, and project data, to gain comprehensive visibility into resource flows and track progress throughout the supply chain. This integrated data approach allows them to monitor material usage, manage procurement processes, understand sales cycles, and oversee project milestones effectively.

- Results show that the ERP data breakdown for Distributors is:



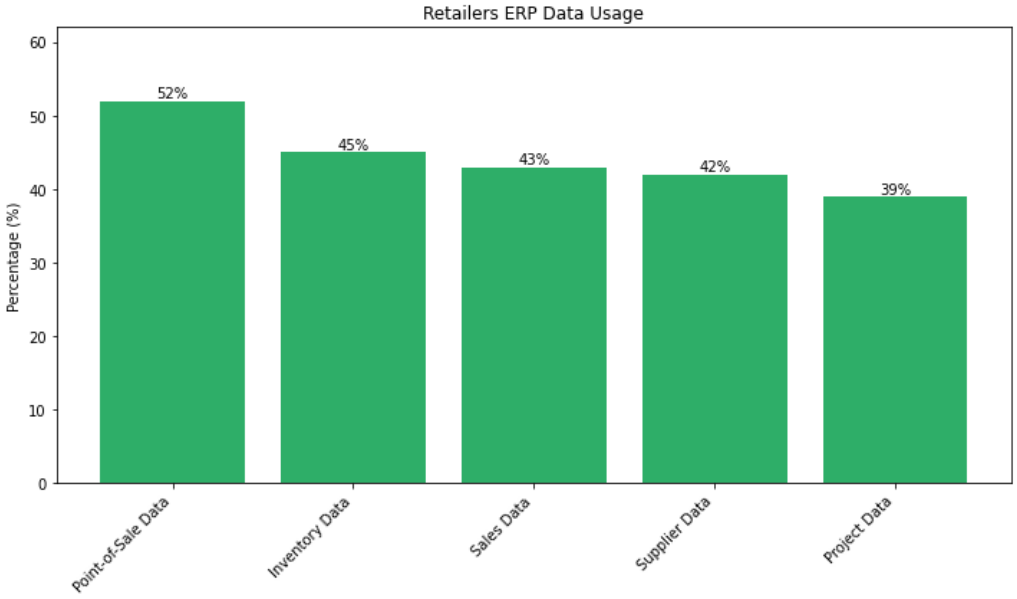
In the distribution industry, organizations primarily utilize various data types to enhance visibility into demand, manufacturing processes, and product movement. Inventory data is pivotal for tracking stock levels and aligning them with demand patterns. Sales data provides insights into customer demand and helps forecast. Production data, significant for nearly half of these organizations, enables monitoring manufacturing efficiency and scheduling. Additionally, supplier data is leveraged to understand supply chain inputs and ensure timely product availability. Operational data also plays a key role, offering a comprehensive view of the entire distribution process, from procurement to delivery. This integrated data approach facilitates a thorough understanding of demand and supply dynamics, which is crucial for optimizing distribution strategies.

- Results show that the ERP data breakdown for Manufacturers are:



Survey findings show that manufacturers prioritize a distinct set of ERP data types to boost operational efficiency and coordination visibility. Production data is notably emphasized, reflecting manufacturers' focus on optimizing production processes and workflows. A significant 57 percent of manufacturers depend on inventory data to help manage resources effectively and ensure seamless production schedules. Furthermore, 41 percent leverage procurement data, highlighting the role of efficient sourcing in operational efficiency. Supplier data is also critical for manufacturers, facilitating better collaboration and integration. This data-driven approach enables manufacturers to fine-tune their operations, from production floor efficiency to supply chain coordination, distinguishing data usage patterns from building suppliers and distributors.

- Results show that ERP data breakdown for Retailers are:



Many rely on point-of-sale data, enabling them to closely monitor sales trends and inventory levels and foster collaborative efforts. Like building suppliers and distributors, 45 percent of retailers use inventory data to maintain insight into sales dynamics and stock management. Sales data is also crucial for 43 percent of retailers, assisting in understanding customer purchasing behaviors and inventory demands. Additionally, supplier data, utilized by 42 percent of retailers, aligns with distribution and manufacturing practices, aiding in managing supply chain relationships and ensuring product availability. Furthermore, project data is leveraged by 39 percent of retailers, facilitating the coordination of various retail operations and projects to optimize sales, inventory control, and collaborative initiatives. This comprehensive approach to data utilization underscores retailers' strategies for achieving a holistic view of their supply chain activities.

DAAS

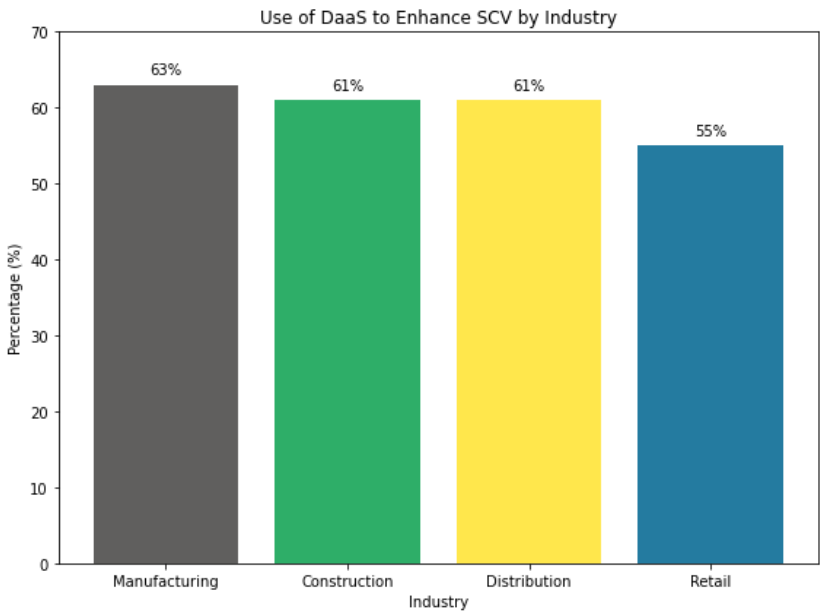
Nucleus discusses the role of Data as a Service (DaaS) in enhancing supply chain visibility. DaaS is a model in which data is provided on demand to the user, regardless of the provider and consumer's geographic or organizational location. DaaS uses cloud computing to deliver data storage, integration, processing, and analytics services via the Internet, typically on a subscription basis.

DAAS FINDINGS

DaaS solutions are increasingly becoming a cornerstone for enhancing Supply Chain Visibility, with Supply Chain Visibility Platforms (SCVP), including FourKites and Project44. Supply Chain Intelligence Platforms (SCIP), such as S&P Global Market Intelligence, Pharma Intelligence, and Epicor Aftermarket Data Analytics, offer insights that are not limited to supply chain operations but also extend to financial, weather, geographic, and demographic intelligence to provide comprehensive overviews essential for informed decision-making.

Sixty percent of all survey respondents acknowledge using DaaS solutions for Supply Chain Visibility, highlighting these platforms' role in ensuring transparency and efficiency within the supply chain. Moreover, within this group, 87 percent consider their DaaS solution indispensable for achieving SCV.

- Nucleus examined the breakdown of DaaS reliance on supply chain visibility by industry:



Building Supply and Distribution organizations rely on DaaS solutions to improve visibility across their supply chain operations and enhance decision-making capabilities. This reflects the sector's requirement for real-time data to manage complex logistics and supply networks effectively. In the Manufacturing industry, organizations leverage DaaS solutions to gain critical insights into production processes, inventory levels, and logistics operations. This utilization underscores manufacturing's need for precise, up-to-date information to optimize production efficiency and coordinate supply chain activities seamlessly. Retailers, while adopting DaaS solutions, demonstrate that these solutions monitor point-of-sale trends, manage inventory, and facilitate supplier collaboration. This indicates the retail sector's focus on leveraging data to respond to consumer demand patterns, ensure product availability, and maintain efficient supply chains.

Supplementing ERP data with DaaS is a cornerstone for improving Supply Chain Visibility.

When explicitly asked about the necessity of DaaS for attaining higher levels of Supply Chain Visibility, 95 percent of respondents from Distribution organizations affirmed that DaaS is vital for accessing the granular data required to provide visibility across supply chain functions. Similarly, 93 percent of Manufacturing respondents identified DaaS as critical for visibility into machining, uptime, orders, and inventory movement to mitigate disruptions. Eighty-four percent of respondents from Building Supply companies indicate that DaaS is pivotal for views into material flows, project progress, and equipment effectiveness to keep projects on track. In contrast, 78 percent of respondents across Retailers highlight that DaaS is essential for visibility into sales patterns, inventory, and supplier collaboration, enabling faster response times.

KEY FINDINGS

Nucleus found that 41 percent of survey respondents claim to have adopted an integrated approach to enhancing SCV. These organizations leverage a cohesive platform combining ERP and SCM data into a unified solution to facilitate improved procurement and delivery decision-making. Of those respondents, 93 percent reported having mature data-sharing practices. This indicates that such a technology setup fosters enhanced data-sharing capabilities and significantly contributes to more efficient and transparent supply chain operations. Nucleus found quantifiable benefits from organizations leveraging an integrated ecosystem, including an 18 percent improvement in on-time, in-full (OTIF) service levels, a 19 percent increase in demand forecast accuracy, and a 16 percent decrease in the cost of goods sold (COGS).

Organizations that have integrated their ERP and SCM solutions have seen an 18% improvement in on-time, in-full (OTIF) rates, 19% increase in demand forecast accuracy, and a 16% decrease in the cost of goods sold.

Organizations gain real-time visibility across the supply chain network by integrating ERP and SCM systems. With a unified data source, organizations eliminate data silos and inconsistencies that often arise from disparate systems. This ensures that all functions and stakeholders are working with the same accurate, up-to-date information. Organizations can proactively identify and respond to disruptions, delays, or issues, improving OTIF service levels. Integrating sales, inventory, and supplier data from ERP with logistics and distribution data from SCM enables advanced demand sensing and forecasting capabilities. The holistic view of demand signals and supply constraints leads to more accurate demand forecasts. An integrated ERP and SCM solution helps decrease the cost of goods sold by providing better visibility and control over inventory levels across the supply chain. This prevents companies from carrying excess inventory, which reduces storage and obsolete warehouse costs. The integration also streamlines operations by cutting out redundancies and inefficiencies, lowering expenses related to the manufacturing and logistics of goods.

BENEFITS IN CORPORATE PERFORMANCE

Nucleus assesses the benefits of supply chain visibility in corporate performance and what this visibility allows organizations to do.

- **Adapt to market changes.** SCV enables organizations to adapt and maintain continuity amid disruptions and unforeseen events such as natural disasters, geopolitical tensions, or shifts in consumer demand. With accurate, real-time visibility into inventory levels, supplier constraints, and logistics operations, organizations can proactively identify potential bottlenecks and reroute resources as needed. This agility empowers businesses to adjust production schedules swiftly, renegotiate contracts, or explore alternative sourcing options, minimizing the impact of disruptions on their operations and customer commitments. For distributor organizations with extensive supply networks, SCV facilitates proactive risk mitigation by providing visibility into potential disruptions like natural disasters impacting supplier operations or transportation delays. This visibility allows distributors to implement contingency plans, such as rerouting shipments, securing backup suppliers, or adjusting safety stock levels in strategic locations, ensuring continuous product availability and preventing stockouts that could impact customer relationships and revenue streams.
- **Increase operational efficiency.** By providing a comprehensive view of demand signals, inventory positions, and production capacities, organizations can align their supply and distribution networks more effectively, minimizing excess inventory and stockouts. Additionally, SCV enables data-driven decision-making, guiding strategic investments and identifying new market opportunities, ultimately driving growth and profitability. SCV allows organizations to improve operational efficiency in the manufacturing sector by providing a comprehensive view of production capacities, material availability, and downstream demand signals. This visibility enables manufacturers to reduce excess inventory carrying costs, minimize material shortages that can halt production lines, and identify bottlenecks that slow throughput. For building suppliers, SCV provides transparency into inventory levels across distribution networks, supplier lead times, and project demand forecasts, enabling optimized inventory management and distribution strategies. By leveraging this visibility, suppliers can stock suitable materials at locations nearest to upcoming construction projects while minimizing excess inventory of slow-moving products. SCV gives insight into supplier performance, allowing proactive sourcing from alternate vendors to prevent stockouts that can delay projects for contractor customers.
- **Improve customer satisfaction.** Supply chain visibility allows organizations to effectively meet customer expectations by ensuring reliable and timely order fulfillment. With transparency into inventory levels, production schedules, and logistics operations, organizations can optimize their supply chains to deliver products and services promptly. Transparency fosters seamless collaboration with partners, enabling proactive issue resolution and maintaining high service levels.

Organizations implementing an integrated SCM technology ecosystem with mature data-sharing practices can enhance customer experiences and build trust and loyalty. SCV allows companies to forecast consumer demand accurately and align inventory across retail distribution centers and stores. When a customer orders a product online or in-store, SCV provides visibility into which locations have the item in stock for immediate fulfillment. If an item is out of stock, SCV helps identify the nearest location with availability and allows organizations to transfer merchandise seamlessly. This capability ensures retailers meet customer expectations for reliable delivery, improving satisfaction and driving repeat business.

HIGHLIGHTED USE CASES

Nucleus identified four use cases to highlight the value of leveraging an ERP and SCM within the same technology ecosystem to enhance supply chain visibility.

ELECTRONICS MANUFACTURER

An electronics manufacturer specializing in data-collecting scanners for business inventory and asset tracking faced significant operational constraints due to an outdated and fragmented ERP system. The existing on-premises solution could not scale with the company's growth, lacked visibility throughout the order lifecycle, and struggled with integrating new acquisitions. These internal system limitations were exacerbated by external factors such as global pandemics, trade disputes, and fluctuating tariffs, which complicated supply chain management and regulatory compliance.

The company sought a cloud-based ERP system that could offer advanced supply chain and financial functionalities tailored to the electronics manufacturing industry in response to these challenges. The system had to deliver precise supply chain planning for component tracking, transportation management to optimize delivery routes and consolidate freight, and comprehensive global trade compliance to manage the diverse regulatory landscape.

Adopting a new cloud-based ERP with integrated SCM tools was a critical development for the manufacturer. It streamlined transportation logistics, leading to an annual reduction of $4 million in related costs. Additionally, the automation capabilities within the global trade management module significantly reduced administrative overhead, allowing the team to pivot toward strategic, high-value tasks. Real-time visibility into inventory and demand trends provided by the supply chain planning function enabled smarter inventory management, fostering an operational model that was leaner and more resilient to the complexities of the global market.

MACHINERY MANUFACTURER

A machinery manufacturer used an outdated, self-developed ERP system that was difficult to manage and upgrade. The system's shortcomings included the inability to attach documents or integrate a proper document management system, a lack of material and time tracking, reliance on manual data entry, and frequent data inaccuracies. The system also lacked proper SCM functionality, which hindered shipping tracking and visibility into the manufacturing floor's operations. The organization began searching for an ERP solution to consolidate its multiple software systems into one technology ecosystem and provide the necessary supply chain functionality for a small manufacturing setup.

With the new ERP system, the organization streamlined training processes and improved standard operating procedures, such as inventory tracking on the shop floor. Financially, the company reduced the time it took to receive payments and improved the management of payment terms. This enabled the organization to negotiate favorable terms with suppliers and customers. Operationally, there was a 25 percent reduction in work hours and a 20 percent reduction in staff required by eliminating manual data entry and consolidating data across various processes. Manufacturing processes saw a 30 percent reduction in overtime and improved on-time delivery rates from 80 percent to 95 percent. Transparency into production schedules, material availability, and labor resources facilitated better capacity planning and allocation. Additionally, the system facilitated the creation of a customer portal, providing real-time access to stock and shipping data.

BUILDING SUPPLY ORGANIZATION

During rapid growth, a building supply company encountered obstacles in scaling its operations to match the pace of its expansion. The organization, which dealt with the distribution of construction materials and managed extensive inventories for various building projects, found that handling tens of thousands of product lines and installations was becoming increasingly unmanageable. The lack of an integrated system caused delays in material procurement, inventory discrepancies, and difficulties in project cost tracking, which impeded the company's ability to allocate inventory and manage finances effectively. In response, the company recognized the need for a comprehensive ERP and SCM platform to streamline its industry requirements with functionality, such as inventory management, project-based accounting, and supply-demand alignment for building materials.

Adopting an integrated SCM technology ecosystem offered a consolidated view of supply chain, financial, and inventory data, breaking down silos between the procurement of materials, inventory management, and financial oversight. The system's sales and operations planning tools enabled precise forecasting of construction materials, which is essential for the timely procurement of goods and managing the demands of specific projects. With this approach, the organization optimized its logistics processes by ensuring the right materials

reached the right construction sites on time, improving client satisfaction and reducing operational costs and project completion times.

ENVIRONMENTAL SERVICES ORGANIZATION

This organization focuses on properly collecting, transporting, and recycling batteries, helping minimize the environmental impact of disassembling and recycling these goods. Non-profit organizations encountered significant challenges with their outdated, overly customized ERP systems that frequently failed and were unable to keep pace with the rapid changes within the organization. The old system's slow performance and archaic interface created operational delays. In seeking a more agile and scalable solution, the organization required a cloud-based system with an intuitive user interface and comprehensive supply chain management capabilities to improve operational efficiency and shorten integration times with fulfillment partners. It was also essential for the new system to offer native integration with finance and other departments, eliminating the need for complex third-party integration.

It chose a modern ERP solution for its extensibility for adding new application functionality, robust supply chain features, and native integration capabilities. The organization enhanced invoice and system onboarding processes with a dedicated ERP solution, saving organizational time. Moreover, automating reporting led to a 10-to-12-hour reduction in monthly reporting. The organization experienced savings in invoicing approval costs, allowing it to engage with new ventures seamlessly and cutting down project kickoff times from six to eight months to two months.

BEST PRACTICES

Nucleus' best practice recommendation is for organizations to increase visibility in their supply chain.

- **Unified system architecture.** Choosing an integrated ERP and SCM solution from a single provider simplifies system architecture and data flow. This approach ensures consistent user experiences, reduces the learning curve with similar interfaces, and promotes accurate data across the organization. For example, integrating warehouse management directly with procurement processes can prevent stock discrepancies and enable real-time inventory updates.
- **Centralized Operational Management.** Centralizing operational data within one platform can significantly improve oversight across all supply chain stages. This centralization enables quicker adjustments in response to market fluctuations and streamlines processes by reducing redundant systems, which, in turn, can lower

operational costs and heighten service delivery. This might involve a dashboard aggregating manufacturing, logistics, and sales data, offering a singular view to drive strategic decisions.

- **Predictive Analytics Utilization.** Applying AI and advanced analytics to dissect supply chain data can unearth predictive insights, allowing companies to anticipate market trends, forecast demand more accurately, and preemptively address potential supply chain disruptions. For instance, AI models could predict machinery failures before they occur, minimizing downtime.
- **Scalable cloud solutions.** Embracing cloud technologies for ERP and SCM enables flexibility and scalability. Cloud platforms can adjust to the ebb and flow of business needs, ensuring data is accessible and secure, no matter the scale. Moreover, cloud solutions facilitate integration with emerging technologies like IoT devices, which can track products throughout the supply chain in real time.

ROLLOUT STRATEGIES

Nucleus recommends the following rollout strategies for organizations seeking supply chain visibility.

- **Phased rollout.** A phased roll-out of integrated ERP and SCM systems can be more effective than a full-scale immediate implementation. Begin by deploying the system in one supply chain segment, such as inventory management or logistics, and gradually extend to other areas. This approach allows for mitigating risks and addressing challenges on a smaller scale before full deployment. It also provides the opportunity to gain insights and feedback from each phase, ensuring continuous improvement. Begin by integrating the new ERP system within the procurement department to streamline supplier onboarding and purchase order management. Once successful, replicate the model in inventory management to sync stock levels with procurement data. As you implement this phased approach, note that external challenges related to data, integration, and resources often mirror internal ones. Addressing internal challenges first allows for valuable learning experiences that can be applied when extending the system to interact with external partners and stakeholders, refining the approach for managing external supply chain challenges.
- **Change Management and User Adoption.** Active engagement with all stakeholders, including suppliers, customers, and employees, is essential. Inform and educate them about the new system and its benefits. Effective change management practices should be implemented to ease the transition, address resistance, and ensure a smooth adoption process. This includes comprehensive training sessions, clear

communication of changes, and soliciting feedback for continuous improvement. For example, dedicated support teams can help employees transition to new workflows, and preview sessions with suppliers can prepare them for new integration processes.

- **Data Integration and Cleansing.** Before deploying the integrated system, ensure that existing data is accurate, clean, and standardized. This step is crucial for the effectiveness of the ERP and SCM integration, as it ensures that the system operates on reliable and consistent data. It also prevents data-related issues post-deployment, which can be costly and time-consuming. Before system integration, run a data-cleansing operation to unify customer records, ensuring that all customer interactions and orders are tracked under a single customer ID across the system.
- **Customized Platform.** While implementing ERP and SCM solutions, tailor the system to meet your organization's unique needs. Customization should align with business processes and requirements. Additionally, consider the system's scalability to accommodate future growth and changes in the business environment. Tailor the dashboard of the ERP system to provide real-time metrics crucial for the logistics team, such as delivery schedules and vehicle tracking, while ensuring the system infrastructure can support additional users and modules as the company grows.
- **Continuously Monitor and Optimize.** Continuous monitoring of the system's performance is crucial post-deployment. This involves regularly reviewing key performance indicators (KPIs) and making necessary adjustments to optimize the system's functionality. Regular audits and updates ensure the system remains aligned with evolving business needs and technological advancements. Implement a monthly review process where the logistics team assesses delivery performance metrics from the SCM system and adjusts routing or scheduling parameters to improve efficiency.

LESSONS LEARNED

The survey findings underscore the critical importance of integrating ERP and SCM solutions to enhance supply chain visibility. These integrated systems provide a comprehensive view of the entire supply chain, enabling real-time tracking of inventory, shipments, and operational processes. Such integration allows organizations to gather and analyze essential data across various supply chain stages, from material sourcing to the delivery of finished products, offering a holistic data landscape. This integration is critical to leveraging predictive analytics, empowering businesses to anticipate and manage potential disruptions effectively.

Across all verticals surveyed, there are varied practical benefits from combining ERP and SCM data. For instance:

- Inventory management: this combination leads to the accurate tracking and automatic updating of stock levels, minimizing the risks associated with overstocking or stockouts.
- Logistics: this ensures a full view of the delivery process, facilitating quick responses to transportation issues or delays.
- Procurement gains insights into supplier performance and delivery times, enabling more informed decisions regarding supplier selection and contract negotiations.
- Production planning benefits from manufacturing schedules better aligned with supply availability and customer demand, resulting in more efficient operations. Additionally, demand planning is enhanced by integrating sales data and market trends, improving the accuracy of customer demand forecasts.

Altogether, these lessons learned from the survey highlight the transformative impact of ERP and SCM integration for achieving a more transparent, responsive, and efficient supply chain, ultimately leading to improved quality control, regulatory compliance, and more vital trust and reliability among customers and stakeholders.