

Supply Chain Management (SCM) for capital owners



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The turbulence of recent years has brought to light the vulnerabilities in modern supply chains. Let's compare the present situation to the pre-COVID era. In the past, freight shipments from Long Beach, LA, to Chicago would take approximately four days by rail, followed by an additional four days to reach the East Coast. However, the pandemic, with its port congestion and labor shortages, altered this landscape, increasing costs and turnaround times. Furthermore, the competitive nature and lack of cooperation among truck, rail, and ocean transport providers aggravated supply chain bottlenecks. Industry veterans have long recognized these issues, but the disruptions of recent years have starkly exposed the inherent weaknesses within supply chains. The relentless pursuit of optimal pricing, faster lead times, and access to the intricate mix of products required for modern production processes, all while neglecting the establishment of stable supplier relationships, has begun to take its toll.

To add to these woes, the supply chain industry faces endemic issues that demand attention. One

such issue is the disparities in interstate policies and regulations, particularly those related to truck size and weight restrictions. For instance, Montana permits 206,000 pounds, whereas Idaho has more stringent regulations. This disparity complicates cross-border shipping. Addressing this problem, as challenging as it may be, necessitates the harmonization of disjointed policies. Eleven midwestern states have set an example by creating a model for addressing such problems, especially during emergencies. Other states could take a cue from this and prioritize shipping reforms and policy harmonization.

Another critical and necessary intervention is to increase the participation of private sector stakeholders in freight management. These stakeholders can provide valuable insights to the public sector, helping identify choke points and areas where the transportation system is faltering. The current issue lies in the shortage of experienced and dependable private sector operators that can bring value to the public sector.

In response to the mounting challenges, a new philosophy of Supply Chain Management (SCM) has emerged. This new approach aims to rectify historical shortcomings by emphasizing the need for tightly integrated supply chains and harnessing intelligent technology to enhance performance. According to **Gartner, by 2024, 50% of supply chain organizations will invest in applications supporting Artificial Intelligence (AI) and advanced analytics capabilities.** In capital programs, this means integrating job sites, field equipment, ERP systems, suppliers, distributors, warehouses, transportation, and governance through cutting-edge technology to optimize material management.

The real hitch lies in the fact that capital projects have traditionally relied on procurement software rather than supply chain technology. Adaptation is imperative. A few years ago, a buyer might have placed an order, asking the supplier, "I need 100 steel beams. When can you deliver them?" and could have received a response such as, "I have them; you can expect delivery in March." This approach is no longer sufficient. Today, buyers want to track the entire life cycle of steel, from melting to forming, drying, and loading onto a truck. They demand real-time visibility into the supplier's inventory and shipments to establish transparency. The traditional bill of lading no longer suffices. To meet these demands, technology companies now offer applications capable of monitoring materials from warehouses to job sites, complete with dashboards displaying the real-time status of all orders in transit.

Amid this transformation, a fundamental question emerges:
What are the key factors that will future-proof SCM?





The top four factors that future-proof SCM

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- Talent and relationships
 - Visibility
 - Resilience
 - Digital technologies
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Talent and relationships

Despite the advancements, it's crucial to remember that people are at the heart of reliable and resilient supply chains. According to the [Supply Chain Resilience Report 2023](#), the primary cause of disruptions in the past year was staff shortages, affecting 46.8% of respondents. However, only 39.7% of organizations anticipate this as a concern over the next five years. This report underscores that recurring threats and staff shortages continue to exert a significant influence on supply chains. Therefore, these concerns deserve due consideration when analyzing future threat landscapes.

New solutions, such as leveraging the Internet of Things (IoT) for real-time data, predictive analytics for decision-making, AI-driven workflows, and automation for error-free execution, are emerging. Professionals in the field must adapt quickly to new

ways of working with data and automation to ensure that the talent landscape matches the pace at which technology is emerging.

Maintaining stable and reliable relationships with everyone in the supply chain, including your organization's supply chain team, is essential. Improving relationships with vendors, suppliers, and team members is the key to increasing collaboration, reducing friction, and yielding some victories when materials are scarce. As a best practice, capital owners must create a comprehensive list of approved vendors and establish strong relationships with them. Follow this with continuous and proactive due diligence and risk assessment for each supplier. Prioritizing relationships can positively impact cost optimization and the detection of disruptions that traditional systems overlook while also improving lead times.



Visibility

B2B enterprises rely on various partners and platforms to fulfill and ship orders in a complex ecosystem. This often involves working with numerous trading partners, manufacturers, shipping platforms, and logistics providers. The challenge lies in the fragmented nature of data sharing. Although substantial information is generated, it is rarely shared reliably and in a timely manner. Capital program software, integrated with intelligent data management, can revolutionize this landscape, enabling granular tracking of material costs during estimation, bidding, and construction. It can provide accurate material demand forecasts, bills of materials, and sourcing options. Currently, the data remains scattered, with outdated figures from various sources presented in diverse formats for inventory and sales. Gaining insights from this data is crucial.

Cloud supply chain technology holds the potential to resolve this chaos by centralizing data on a single capital program platform, ready for consumption

and distribution. Moreover, suppliers are increasingly granting owners access to their inventory management software, offering real-time insights into material production and shipping. Many suppliers also provide transparency into their own suppliers, including sub-suppliers or tier 2 suppliers, who deal in raw materials, not just finished products or components. Understanding these sub-suppliers has become indispensable.

Modern technology can automate data sourcing, aggregation, and unification, preparing it for consumption by analytical engines. Program owners can view data and insights on a single dashboard, generate reports, and trigger timely actions based on results. They can run multiple what-if scenarios during CIP/TIP planning and be prepared for price fluctuations and delays. Modern capital program management solutions offer several advantages, including the critical ability to anticipate and avert delays, minimize material loss, and facilitate better scenario planning.



Supply chain resilience

Organizations often take several days or weeks to recognize that they are on the wrong side of a disruption. Alternate scenario planning, internal discussions, and decision-making can further extend response times, leading to project delays and increased costs. Reducing the response time to disruptions is critical. **According to the [Supply Chain Resilience Report 2023](#), supply chain disruptions have reached their highest level (35.6%) in the history of the report. Alarming, there is nearly a 50% chance that a supplier does not have any mitigation measures in place.** While initial efforts to enhance supply chain resilience in response to the pandemic are waning, supply chains are still in a better place than they were before COVID-19. Nonetheless, it is imperative to maintain a strong commitment to supply chain resilience as a

fundamental component of overall strategies. Senior leadership must recognize the significance of this commitment so that the lessons learned from the pandemic can be applied to new challenges in the near future.

Leveraging technology to analyze and report on supply chain disruptions is prudent. Data expertise and capital program software solutions can enhance supply chain resilience. Diversifying suppliers and transportation processes is also necessary to mitigate risk. Owners should seek nontraditional partnerships and source alternative materials in advance. For instance, can alternatives be found when disruptions hinder the procurement of certain materials, as was seen after the [storms in Texas in 2021](#)?



Digital technologies

Supply chains and the IoT

Capital owners are increasingly employing advanced SCM software to digitally track their assets with pinpoint accuracy. Devices equipped with sensors have become a part of the IoT, a network of physical objects transmitting data over wireless networks. Besides offering greater visibility into operations and transportation, the IoT can enhance warehouse management, fleet tracking, and inventory control. Operations teams can implement condition-based maintenance instead of traditional interval-based schedules, reducing costs and equipment downtime.

Research indicates that by 2030, there will be more than **25.4 billion IoT devices**. This growth will play a significant role in SCM, particularly in logistics. However, with the expansion of IT networks and their complexity, there is a heightened risk of vulnerability to cyberattacks. According to the **Supply Chain Resilience Report 2023**, cyberattacks rank sixth on the list of supply chain disruptions and will become a critical area of investment for supply chains, a factor not historically accounted for in budgets. **KPMG** suggests that there will likely be increased investment in supply chain planning maturity, warehouse and operational task automation, and the gathering of comprehensive end-to-end supply chain analytics to enhance visibility.

Supply chains and capital program management software

Every agency strives to deliver projects on time and within budget while meeting or surpassing sustainability and resiliency goals. However, the real world presents challenges, including pricing fluctuations and material delivery delays. In some cases, materials may arrive with incorrect specifications, upsetting schedules. In an era marked by persistent disruptions, it is evident that embracing resilience is crucial to adeptly manage unforeseen circumstances and leverage opportunities. The key to navigating volatility and unpredictability lies in connected, real-time systems that provide early signals for deviations in price, quality, volume, and delivery. These systems empower stakeholders to take prompt corrective actions, optimize budgets, and adapt procurement processes to changing business conditions. Additionally, they facilitate data standardization, enabling improved reporting and historical cost analysis across programs. When coupled with artificial intelligence, this becomes a valuable tool for estimating upcoming projects through the analysis of extensive datasets. Such solutions typically fall under the comprehensive category of capital program management systems, integrating planning, budgeting, procurement, cost management, reporting, and compliance.

Running multiple what-if scenarios during CIP/TIP planning

Capital program management systems enable owners to run multiple what-if analyses during CIP/TIP planning, allowing them to foresee and evaluate potential risks, material cost fluctuations, or construction project delays. As a result, informed decisions can be made, and budgets as well as supply

lead times can be planned, provisioned, and adjusted proactively instead of reactively. For instance, an agency can simulate a scenario where a particular material experiences a 10% price hike and make the necessary adjustments to their budget planning. This proactive approach not only enhances decision-making but also ensures that projects are completed on time and within budget. By integrating innovative ideas and iterating earlier in the project life cycle, public agencies can mitigate risks and improve supply chain certainty.

Streamlining budget changes and ordering processes

With an integrated system, owners gain the ability to track every funding source detail, including plans, ratios, and allocations, along with transactions, fund availability, materials procurement, and forecasts. This includes capturing field data, which can be synchronized with other applications such as ERP or accounting software, helping with budget planning and modifications based on the financial climate and data-driven insights. This becomes particularly important when unexpected material cost increases occur during a project. By simplifying and automating administrative and procurement processes, a capital program management solution enhances operational efficiency, saves time, and reduces unnecessary costs in the supply chain.

Tracking material costs in detail

Transitioning supply chain operations to a digital and efficient format allows for the effective evaluation of multiple vendors and the selection of the most suitable ones for a project. With a capital program management software solution,

you can generate estimates using real costs, historical data, or a combination of both while also accounting for inflation in suggested prices. This approach provides an accurate view of all bids received, automatically calculating, comparing, and ranking each bid against both the engineer's estimate and all other bids. During the bidding and construction phases, the agency can use this software solution to track the actual costs of materials purchased and used. This allows them to compare actual costs with estimated costs, quickly identifying overspending and inefficiencies in processes and making necessary adjustments. By meticulously tracking material costs, agencies can ensure that they stay within budget and do not overspend on materials, which is particularly important for public infrastructure projects with limited funding that require stringent cost management.

Spotting trends and taking action early

Technology not only enhances performance, agility, and resilience but also aids risk mitigation. To harness these advantages, public agencies can leverage AI and advanced program management solutions integrated with SCM to provide teams with deeper insights at higher frequencies and granularity. One of the key benefits of these AI-driven solutions is their ability to help public agencies identify and respond to specific changes in material pricing and labor costs across different projects, thereby influencing supply chain outcomes. Collaborating with logistics partners, including vendors and suppliers, in tracking these changes provides valuable data for identifying potential improvements. Greater control over material usage and issue resolution improves supply chain operations and facilitates early decision-making in the public agency's project execution process.

Benchmarking data with AI and forecasting better

Using technology to optimize everyday tasks and extract better value from interconnected data is crucial to improving project outcomes. A robust program management solution with integrated systems helps centralize data from past projects or among stakeholders, ensuring a single source of truth. Historical data can be leveraged to analyze large datasets over time and across programs, providing insights and alerts on cost variances. This data can also be used to create risk libraries that aid in predicting and preventing issues, finding ways to boost productivity, reducing strains on resources, or identifying opportunities to reduce overspending, such as switching suppliers. AI algorithms can automatically process past data to enhance project forecasts, making them more accurate. Using predictive analytics, owners can forecast future costs and their business implications by leveraging statistical modeling and regression analysis. Deep learning techniques, including neural networks, can strengthen quality control and help agencies understand the likelihood of delivery problems, enabling proactive contingency planning and mitigation strategies.



A typical checklist for SCM users should look like this:

01



Prepare for change and invest in planning. Enhance labor planning, but simultaneously engage with technologies such as AI to control and predict freight travel times and material costs.

02



Closely track material and labor changes across projects so that early signals of disruption can be identified and responded to with precision and agility.

03



Estimate risk, by tracking how much you are over budget or over time, and rapidly execute changes accordingly.

04



Stay organized and stay modern (i.e., no spreadsheets) to make the provisioning of services on your program easy.

05



Provide supply chain stakeholders with accurate information about freight movements. Communicate disruptions and their impact to your board/council/public early.



Final thoughts

As the construction industry continues to evolve, the need to embrace cutting-edge technologies has become imperative for owners and project managers in public agencies. The advent of AI, predictive analytics, the IoT, drones, 5G networks, 3D modeling, additive manufacturing, and VR simulations has ushered in a new era of possibilities. These innovations not only promise enhanced efficiency, safety, and accountability but also present unique opportunities to revolutionize how we manage construction supply chains.

In this fast-paced environment, it's crucial for industry leaders to channel their focus toward science and technology within SCM. By doing so, they can avoid the pitfalls of overinvesting in labor, excessive inventory, and costly premium freight. Instead, they can steer their organizations toward a future marked by on-time and on-budget project execution, underpinned by data-driven decision-making and streamlined processes.

About Aurigo Software

Aurigo builds software that helps build the world. Aurigo is an AI-native company that helps capital owners connect planning, construction, and operations in a single environment, improving decision-making and execution. Trusted by over 300 organizations across infrastructure and facilities, Aurigo manages more than \$450 billion in capital programs, with over 40,000 projects throughout North America. Aurigo is a privately held U.S. corporation headquartered in Austin, Texas, with global offices in Canada, South Africa, and India.

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Schedule your demo today to learn how Aurigo Masterworks can help your organization streamline information, accurately track, forecast, and prioritize projects, and help you save time and money.

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