SPOTLIGHT
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If post-pandemic supply chains are to be resilient, they must be sustainable. Sustainability must become part of the supply chain's DNA.

Embedding Sustainability into Integrated Supply Chain Planning

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Introduction

Many companies — perhaps even most — run their sustainability efforts as a centralized program overseen by the chief sustainability officer. While that approach to the problem is a start, it will quickly not be enough in today's resource-sensitive world. If sustainability efforts are to truly make a difference for manufacturers and brand owners, they will need to become part of the way that the supply chain runs. It's not enough to track and extol green virtues. Sustainability must become part of the supply chain's DNA. Companies seeking to elevate their operations to be more sustainable may find moving from a "white tower" management model to embedding sustainability within operations will accelerate advancements in both sustainability and operational outcomes. As planning is at the heart of operations, we explore what this might mean within integrated planning.

AT A GLANCE

KEY STATS

Supply chains across all industries are focused on sustainable practices; 26% said that machine learning and artificial intelligence technologies have improved their sustainability outcomes, mostly through better use of data to drive sustainable decisions.

WHAT'S IMPORTANT

IDC believes supply chain planning is a connector for the entire enterprise; thus, embedding sustainability within planning may play a critical role in the maturity scale for sustainable operations.

If today's supply chains are to be resilient, they must also be sustainable. It's not just about an organization's carbon footprint. True sustainability must encompass all scarce resources as well as issues of waste, emissions, and inequality extended through the life cycle of products. IDC recently interviewed a manufacturing executive whose company runs a large factory in the western United States. The factory consumes a lot of water in a region that is in a 20-year drought and facing the prospect of unprecedented water restrictions. He noted, "We must find a way to reduce net water consumption at this site; otherwise, we may be forced to close. If that isn't sustainability, I don't know what is!"

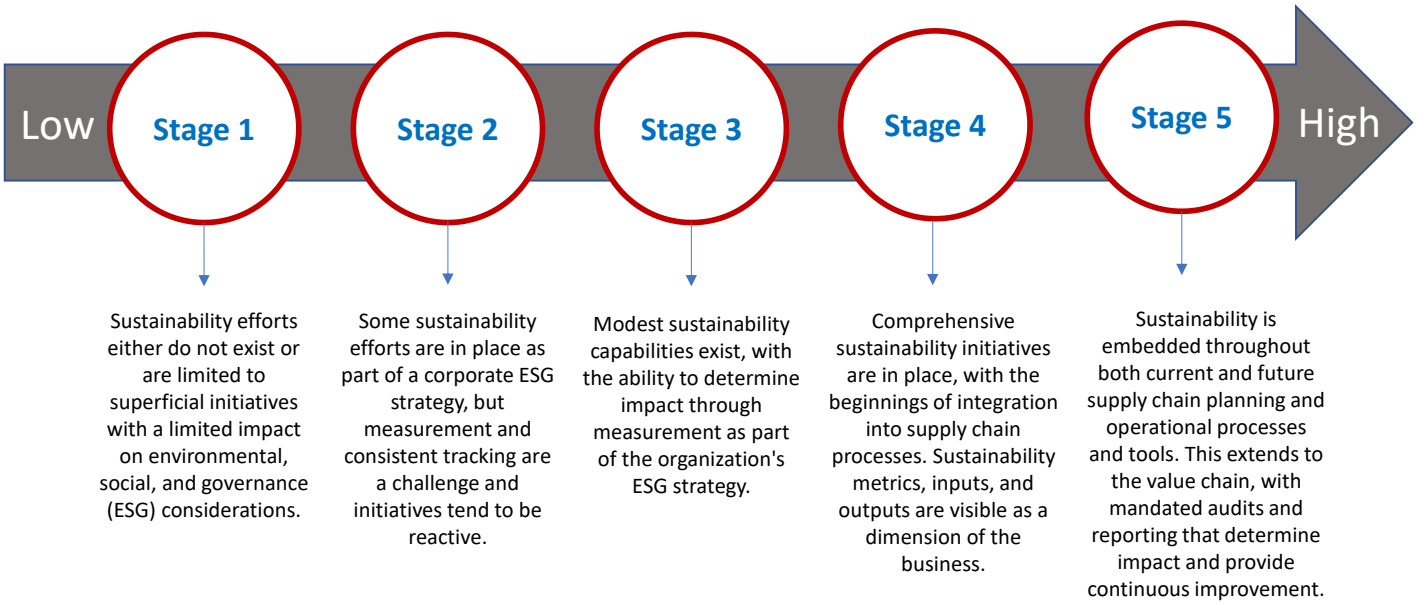
At IDC, we have always viewed sustainability as about more than just the environment; it's also about assurance and allocation of scarce supply and associated resources. Certainly, sustainability means being a responsible custodian of the environment, but it also means that if supply chains are entering a protracted period of resource constraints as current evidence certainly suggests, then sustainable supply will be a critical element of successful companies that are able to better manage finite resources.

IDC also sees linkages between sustainability, workers, and skills. Ten years ago, most consumers didn't care much about the sustainability practices of the companies whose products they bought and used. Even if they did, there was often no easy or effective way of finding out which were operating sustainably — and which were not. As consumers skew younger and more environmentally savvy, sustainability becomes a much more important factor in their product selection criteria. They can research the companies and the products and make informed choices. The importance of sustainability now also extends to hiring. We have had several supply chain services firms tell us that they must have a coherent and favorable sustainability story to attract top young talent. Consumers who care about the sustainability of the products they buy also care about the sustainability of the companies they work for.

This raises an interesting conundrum. The growth of ecommerce and the ensuing consumer expectations for next-day delivery often runs counter to sustainable fulfillment and carbon footprint. We think that there may well be a rebalancing or rationalization coming about the way that people consume (i.e., Do I really need the product the next day?). Companies such as Amazon already offer a consolidation option where consumers can get all their weekly orders on a single day, allowing for shipping efficiencies.

Maturity and sustainability are important to a modern, resilient supply chain. There are five stages to the supply chain resiliency journey, and the large majority of firms report being in stage 2 or stage 3, presenting significant room for improvement, as noted in Figure 1.

FIGURE 1: ***Sustainability Stages of Maturity***



Source: IDC, 2022

It has long been IDC's view that sustainability must be an integral part of how companies run their supply chains. Investing in sustainability and the circular economy is an important aspect of this emerging supply chain model. Sustainability will be a critical component of a resilient supply chain over the next decade.

Trends

IDC research indicates a correlation between supply chain maturity and a focus on sustainable operations. Additionally, companies that self-report as being more advanced in digital transformation are also showing a higher focus on sustainable operations.

Among organizations identifying themselves as having supply chain capabilities "ahead of peers" and "best in class," more than one in five reported an on-premises focus on sustainable operations in the next year. Nearly one in three companies describing themselves as being "best in class" indicated they will be focused on sustainable operations on premises within the next three years. Meanwhile, companies that are on par with or lagging industry supply chain capabilities indicated a lower priority for sustainable operations.

Organizations reporting their digital transformation as being optimized or repeatable also showed a similar focus on sustainable operations on premises (29% and 25%, respectively, versus an average of only 15% in companies with less advancement in this area).

It appears the more advanced a company's supply chain and digital supply chain capabilities, the more focused the company is on sustainable operations. Which one follows the other could be debated, but the correlation is evident. What is less debatable are the intended outcomes of a focus on sustainable operations. According to IDC's *Supply Chain Survey*, the three top reasons to focus on sustainable operations are:

1. **A reduction in waste and gain in efficiency.** In an environment of rising costs, constraints, and disruptions, the opportunity may exist to leverage sustainable practices to improve efficiency and resiliency simultaneously.
2. **A focus on understanding and managing resource consumption.** The ability to manage consumption may offer significant opportunities beyond the standard aims of efficiency.
3. **A desire to meet energy efficiency requirements and regulations.** Manufacturers in some industries must focus to hit regulatory requirements.

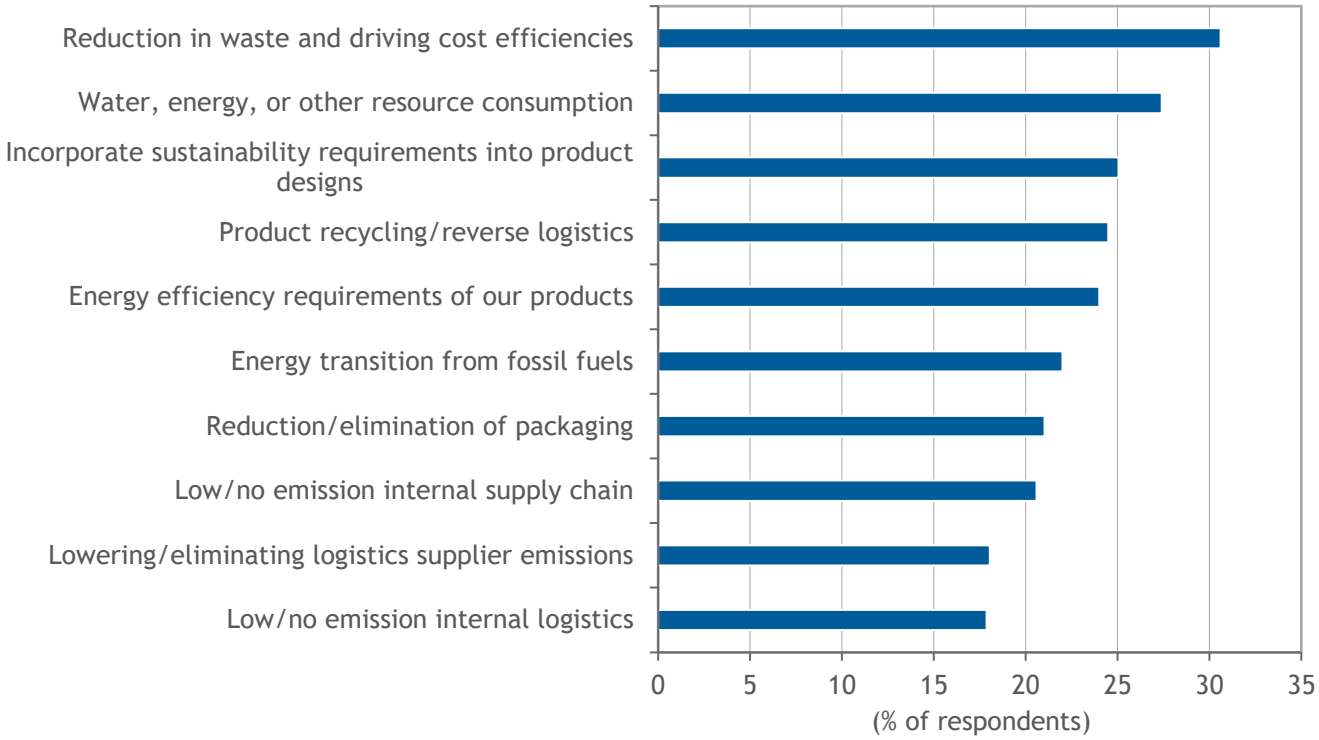
The survey also found more than a third of companies advanced in their digital supply chain transformations said that machine learning (ML) and artificial intelligence (AI) have improved their sustainable practices. It appears there is a correlation between advancement in capabilities and improvement in sustainable practices. It may be companies are leveraging advancements in capabilities to support improvements in sustainable practices, either by better understanding particular trade-offs in real time or by integrating sustainable resiliency into their supply chain planning efforts.

Whether a focus on sustainable operations is driving advancements in supply chain and digital capabilities or whether the advancements are affording heightened focus, the correlation is becoming evident. Companies that are ahead of standard in supply chain and that have advanced their digital transformation are showing increased focus and improvements in sustainable operations. Supply chains across all industries are focused on sustainable practices, rating it consistently as a top 3 priority:

- More than one in five cited sustainable operations as their top physical challenge/focus.
- One-third said they use advanced analytics/AI to help drive better sustainability outcomes.
- 26% said that machine learning and artificial intelligence technologies have improved their sustainability outcomes, mostly through better use of data to drive sustainable decisions.

Figure 2 highlights areas of focus to bring sustainability further into enterprise operations and improve supply chain resiliency.

FIGURE 2: ***Sustainability Priorities***



n = 1,109

Source: IDC's Supply Chain Survey, April 2022

Connecting Sustainability to Holistic Supply Chain Planning

One of the dreams of integrated planning is to create a responsive and resilient supply chain, capable of incorporating all manner of feedback seamlessly into every part of the enterprise. Now that many C-suites are focused on the strategic and critical nature of supply chains, it's a great time for executives to incorporate sustainable planning practices into enterprise planning. Resiliency is the ability to maintain operations through challenging circumstances and to pivot organizations to navigate these circumstances while maintaining profitability. Given the ongoing disruptions sparked by the pandemic, the economy, and the Russia-Ukraine war, businesses would do well to incorporate the impact of resources on the future outlook of resiliency.

IDC finds that many organizations are intent on being able to adapt if lead times, costs, consumer demand, trade regulations, supply constraints, or other variables change. Companies with robust, integrated planning can take shifts in these critical variables and adjust all enterprise plans in a synchronized way that can drive competitive advantage. Those with advanced capabilities will seek to model scenarios for managerial decision making, consider the pros and cons, and then move forward with a holistic approach. This approach requires leadership in the planning as well as sound processes and tools.

While efforts to improve integrated planning are ongoing, companies look to reduce risks and ensure business continuity. Executives have faced a steady stream of supply chain disruptions, and they are looking to position their operations to navigate future disruptions profitably.

As we have seen, it is becoming ever more important to incorporate sustainable resources as a hedge against future supply chain risk. Consider:

- The United Nations (via the Paris Agreement) has called for carbon emissions to be reduced by 45% by 2030 and reach net zero by 2050.
- In some areas of the world (including developed areas such as the western United States), water has become a limiting factor in manufacturing.
- The future of other needed natural resources and man-made components such as metal and plastics must be factored into supply chain planning.
- Energy costs in the manufacturing, transportation, and storage chain must be taken into account.

Whether materials become constrained or simply become far more expensive, or regulations become more pressing, planning now for future impacts seems wise.

Supply chain planning was already a top priority in advancing supply chain capabilities prior to recent disruptions and constraints. The current situation has only heightened investment in planning improvements. As planning has become central to supply chain maturity, it is important that organizations incorporate sustainable resources and business practices into planning. Notably:

- Supply chain planning must operationalize sustainability efforts and make them part of optimization algorithms, moving them from often superficial ESG efforts to "the way that we run the supply chain."
- End-to-end connectivity to procurement, manufacturing, and fulfillment (synchronized planning) is needed, extending "traditional" planning breadth to better connect previously disparate activities including building sustainability more broadly and with greater impact.
- If organizations don't plan for sustainability, they won't improve sustainability.

Benefits

Incorporating resource considerations into an integrated planning framework will leverage the existing intent of holistic, synchronized planning and give executives the ability to make more deeply informed future-proof decisions.

By making resource consumption a visible part of an enterprise plan, companies would gain insights into total cost of ownership (TCO) thinking on their supply chain. Imagine scenario modeling the impact a shift in multinode inventory strategy might yield on a carbon footprint or what a move from single sourcing to dual sourcing might mean in terms of energy requirements and costs. By incorporating resources as a component of integrated planning (e.g., lead times, transportation costs, inventory, lost sales), organizations can become better educated and gain insights into the resource demands of their plans.

There are already many examples of this across multiple industries. In the dairy industry, for example, better demand sensing and planning approaches led to a reduction in waste because milk production (and the allocation of production to higher demand end products [i.e., yogurt versus ice cream]) was optimized versus historically biased demand planning. In industrial manufacturing, better alignment of demand and supply planning means improving production line efficiency and reducing both energy and water consumption.

Considering constraints (both regulatory and natural) may become a "be in front of the wave" scenario. Enterprises that learn how to incorporate resource visibility and planning into their integrated planning networks will be ahead of sharp rises in costs and/or spikes in constraints. This directly impacts future business continuity and profitability. Many organizations are balancing resiliency and efficiency, but in a constrained environment, it just may be that resiliency *is* efficiency (it's not efficient to shut down a supply chain due to rocketing costs or resource constraints).

In summary, by incorporating resource considerations within integrated planning networks, enterprises have the opportunity to:

- Improve synchronized planning capabilities to optimize the enterprise
- Jump ahead of future disruptions and cost spikes due to regulations or natural resource constraints by building responsive planning capabilities in advance
- Leverage existing planning capabilities and processes rather than build them from the ground up
- See sustainability practices and decision frameworks quickly incorporated within enterprise decision making
- Ensure alignment with consumers and the workforce

Considering SAP

SAP Integrated Business Planning for Supply Chain connects strategic and operational planning with real-time visibility and execution to help enable a more sustainable and profitable operation. Features include:

- **Demand-driven predictive and prescriptive modeling.** Customer experience and demand sensing are incorporated in predictive modeling for higher service levels, overall responsiveness, and forecast accuracy.
- **Synchronized planning, from strategy through execution.** Planning processes are synchronized with process control on strategic, tactical, and operational levels across the organization and trading partners, with advanced analytics and simulation.
- **Advanced planning and machine learning.** State-of-the-art planning methods enable demand-driven, profit-optimized, and sustainable chains for faster decision making and more touchless operation with increased automation.
- **Real-time visibility into the extended supply chain.** Modern supply chain planning software provides visibility into the extended supply chain, including source, make, deliver, and operate, and it enables timely understanding of impacts and can execute adjustments in real time.

Challenges

When incorporating sustainable operations within planning, enterprises may face the following roadblocks:

- Some enterprises are still skeptical that improving sustainability in the supply chain is aligned with efficiency goals, most notably margin considerations. As the old saying goes, "What gets measured, gets managed." Until supply chains incorporate resource and carbon footprint information in their core functions, sustainability will continue to be guided by "gut feel" management. SAP must demonstrate that it understands this and offer tools that can easily integrate sustainability data.
- Sustainability actions remain aspirational for many companies, so SAP must clearly demonstrate that any early investment in this area might focus on clear opportunities for efficiency or resiliency in industry and business models.
- Often a "let them figure it out" mentality persists, and organizations believe that it might be easiest to wait and adopt solutions that others build. Although that approach can be effective, SAP needs to clearly articulate the dual risks of lagging competitors and any future resource, energy, or regulatory constraints.

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Conclusion

Supply chains with modern, holistic planning capabilities tell IDC that integrating sustainability is a top priority for their operations. IDC believes supply chain planning is a connector for the entire enterprise; thus, embedding sustainability within planning may play a critical role in the maturity scale for sustainable operations.

Indeed, supply chain planning must operationalize sustainability efforts and make them part of optimization algorithms, moving them from often superficial ESG efforts to "the way that we run the supply chain." This means embedding sustainability into current operations as well as factoring it into future plans.

The ability to anticipate future disruptions and cost spikes due to regulations or natural resource constraints by building responsive, sustainable planning capabilities in advance allows companies to reduce both the duration of these events and the degree to which resources are wasted and or poorly deployed. Incorporating sustainability practices into decision frameworks within enterprise decision making means a better chance of optimizing said resources and minimizing the consequential consumptions and emissions.

Whether customers are demanding it, or the organization's ability to hire new employees depends on it, planning for sustainability will quickly become table stakes for most manufacturers and retailers. Companies that are able to embed sustainability into integrated supply chain planning will have a competitive and reputational advantage over those that cannot.

About the Analysts

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As program vice president, Simon Ellis leads the U.S. Manufacturing Insights and Global Supply Chain Strategies practices at IDC Manufacturing Insights, specializing in advising clients on manufacturing strategies, supply chain digital transformation, sustainability, cloud migration, network, and ecosystem design. Mr. Ellis works with manufacturers, supply chain companies, and technology providers to develop best practices and strategies leveraging IDC quantitative and qualitative data sets.

Eric Thompson, *Research Director, Global Supply Chain Planning*

As a research director, Eric Thompson is a member of the IDC Worldwide Supply Chain Strategies Program, responsible for providing research, analysis, and guidance on key business and IT issues pertaining to manufacturing, retail, and healthcare supply chains. He currently leads the Worldwide Supply Chain Strategies: Planning and Multi-Enterprise Networks practice, providing fact-based research, analysis, and insight on best practices and the use of information technology.

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Working together with our customers, we are reinventing how supply chains run. Reconceiving how we plan and use resources. And adopting new holistic business models for greater resiliency, profitability, and sustainability – end-to-end, from design to operate.

Wherever you are in your own digital journey, SAP can help guide your way. We can help you think beyond tomorrow while addressing the challenges of the here and now. Whether it be through simple process improvement or a more complex change – you gain the agility you need to address challenges head on.

At SAP, we commit to taking this journey with you. By learning from each other and innovating together. By finding success in each other's achievements. By embracing diversity. And by achieving the outcomes needed to help the world run better and improve people's lives.

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