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Synchronizing Supply & Demand in 2023 and Beyond

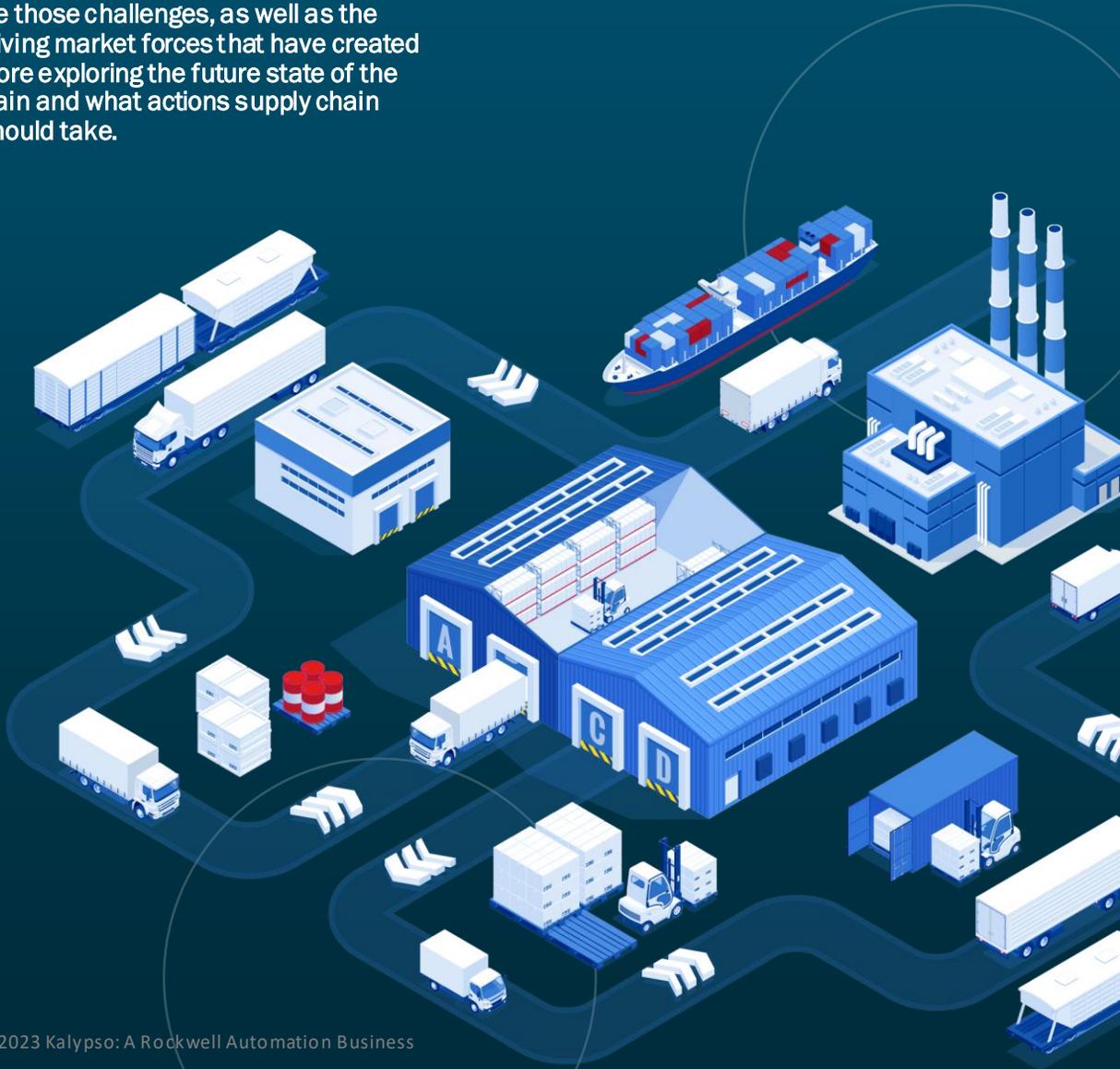
March 2023

Executive Summary

Synchronizing Supply & Demand in 2023 and Beyond

Subject matter experts from Kalypso take a probing look at the evolution of the supply chain, where the acceleration of key issues and trends over the past few years has left few industries and businesses unaffected. Volatility and constraints in labor, materials, resources and capacity have been compounded with limited end-to-end visibility and an ever-growing regulatory environment to create increasingly complex challenges for supply chain leaders.

We profile those challenges, as well as the central driving market forces that have created them, before exploring the future state of the supply chain and what actions supply chain leaders should take.



Challenges for Modern Supply Chain Leaders

In 2023, supply chain leaders continue to confront intractable, persistent issues. These include:

Labor and Talent:

Shortage of labor and increased competition for supply chain talent arose as a top issue at the onset pandemic and has persisted over the past few years at all organizational levels. As a result, supply chain leaders are still struggling to field teams and fill roles while also grappling with rapid wage and compensation increases to attract and retain the workforce. Several factors have contributed to this gap, including early retirement from an aging workforce, the employees' decisions to change professions, time away to address mental or physical issues, or not returning to the workforce entirely. Furthermore, labor will continue to be at the forefront of supply chain discussions and risks for years to come due to overall shifts in employee expectations and shrinking opportunities for lower-cost offshore labor, challenging prior norms and strategies.

Volatility in Resources and Capacity:

It is difficult to find a link in the supply chain that has not been impacted over the past few years. There have been significant fluctuations in the availability and cost of raw materials, components, manufacturing, containers, shipping capacity and warehousing. The demand drop-off and extended spike during COVID-19 were coupled with shutdowns and new restrictions. Overall, the global supply chain experienced the bullwhip effect at a macro level. Stock-outs and longer lead times led to earlier and/or overbuying of inventory and capacity to buffer uncertainty. As the world began to normalize, many companies experienced gluts of inventory or unused capacity at the end of 2022. Although lead times, costs and capacity are trending towards pre-pandemic levels, new issues and emerging risks threaten the interconnected ecosystem.

Labor & Talent



Volatility



Limited Visibility and Connectivity:

Visibility is one of the foundational issues supply chain leaders experience. Monitoring and gaining insight across suppliers, factories, transportation modes and distribution/ fulfillment is exceptionally challenging. Most supply chain leaders leverage a network of suppliers, service providers, internal functions and/or entities. This network has only increased in complexity with prior decades of outsourcing and offshoring. However, the connectivity and maturity of transacting, monitoring, and responding across this holistic network are insufficient. As a result, there is a lag or deficit in the ability of operations and networks to predict, react, respond, and effectively make decisions as uncertainty and risk continue to grow.



Visibility & Connectivity

Rising Regulatory and Compliance Environment:

Political leaders seek to implement more significant regulatory boundaries for private sector companies across many world regions. Furthermore, trade compliance continues to evolve as global and geopolitics drive new refined policies or restrictions. Outside the formal regulatory environment, consumer expectations are also setting higher expectations for environmental, social and governance standards. These factors contribute to a rapid growth in the number and complexity of programs supply chain leaders must implement to remain compliant while also responding to an increasingly aware consumer.



Regulatory & Compliance

However, these issues are lingering symptoms of a larger problem. Supply chains have increased in complexity, but haven't evolve at the same speed to address present and future market needs and dynamics.

The Bigger Picture

The supply chain challenges associated with volatility, uncertainty, complexity and ambiguity are not new concepts. These topics have been the focus of research and industry-expert analysis for years.

Nevertheless, the main goal of supply chain leaders remains: to synchronize supply and demand in an increasingly complex and technology-driven world.

At the core of this challenge has been the pervasive focus of supply chains to optimize cost, service levels and quality. However, the focus on efficiency has not accounted for the levers needed to address agility, resiliency, responsibility and security.

In fact, many organizations structure their supply chains with the goals targeted to optimize cost, service levels and quality to meet financial performance expectations regarding profitability and capital management, especially in publicly-traded companies.

As a result, legacy supply chains rely on large lots, long lead times, cheap, single sources of supply and just-in-time deliveries built on unreliable plans and forecasts. Therefore, they are forced to deal with the intractable, persistent issues described above. The COVID-19 pandemic further brought this problem to light.



Today's Driving Forces

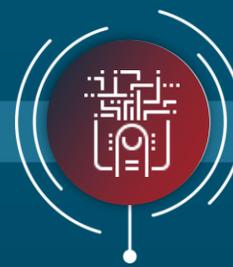
The time has come for the redesign of supply chains for the practical realities of the operating environment now and in the future. The major challenges highlighted above will evolve as three forces continue to shape the landscape:



External Factors



Changing Business Landscape



Technology & Automation

External Factors

“...companies can now expect supply chain disruptions lasting a month or longer to occur every 3.7 years”

The impact of external factors on the global supply chain cannot be overstated, notably as recent trends have radically shifted market conditions. For example, climate change has altered weather patterns and green zones, directly affecting key supply chain factors such as transportation, energy generation and raw material sourcing, as well as creating an indirect impact on company operations through increased environmental regulatory policies.

In addition to causing disruptions and financial loss, the recent pandemic has also introduced extreme uncertainty as company strategists attempt to develop new strategies to deal with the unprecedented post-pandemic economy.

Adding to these uncertain times, political polarization, rising nationalism and evolving trade tariffs and sanctions have made international operations increasingly challenging to manage. In this market, where vital supply chain variables are constantly changing, companies need to achieve the agility to adapt to new circumstances and the resiliency to weather less-than-ideal market conditions.

Changing Business Landscape

Macro shifts to the global business landscape are well underway. These can be separated into three primary categories: changing consumer preferences, evolving sales channels and a changing labor market.

Today's consumer is well informed and expects products to be available when they want them, where they want them and how they want them. As a result, the supply chain is now an integral part of the consumer experience. In terms of service levels and convenience, consumers expect speed, precision and flexibility. The new norm of two-day, next-day and same-day fulfillment must be augmented with the ability to track an order, deliver that order when expected, and with different options for where that order can be delivered or picked up. Consumers are also becoming increasingly accustomed to the ability to customize and personalize products, requiring flexible manufacturing processes to handle extreme variation. Furthermore, in this age of immediate gratification, customers are expecting a high frequency of new products to be available quickly, requiring companies to accelerate their product development cycles and product line switching to meet demands.

Meanwhile, e-commerce has been growing in significance for years. Over the past decade, there has been a blurring of channels and the introduction of new business models. The now ubiquitous concepts such as the "end-less aisle," "buy online, pick up in store," "buy online, ship from store," and "buy online, return in store" are examples of the expansion of omnichannel and convergence of physical and digital channels.

Lastly, new business models such as subscription-based offerings and online marketplaces have become more prominent, requiring companies to develop different strategies and operations.

While the expectations and experiences of the consumer are shifting, so are those of the workforce. With generational shifts in the employee base and the aftermath of COVID-19, employees' expectations for flexibility, conditions and a culture where they feel valued and see opportunity have increased. There is an increased need for companies to consider their "Employee Value Proposition" to be competitive in the war for talent.

There are significant shifts in the global labor market, closing the considerable gaps in labor standards and wages between different regions of the world. In the past, emerging globalization enabled many companies to cut costs by outsourcing operations to countries where wages and other operational costs were significantly less. However, the modernization of traditionally low-cost labor markets and international labor policies continue to equalize labor rights across borders. As a result, the standard of living will continue to improve while opportunities in labor arbitrage will continue to shrink.

Countries that have been the main sources of labor in the past are also starting to feel the effects of long-term population decline as their workforce ages out and becomes part of their dependent populations.

Technology & Automation

Of course, in this digital age, ignoring the impacts of technology and automation on supply chains is impossible. As new technologies evolve at an accelerating rate, companies must regularly incorporate them into their operations to optimize, automate and streamline their supply chains – or else risk being left behind by the competition.

Cloud computing has allowed companies to access powerful software and applications on a pay-as-you-go basis, increasing the availability and versatility of the tools used to design, develop, manufacture, and sell products. At the same time, distributed ledger and Blockchain have enabled the secure storage and sharing of data across networks, improving a company's ability to share data and collaborate with partners.

The Internet of Things (IoT) connects every process throughout a product's lifecycle, improving the quality, quantity and accessibility of data. This, in turn, enables AI and machine learning to use the improved data infrastructure to automate scheduling, analyze trends, improve processes, forecast and provide real-time insights. This allows organizations to make inferences and predict potential outcomes, enabling automated decision-making and operational efficiencies.

These and other examples of the integration of Information Technology and Operational Technology (IT/OT) are helping companies reach unprecedented levels of efficiency.

Powerful visualization and immersion tools have also become key technologies contributing to a company's success. Digital twins provide virtual representations of physical assets for the purpose of monitoring and performance management, while augmented, virtual and mixed reality (XR) serve to improve training, run simulations and increase interconnectivity and remote operations.



To realize new opportunities, leaders need to expand their traditional views of supply chains, moving beyond a focus on just cost optimization, service levels and quality by understanding these key drivers and how they should be incorporated into a cohesive strategy.

The Future State of Supply Chain

So far, we've discussed the challenges inherent in modern supply chain operations, as well as the business drivers that have generated them, and the need to look beyond efficiencies.

After assessing the impacts of critical drivers on both current demand and supply, it's important for organizations to understand three approaches that will define the future state of supply chain in the coming years:

- Customer & Consumer Driven
- Responsible & Purpose Led
- Digitally-Enabled Operations

Customer & Consumer Driven

Consumers of products and services are demanding more than ever before. They are looking for the right features and functionality for the right price at the right time with the right level of sustainability and social responsibility. Failure to alter existing strategies to meet these new consumer expectations can have a significant impact on a business' success. One study on the retail and apparel industry revealed that 92% of customers abandon a brand after just 1 negative experience. Another study showed that 86% of buyers will pay more for a better customer experience. In response to these and other changes in consumer expectations, supply chains require new and improved capabilities to manage end-to-end value chains from product innovation to product support.

Supply & Demand Scenario Modeling

Planning and forecasting must mature from focusing on accuracy to evaluating different scenarios and risks. Companies must incorporate scenario modeling to analyze the impact on overall business success to develop contingency plans and risk mitigation strategies. Once appropriate models are in place, they can improve working capital, reduce lead times, and increase customer satisfaction by increasing responsiveness and agility when actual issues arise.

eCommerce Fulfillment Strategies

Morgan Stanley predicts that e-commerce will represent 27% of global sales by 2026

As e-commerce is already a mainstay sales channel marked by rapid expansion over the past ten years, companies are still evaluating approaches to optimizing the customer experience along the supply chain. This is especially true in omnichannel businesses where "retro-fitting" and evolving current supply chain capabilities can be highly complex. Therefore, organizations must evaluate domains along the supply chain, including product creation sourcing, manufacturing, order management, planning distribution and logistics, to support growth and continued evolution in consumer expectations optimally. This will improve the company's ability to reduce operational costs, take advantage of economies of scale and strengthen buyer/market demand agility.

Responsible & Purpose Led

Today, companies face increasing pressure from multiple sources to accelerate their sustainability efforts. Consumers are beginning to demand more transparency from their brands, showing a willingness to spend more on sustainable products and publicly criticize companies who fail to meet sustainability expectations. The pressures extend beyond the consumer and into a company's investors and employees, impacting its ability to attract and retain talent and investor support. These pressures are compounded by a dramatic increase in environmental standards and regulations, which are being made increasingly enforceable through the improvement of communication and monitoring technologies.

The days of unchecked business operations are coming to an end, as companies strive to meet their sustainability goals, reach environmental regulatory compliance and satisfy the evolving expectations of their customers, investors and employees. To adapt to these changing times, companies will need to evaluate their business to improve the visibility, collection and quality of environmental, social and governance (ESG) data across their supply chain and identify capabilities to improve.



Sustainability Strategy

Companies will develop an enterprise-wide sustainability strategy that works with the existing corporate strategy. By doing so, they will be able to accurately report sustainability metrics, capture sustainability-related price premiums at the consumer level, better identify their existing capabilities and opportunities for improvement, and work towards satisfying expectations at the consumer, investor and employee levels.

Energy Management

Companies will leverage advanced machine learning control for process optimization, to achieve higher and more consistent levels of energy quality and usage through predictive methods. In the past, we have seen clients use these methods to realize 15% energy savings, increase manufacturing technology lifespans, decrease maintenance costs and eliminate equipment cycling issues.

Waste Reduction

Companies will enable digital technology to create, make, and sell better and more sustainable products. By incorporating these technologies, they will be able to reduce the number of prototypes during the design phase, decrease total material output and increase water conservation.

Digitally-Enabled Operations

A theme permeating our research and Kalypso's position is the crucial role digitalization plays in developing agile and resilient solutions for an increasingly uncertain market – with the goal being a digitally connected end-to-end supply chain. The digitalization of data unlocks the ability to leverage advanced analytics and turn insights into meaningful actions, and transition siloed diagnostic analyses into predictive solutions across an integrated network. With effective technology architectures and integrated data, companies will be able to automate countless processes, and make faster, better decisions across a supply chain ecosystem.

Smart Connected Operations

Improvements and standardization of sensor technology and reduction in technology cost will continue to drive increased investment and adoption of smart connected operations (SCO) to improve real-time visibility, connectivity and risk management. Scenarios range from asset tracking and predictive maintenance to telemetry and tolerance monitoring for quality or process improvement. In the past, we have seen the results of this increased connectivity unlock an overall faster time to market, 40% faster line commissioning, and a 10-25% increase in productivity.

Supply Chain Control Tower and Supply Chain Intelligence

As IT/ OT data converges, the operational insights will be leveraged to inform or even automate decision-making, effectively increasing labor and resource efficiencies leading to reduced cost and increased utilization and throughput. Furthermore, internal and external data will be leveraged to provide predictive and prescriptive insights across the supply chain networks to proactively respond to fluctuations, disruptions, and issues. The intelligence and ability to act will ultimately enable supply chains to minimize impact or risk exposure while also increasing responsiveness to demand singles and serve customers.

Digital Supply Chain

Companies will apply IoT, advanced robotics, and data science to supply chain management to enable lights-out automation and predictive analysis to improve quality, increase performance, and reduce operating costs. For example, by incorporating these solutions, we have seen clients realize benefits such as a 15% - 25% reduction in transportation costs and a 35-70% reduction in their inventories. Furthermore, adopting digital technologies can help reduce the outlined labor risks while also increasing employee satisfaction by focusing labor and skills on higher-value add activities.

Advanced Simulation and Emulation

Major advancements in the ability to simulate, visualize and apply machine learning will enable organizations to create virtual environments, rapidly iterate through scenarios, process improvements, and even predict and prescribe unforeseen outcomes. Through modeling and optimization scenarios, we have seen companies achieve benefits such as a 40% reduction in automation commissioning time and a 10% improvement in overall equipment effectiveness (OEE).

Tying it All Together

Drivers and market forces are already creating an environment where companies will need to adjust their business strategy and operations to survive and thrive. The call to action for supply chain leaders is to emerge from the crises and disruptions of the past few years by proactively driving a transformation strategy that elevates the supply chain from an operational necessity to a differentiator and enabler for the overall success and forward trajectory of an enterprise.

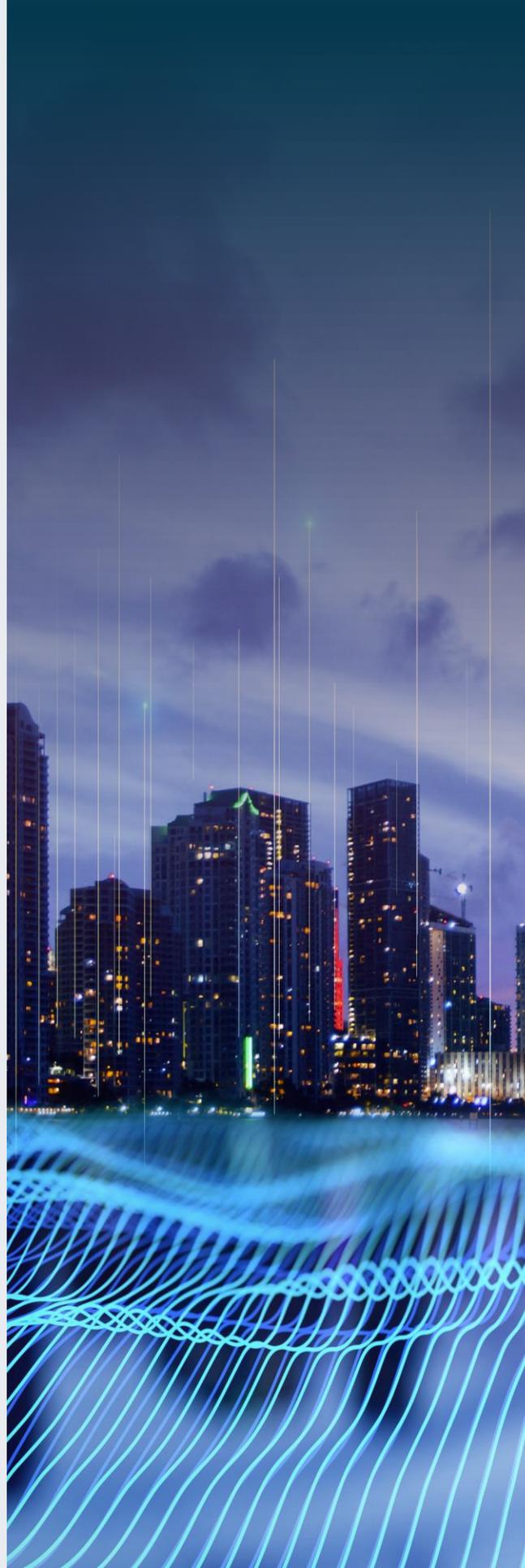
With over a decade of experience enabling digital transformation for our clients, Kalypso has the following recommendations for supply chain leaders to evaluate against their current supply chain transformation or strategy:

1. Expand the supply chain focus beyond traditional efficiencies such as cost, service and quality to address the critical levers of resiliency, agility, responsibility and security.

- Evaluate the macro external, business, and technology drivers and the emerging implications and trends for supply chains to understand the short- and long-term implications for your industry and business.
- Identify your most significant constraints, key risks, and headwinds.
- Define initiatives and capabilities critical to optimizing your supply chain now AND address the ongoing uncertainty and complexity in the future.

2. Align your supply chain agenda with the strategic direction of the organization.

- Evaluate and align supply chain strategies and priorities to your business's growth and commercial drivers.
- Drive clarity across functions and business units to ensure understanding and investment needs of supply capabilities that enable operations but support the overall value stream.



3. Drive transformative change by leading with outcomes, not "the how."

- Invest time upfront to ensure the opportunity or problem is well defined.
- Communicate your vision and impact over time to then drive alignment on the sequencing and priorities.

4. Establish a robust performance management strategy from the executive level down.

- Define KPIs and processes that provide visibility and drive accountability at a regular cadence, starting with the executive team.
- Ensure your supply chain performance management framework provides a balanced view to measure and monitor the impact on the overall business and the seven key levers we have highlighted - service, cost, quality, growth, resiliency, agility, and security.
- Align functional metrics and initiative outcomes to your performance management framework.

5. Think big, but start small.

- Identify the minimum viable scope and capabilities to reduce time to value and validate the approach before defining an approach to scale.
- Shift from a foundation-first mindset to a just-in-time foundation to unlock value earlier and incrementally.

6. Embed a digital mindset into your culture.

- Proactively align your investment, development, and evolution of your workforce to the roles and skills needed to support an increasingly digital future.
- Consider how your employee value proposition, organization norms, and incentives enforce your transformation vision and adoption of digital capabilities.



It's important to remember that organizations are at different stages in the transformation journey. If you are earlier on in your process, struggling to define your holistic approach, or lacking the sponsorship and momentum to drive your supply chain initiatives, we recommend you start with an assessment and strategy phase to align on a path to action the recommendations above.

If you are further along and feel confident in your strategy, approach, and sponsorship we encourage you to assess how to accelerate the impact and value through a more iterative and outcome-based approach.

About Kalypso

At Kalypso, we help clients fundamentally change the way they discover, create, make and sell products by powering innovation and autonomous operations with a digital value chain.

From product ideation to production to the end customer, Kalypso provides professional services in strategy and change management, data science and artificial intelligence, enterprise technology, and managed services. Kalypsonians bring deep expertise in discrete, hybrid and process industries and serve clients around the world.

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